Self-reported psychological problems and coping strategies: a web-based study in Peruvian population during the COVID-19 pandemic.

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Abstract

BACKGROUND: The Coronavirus pandemic has disrupted health systems across the world and led to major shifts in individual behavior by forcing people into isolation in home settings. Its rapid spread has overwhelmed populations in all corners of Latin-American countries resulting in individual psychological reactions that may aggravate the health crisis.

OBJECTIVE: This study reports on demographics, self-reported psychological disturbance and associated coping styles during the COVID-19 pandemic for the Peruvian population.

METHODS: This cross-sectional study uses an online survey with snowball sampling that was conducted after the state of emergency was declared in Perú (on April 2nd). The General Health Questionnaire (GHQ-28) was used to identify somatic symptoms, incidence of anxiety/ insomnia, social dysfunction and depression and the Coping Strategy Questionnaire (COPE-28) mapped personal strategies to address recent stress.

RESULTS: 434 self-selected participants ranging in age from 18 to 68 years old (ME =33.87) completed the survey. The majority of participants were women (61.3%), aged between 18 and 28 (41.7%), well-educated (>=85.0 %), Peruvian (94.2%), employed (57.4%) and single (71.20 %). 40.8% reported psychological problems, expressing fear of coronavirus infection (71.43%). Regression analysis shows that women developed more somatic symptoms (p<0.001*, C.I: -2.75 to -.99) and greater anxiety/insomnia (p=0.00*, C.I: -2.98 to 0.84) than men. Depression and social dysfunction were equally likely at any age. Educational status was protective against developing psychological disorders (p<0.05). While active responses (acceptance and social support) are scarcely used by individuals with psychological problems; passive strategies (such as denial, self-distraction, self-blame, disconnection, and emotional discharge) are more commonly reported.

CONCLUSION: This study provides a better understanding of psychological disorders occurring during the COVID-19 pandemic in the Peruvian population. About half of the respondents reported psychological disturbance and poor coping responses. This evidence informs the need for broader promotional health policies focused on strengthening individual's active strategies to improve mental health, especially in underprivileged groups during and after the COVID-19 pandemic.

1. Background

To date (June 10th, 2020), more than 400,000 deaths worldwide have been attributed to the coronavirus (1). Despite the deployment of several public health strategies to prevent continued transmission of the virus at the global level (1−3), the subjective perception of risk within the population represents a latent threat that may potentially trigger a wide variety of individual behavioral and emotional responses. Therefore, during this pandemic complex morbidities are highly likely to occur (4−6) and recent research has found a significant association between the current COVID-19 pandemic and the emergence of mental disorders (7−9).

Early reports from multiple studies during the epidemic phase in China confirm moderate to severe psychological impact, described as severe states of distress and deteriorated general health self-assessments in numerous samples in China (10−13). In a cross-sectional nation-wide study, with nearly 52 730 participants, psychological distress was identified among the one-third of the sample (35%) (11). Another study performed in Australia including 5070 participants drawn randomly from the general population, 78% of respondents had worsened their mental conditions since the beginning of the quarantine; this study found that vulnerable groups comprising those unemployed, student, retired and stay-at-home parents were highly susceptible to develop depression (14). Other studies have reported the emergence of emotionally disturbance patterns (15), anxiety disorders, depression, sleep problems, (8−10), and increased risk behaviors, such as substance use and smoking (14,16). As financial instability resulting from job loss and massive social isolation became more prevalent, these clinical conditions worsen their status (16).

Considering that coping mechanisms are multifaceted in the face of stress (17), a strong link has been demonstrated between physical health, psychological well-being, and the use of active coping styles (18).

Prior studies that have documented pandemics and its impact on the psychological health (19,20) also reflect on the role of coping strategies to face life-threatening circumstances. For instance, Li et al. analyzed the emotional and cognitive responses published in the Chinese social network Weibo, whose results revealed an intensification of negative emotions (anxiety, depression and indignation) and coping behaviors mostly related to increased leisure activity and religion-based responses (9). In this context, the starting point of our research is the conceptual analysis given by Lazarus, who explains the stress mechanism suggesting two types of responses (17). While some individuals may proactively explore options for assistance, others remain in the space of their own loneliness, worsening the burden of their illness. Both either passive or active behavior-related strategies would predict the evolution of disease symptoms. Thus, there is a critical demand to identify coping mechanisms to reduce the risk of coronavirus spreading within the population.

What is worth noting from previous reports is that, global pandemics tend to create confusion, sense of urgency, fear and perplexity, which may threaten emotional stability of entire families (21–23), lead alarmingly to some sort of "collective hysteria" (24) and to increased perceived health vulnerability during quarantine due to the unknown nature of the disease and its treatment (25). Together these reports demonstrate the possible emergence of mental problems in general population, along with unadjusted behaviors as suggested from previous pandemics (26).

This project provides valuable evidence on how the ongoing pandemic impacts psychological health in the general population. It is worth mentioning the limited studies capturing the perspective directly from the affected population and their mental health during global crises, data is particularly scarce in Latin American context. There is an increased susceptibility to develop disease (23,27,28) within the poorest and most vulnerable groups in society due to lack of coping response and poor awareness and control measures (10). This justifies the urgent need to better understand the mental health problems caused by unexpected events such as the COVID-19 pandemic in the Spanish-speaking community.

Particularly, Peru has been significantly affected by the COVID-19 pandemic, causing significant national alarm (29). Although exposure to the virus outbreak has already been shown to be related to adverse effects, the role of coping strategies that regulate emotional responses to stressing situations is discussed (17). Therefore, this study aims at investigating psychological health and how it is linked to the deployment of active or passive coping strategies in the general population exposed to the COVID-19 pandemic.

2. Methods

Participants and procedures

Data from 434 individuals of the general population living in Peru were used. Furthermore, to determine the estimated sampling size, G-power statistic were used with a confidence interval of 0.10 and error range of 15%. We selected a cross-sectional survey design to examine the population's psychological responses during the COVID-19 pandemic.

Procedure

Given the pandemic, public government restricted physical interaction, then anonymous online forms were disseminated to likely participants through Peruvian, health and wellbeing- related social networks ("salud y bienestar Peru", "Ministerio de salud Peru", "Comunidad de salud", Peru) using a snowball sampling strategy. Participants completed the survey on a voluntary basis via their smartphones or desktops during March-April. Completing the survey took about 40 minutes. To recruit individuals, researchers considered only people living in Peru, able to provide informed consent (≥18 years), no monetary compensation was given for completing the questionnaire. The study protocol was approved by the ethics committee of "Catolica de Santa Maria" University *(ref. no. 167-2020).* The instruments were considered valid when fully completed; participants under 18 years old and those whose responses were biased by acquiescence or social desirability were excluded, based on the questionnaire's protocol.

2.1 General Health Questionnaire- Goldberg (GHQ-28)

The survey comprised the *(GHQ-28)* Questionnaire, a population-based, self-administered tool for screening mental disorders. Participants were asked about symptoms and/or discomfort they had experienced recently (in recent weeks) during the coronavirus pandemic. Each item is scored based on a 4-point scale containing 4 subscales of depression, anxiety, social dysfunction, and physical symptoms, ranging from "better/healthier than normal" option, through a "same as usual" and a "worse/more than usual" to a "much worse/more than usual" option (30).

The instrument has already been validated in spanish-speaking countries with adaptations for Latin American countries (31), alongside being reported in multiple Spaniard studies (32,33). Reliability analysis by internal consistency was determined for this study by using the Mc Donald's Omega Coefficient (34) with acceptable values for the depression subscale (ω = 0.834; IC95% = 0.818-0.851); anxiety/insomnia subscale (ω = 0.908; IC95% = 0.895-0.921); social dysfunction subscale (ω = 0.796; IC95% = 0.766-0.825) and the physical symptoms subscale (ω = 0.890; IC95% = 0.874-0.906). The presence of psychological problems was identified with a cut-off point 23/24 (44).

2.2 Coping Estrategies Questionnaire (COPE-28)

The survey also included the *(COPE-28)* Brief version (28 items), which measures behaviors and cognitive responses to stressors related to COVID-19. We used the Spanish version (35), which has 14 subscales (asking about self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, relief, positive reframing, planning, humor, acceptance, religion, self-blame). The tool identified active and passive strategies asking 4-point values (1: "I haven't been doing this at all"; 4 "I've been doing this a lot") (36).

Greater values indicate higher strategies to deal with stress. The COPE -28 has been shown to have good validity and reliability in many Spaniard studies (13,35) and has been validated in Peru (37,38). In our sample, the questionnaire had good reliability, it was determined by using the Mc Donald Omega's model ω = 0.858 (IC=95%, 0.838-0.876) indicating high internal consistency for active coping subscales (ω = 0.714; IC95% = 0.675-0.753 and passive coping subscales (ω = 0.747; IC95% = 0.712-0.781).

2.3 Data analysis

Respondents were asked to identify categorically key demographic information, which is subsequently analyzed using *Stata Statistical Software 15.0* for Windows (39) as proportions. Linear regression was used to calculate whether there were univariate associations between sociodemographic data, the GHQ scale and COPE-28 questionnaire.

To establish the relationship between psychological health and both active and passive coping strategies, structural equation models (SEM) were used. Path analysis (40) was done with comparative adjustment index (CFI), with values $\geq$ .90 (41) the root mean square error of approach (RMSEA), with values $\leq$ .80 (42) and the goodness-of-fit Index (GFI >.8 or >.9) was used to evaluate how well the models fit (43). From the correlations, the final model was elaborated with path analysis, using the data on participants who presented with psychological problems to determine the active and passive coping strategies most frequently used within this group.

3. Results

3.1 Participant characteristics (table 1)

Table 1. *Association between socio-demographic variables and indicators of general health status at covid-19*

Variables	N(%)	Somatic symptom			Anxiety/Insomnia			Social Disfunction			Severe Depression		
		R-Squared R^2	Adjusted R-Squared (AR^2)	P-value (95% CI)	R^2	(AR^2)	P-value (95% CI)	R^2	(AR^2)	P-value (95% CI)	R^2	(AR^2)	P-value (95% CI)
Gender													
Men	168 (38.7)	0.039	0.0368	Reference	0.028	0.026	Reference	0.001	-0.002	Reference	0.005	0.005	Reference
Women	266 (61.3)			**0.00*(-2.75 to -.99)**			**0.00*(-2.98 to 0.84)**			0.59 (-1.04 to 0.59)			0.15 (-1.32 to 0.20)
Age													
18 - 28	181 (41.7)			Reference			Reference			Reference			Reference
29 - 38	124 (28.6)	0.013	0.004	-0.34 (-1.57 to 0.54)	0.022	0.013	**0.02* (-2.73 to -0.19)**	0.034	0.025	**0.05*(-1.89 to 0.01)**			**0.00*(-2.21 to -0.43)**
39 - 48	51 (11.8)			0.94 (-1.39 to 1.49)			0.45 (-1.07 to 2.39)			0.23 (-2.08 to 0.50)	0.042	0.033	**0.04*(-2.47 to -0.06)**
49 - 58	54 (12.4)			0.74 (-1.17 to 1.64)			0.24 (-2.70 to 0.67)			**0.03*(-2.61 to -0.08)**			**0.00*(-3.10 to -0.74)**
59 - 68	24 (5.5)			**0.04*(-4.06 to -0.13)**			0.08 (-4.45 to 0.28)			**0.00*(-4.88 to -1.34)**			**0.00*(-4.01 to -0.70)**
Education level													
High school	64 (14.75)			Reference			Reference			Reference			Reference
College	174 (40.09)	0.876	**0.875**	**0.001* (2.55 to 3.48)**	0.502	0.489	**0.006* (0.47 to 2.74)**	0.312	0.307	**0.001* (1.01 to 3.01)**	0.236	0.231	**0.001* (1.01 to 3.01)**
Bachelor	116 (26.73)			**0.001* (6.83 to 7.82)**			**0.001* (5.24 to 7.66)**			**0.001* (3.88 to 6.01)**			**0.001* (3.88 to 6.01)**
Postgraduate	80 (18.43)			**0.001* (12.6 to 13.7)**			**0.001* (9.87 to 12.5)**			**0.001* (5.82 to 8.13)**			**0.001* (5.82 to 8.13)**
Nationality													
Peruvian	409 (94.2)	0.001	-0.001	Reference	0.001	-0.002	Reference	0.000	-0.002	Reference	0.007	0.005	Reference
Foreign	25 (5.8)			0.51(-1.24 to 2.50)			0.66 (-1.75 to 2.78)			0.67 (-1.34 to 2.06)			0.07 (-0.13 to 3.05
Work													
No	185 (42.6)	0.000	-0.002	Reference	0.000	-0.002	Reference	0.000	-0.002	Referencia	0.005	0.003	Referencia
Yes	249 (57.4)			0.93 (-0.84 to 0.92)			0.92 (-1.12 to 1.01)			0.91 (-0.85 to 0.76)			0.14 (-1.32 to 0.19)
Marital status													
Co-habitant	19 (4.38)	0.004	-0.003	Reference			Reference			Reference			Reference
Single	309 (71.20)			0.44 (-1.31 to 2.98)			0.97 (-2.64 to 2.54)			0.34 (-1.01 to 2.89)			0.80 (-2.07 to 1.60)
Married	98 (22.58)			0.77 (-1.94 to 2.61)	0.005	-0.003	0.76 (-2.32 to 3.18)	0.003	-0.004	0.46 (-1.28 to 2.85)	0.006	-0.001	0.70 (-2.32 to 1.56)
Widower	8 (1.84)			0.95 (-3.94 to 3.71)				0.33 (-6.90 to 2.35)			0.97 (-3.42 to 3.55)			0.12 (-5.61 to 0.92)
Fear of coronavirus (family)													
No	124 (28.57)	0.005	0.002	Reference	0.003	0.001	Reference	0.001	-0.002	Reference	0.001	-0.001	Reference
Yes	310 (71.43)			0.16 (-1.66 to 0.27)			0.27 (-1.81 to 0.51)			0.62 (-1.09 to 0.66)			0.53 (-1.09 to 0.56)

	n (%)												
Product Concern													
Little or nothing	211 (48.62)	0.009	0.004	Reference	0.004	-0.001	Reference	0.006	0.001	Reference	0.003	-0.002	Reference
Moderated	207 (47.70)			**0.05*(-1.77 to -0.001)**			0.38 (-1.55 to 0.59)			0.21 (-1.32 to 0.29)			0.25 (-1.20 to 0.31)
Severe	16 (3.69)			0.77 (-2.69 to 2.004)			0.30 (-4.35 to 1.33)			0.22 (-3.47 to 0.81)			0.69 (-2.41 to 1.61)
Cause of concern													
Children and family care	44 (10.14)			Reference			Reference			Reference			Reference
Domestic work	18 (4.15)			0.69 (-3.05 to 2.04)			0.38 (-1.69 to 4.45)			0.10 (-0.38 to 4.24)			0.72 (-1.77 to 2.58)
Social isolation	169 (38.94)	0.003	-0.009	0.82 (-1.73 to 1.36)	0.009	-0.003	0.60 (-1.31 to 2.41)	0.009	-0.003	0.48 (-0.89 to 1.90)	0.005	-0.006	0.49 (-0.85 to 1.78)
Not being able to work	121 (27.88)			0.73 (-1.88 to 1.32)			0.23 (-0.74 to 3.12)			0.84 (-1.31 to 1.60)			0.68 (-1.08 to 1.65)
Working without family	16 (3.69)			0.76 (-3.07 to 2.24)			0.86 (-3.48 to 2.93)			0.61 (-1.78 to 3.04)			0.99 (-2.27 to 2.26)
Teleworking	66 (15.21)			0.33 (-2.65 to 0.89)			0.91 (-2.27 to 2.01)			0.91 (-1.52 to 1.70)			0.68 (-1.83 to 1.19)

* p < 0.05; ** p < 0.01; *** p < 0.001.

From the 450 respondents who completed the survey, only 434 (38.7% males and 61.3% females) were recruited into the study with a response rate of 100% (table 1). The mean age of participants was 33.87 ± 12.6, whose age range from 18 to 68 years old coming from 16 departments of Perú. The majority were well-educated (>=85.0 %), Peruvian (94.2%), employed (57.4%) and single (71.20 %).

Regarding social factors, a great number were afraid of contracting coronavirus (71.43%), 47.7% were worried about limited access to cleaning products, and 38.94% about social distancing, followed by 27.88% worried about not being able to work. Regarding employment, 42,6% were not working due to quarantine period, and 40.09% were university students.

3.3 General health status based on socio-economic profile (table 1)

The sample adjusts to a normal distribution (±1.5 threshold) (45) where 40.8% (n=177) of respondents reported psychological disorders in contrast to non-cases (59.2%), with a cut-off point of 23/24 (44).

Men have lower somatic and anxiety/insomnia symptom scores than women (β= -1.87; (β = -1.91) respectively. The 59-68 age group has fewer somatic symptoms than younger age groups (β = -2.09). Likewise, the 29 to 38 year old group scores (β= -1.46) less in anxiety / insomnia over the rest of the age groups. It is also observed that the groups from 49 to 58 years old (β= -1.35) and 59 to 68 years old (β= -3.11) score lower in social dysfunction than the younger age groups. With respect to severe depression, the 29 to 68 year-old groups present lower scores β = -1.26 to -2.36, with respect to the 18 to 28 year-old groups. When observing study levels, participants who have graduate (β= 13.16), undergraduate (β= 7.32) and university (β= 3.02) degrees present higher somatic symptoms than those who have high school. Similar tendency is presented in the anxiety / insomnia scales; graduate (β= 13.18), undergraduate (β= 6.45) and college (β= 1.61); in the social dysfunction scale: graduate (β= 6.98), undergraduate (β= 4.94) and college (β= 2.01); also in severe depression: graduate (β= 4.84), undergraduate (β= 3.02) and college (β= 0.16). Likewise, there are lower somatic symptoms (β= -0.89), in participants who have moderate concern for the absence of hygiene products (protection, antibacterial gel, chinstraps and others) than those who do not worry about them.

3.3 Association between sociodemographic variables and subscales of active and passive coping strategies toward the COVID-19 (table 2-3-4)

Tabla 2. *Descriptive analysis of the subscales of the Active and Passive Coping strategies*

Active coping	M	Mdn	Mo	DE	Min	Max	Q1	Q3	CI(95%)
Active	3.77	4.00	4	1.45	0	6	3	5	(3.63, 3.91)
Planning	3.75	4.00	4	1.54	0	6	3	5	(3.61, 3.90)
Emotional support	2.66	2.50	2	1.63	0	6	2	4	(2.50, 2.82)
Social Support	2.63	3.00	2	1.56	0	6	2	4	(2.48, 2.77)
Positive re-evaluation	3.62	4.00	4	1.53	0	6	3	5	(3.48, 3.76)
Acceptance	4.18	4.00	4	1.39	0	6	3	5	(4.05, 4.31)
Humor	2.50	2.00	2	1.81	0	6	1	2	(2.32, 2.67)
Pasive coping									
Religion	2.83	3.00	2	1.87	0	6	1	4	(2.65, 3.01)
Denial	1.36	1.00	0	1.49	0	6	0	2	(1.22, 1.50)
Self-Distraction	3.39	4.00	4	1.61	0	6	2	5	(3.24, 3.54)
Self-incrimination	1.93	2.00	2	1.43	0	6	1	3	(1.79, 2.08)
Disconnection	1.29	1.00	0	1.28	0	6	0	2	(1.17, 1.41)
Desahogo	2.01	2.00	2	1.34	0	6	1	3	(1.88, 2.13)
Substance use	.66	0.00	0	1.21	0	6	0	1	(0.55, 0.78)

Men are less likely than women to use the positive re-evaluation coping strategy (β= -0.33). The 59-68 age group is identified as using less of the planning (β= -0.81), positive reassessment (β= -1.14), and acceptance (β= -0.96) coping strategies than the younger age group, similarly in the 39-48 age group (β= -0.58) and the 49-58 age group (β= -0.99), who are also less likely to use positive reassessment strategy (β= -0.66) and acceptance strategies (β= -0.57). Looking at the level of study, participants with postgraduate degrees (β= -0.53) and bachelor's degrees (β= -0.65) use the planning strategy less than participants with high school education, while participants with college education use positive re-evaluation (β= 0.62) compared to those with high school education. We found that married participants use the planning coping strategy (β= -0.79) and positive re-evaluation (β= -0.87) less than singles and cohabitants. It is evident that those who score moderate concern for the absence of hygiene products (protection, antibacterial gel, chinstraps and others), are those most unlikely to use the positive re-evaluation strategies (β= -0.41) (see table 3).

Table 3. *Association between sociodemographic variables and subscales of active coping strategies in covid-19*

Variables	N(%)	Active			Planning			Positive re-framing			Aceptance		
		R-Squared	Adjusted R-Squared	p (95% Confidence Interval)	R2	(AR2)	p(95% CI)	R2	(AR2)	p(95% CI)	R2	(AR2)	p(95% CI)
		R2	(AR2)	p(95% CI)									
Gender													
Man	168 (38.7)	0.006	0.004	Reference	0.000	-0.002	Reference	0.011	0.001	Reference	0.008	0.006	Reference
Woman	266 (61.3)			0.11(-0.51 to 0.05)			0.73 (-0.25 to 0.35)			**0.03* (-0.63 to -0.04)**			0.06 (-0.53 to 0.01)
Age (years)													
18 - 28	181 (41.7)			Reference			Reference			Reference			Reference
29 - 38	124 (28.6)	0.009	-0.000	0.70 (-0.40 to 0.27)	0.026	0.017	0.51 (-0.23 to 0.47)	0.063	0.054	0.23 (-0.55 to 0.13)			0.06 (-0.62 to 0.01)
39 - 48	51 (11.8)			0.97 (-0.44 to 0.46)			0.19 (-0.79 to 0.16)			**0.01* (-1.05 to -0.12)**	0.043	0.034	**0.002* (-1.09 to -0.23)**
49 - 58	54 (12.4)			0.09 (-0.82 to 0.07)			0.10 (-0.85 to 0.08)			**0.001*(-1.44 to -0.53)**			**0.01* (-0.99 to -0.16)**
59 - 68	24 (5.5)			0.26 (-0.97 to 0.26)			**0.02* (-1.46 to -0.16)**			**0.001*(-1.78 to -0.51)**			**0.002* (-1.50 to -0.34)**
Education level													
High school	64 (14.75)			Reference			Reference			Reference			Reference
College	174 (40.09)	0.008	0.002	0.06 (-0.01 to 0.82)	0.020	0.013	0.15 (-0.76 to 0.12)	0.027	0.020	**0.01* (0.18 to 1.05)**	0.013	0.006	0.80 (-0.35 to 0.45)
Bachelor	116 (26.73)			0.27 (-0.19 to 0.69)			**0.01* (-1.13 to -0.18)**			0.63 (-0.35 to 0.58)			0.48 (-0.58 to 0.27)
Postgrade	80 (18.43)			0.19 (-0.16 to 0.79)			**0.04* (-1.04 to -0.03)**			0.11 (-0.09 to 0.91)			0.12 (-0.82 to 0.09)
Nationality													
Peruvian	409 (94.2)	0.003		Reference	0.005	0.003	Reference	0.000	-0.002	Reference	0.002	-0.000	Reference
Foreign	25 (5.8)		0.001	0.24 (-0.94 to 0.23)			0.15 (-1.08 to 0.16)			0.74 (-0.72 to 0.52)			0.34 (-0.84 to 0.29)
Work													
No	185 (42.6)	0.002	-0.000	Reference	0.001	-0.001	Reference	0.001	-0.001	Reference	0.003	0.000	Reference
Yes	249 (57.4)			0.34 (-0.41 to 0.14)			0.55 (-0.38 to 0.20)			0.51 (-0.38 to 0.19)			0.29 (-0.41 to 0.12)
Marital status													
Co-habitant	19 (4.38)			Reference			Reference			Reference			Reference
Single	309 (71.20)	0.011	0.003	0.31 (-1.02 to 0.32)	0.012	0.005	0.16 (-1.23 to 0.19)	0.016	0.009	0.09 (-1.31 to 0.11)	0.014	0.007	0.47 (-0.88 to 0.40)
Married	98			0.16 (-1.23 to			**0.04***			**0.02***			0.09

Variable	N (%)	p (1)	β (95% CI) (1)	p (2)	β (95% CI) (2)	p (3)	β (95% CI) (3)	p (4)	β (95% CI) (4)
	(22.58)		0.19)		(-1.55 to -0.04)		(-1.63 to -0.12)		(-1.25 to 0.11)
Widower	8 (1.84)		0.06 (-2.35 to 0.04)		0.21 (-2.09 to 0.46)		0.07 (-2.40 to 0.13)		0.80 (-0.99 to 1.30)
Fear of coronavirus disease (family)									
No	124 (28.57)	0.003 -0.002	Reference	0.000 -0.002	Reference	0.000 -0.002	Reference	0.000 -0.002	Reference
Yes	310 (71.43)		0.73 (-0.25 to 0.36)		0.76 (-0.27 to 0.37)		0.99 (-0.32 to 0.32)		0.76 (-0.25 to 0.34)
Product Concern									
Little or nothing	211 (48.62)		Reference		Reference		Reference		Reference
Moderate	207 (47.70)	0.007 0.002	0.15 (-0.48 to 0.07)	0.006 0.001	0.30 (-0.45 to 0.14)	0.020 0.016	0.01* (-0.70 to -0.12)	0.012 0.007	0.05 (-0.53 to 0.001)
Severe	16 (3.69)		0.23 (-1.19 to 0.29)		0.18 (-1.32 to 0.25)		0.09 (-1.43 to 0.12)		0.45 (-0.44 to 0.97)
Causes of concern									
Children and family care	44 (10.14)		Reference		Reference		Reference		Reference
Domestic work	18 (4.15)	0.017 0.006	0.51 (-0.53 to 1.06)	0.017 0.006	0.81 (-0.95 to 0.74)	0.011 -0.001	0.68 (-0.67 to 1.01)	0.194 0.008	0.08 (-0.08 to 1.43)
Social isolation	169 (38.94)		1.09 (-0.80 to 0.16)		0.43 (-0.31 to 0.72)		0.60 (-0.64 to 0.37)		0.30 (-0.22 to 0.69)
Not being able to work	121 (27.88)		0.11 (-0.91 to 0.09)		0.81 (-0.59 to 0.47)		0.30 (-0.80 to 0.25)		0.69 (-0.38 to 0.57)
Working without family	16 (3.69)		0.05 (-1.65 to 0.01)		0.24 (-1.42 to 0.35)		0.11 (-1.58 to 0.16)		0.17 (-1.34 to 0.24)
Teleworking	66 (15.21)		0.37 (-0.80 to 0.30)		0.22 (-0.22 to 0.96)		0.91 (-0.61 to 0.55)		0.91 (-0.49 to 0.56)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

When it comes to passive coping strategies, men are less likely to use religion (β= -0.84), self-distraction (β= -0.33), and venting (β= -0.35) as a coping response compared to women. The 39-48 age group uses more religion-base responses (β= 0.74) than younger age groups, and self-disruptive behavior occurs less in most age ranges (β= -0.54 in the 29-38 age group; β= -0. 64 in the 39-48 age group; β= -1.09 in the 49-58 age group and β= -1.42 in the 59-68 age group), in a similar manner in the self-incrimination strategy (β= -0.37 in the 29-38 age group; β= -0.50 in the 39-48 age group and β= -0.80 in the 49-58 age group). The older group (59 to 68 years old) uses the relief strategy to a lesser extent compared to the younger groups. It should be noted that college students use more religion-based (β= 0.61) and relief (β= 0.50) coping strategies, while those with a bachelor's degree use self-blaming (β= 0.64), a comparable finding in more highly educated individuals: professionals with graduate degrees who use self-distraction (β= 0.76), self-blame (β= 1.07), and relief (β= 0.88) as passive coping strategies compared to participants with just a high school education (table 4). Furthermore, visual descriptive for active and passive coping strategies (figure 1).

Table 4. *Association between sociodemographic variables and subscales of passive coping during COVID-19*

Variables	N(%)	Religion			Self-distraction			Self-incrimination			Desahogo		
		R-Squared	Adjusted R-Squared	p (95% Confidence Interval)	R2	(AR2)	p(95% CI)	R2	(AR2)	p(95% CI)	R2	(AR2)	p(95% CI)
		R2	(AR2)	p(95% CI)									
Gender													
Men	168 (38.7)	0.049	0.047	Reference	0.010	0.008	Reference	0.007	0.004	Reference	0.016	0.014	Reference
Women	266 (61.3)			**0.001*(-1.20 to -0.49)**			**0.03* (-0.64 a -0.02)**			0.09 (-0.04 to 0.51)			**0.01* (-0.60 to -0.09)**
Age (year)													
18 - 28	181 (41.7)			Reference			Reference			Reference			Reference
29 - 38	124 (28.6)	0.021	0.012	0.57 (-0.30 to 0.54)	0.075	0.066	**0.003* (-0.90 to -0.18)**	0.038	0.029	**0.02* (-0.69 to -0.05)**	0.015	0.006	0.12 (-0.54 to 0.06)
39 - 48	51 (11.8)			**0.01*(0.16 to 1.31)**			**0.01* (-1.12 to -0.15)**			**0.02* (-0.93 to -0.06)**			0.33 (-0.62 to 0.21)
49 - 58	54 (12.4)			0.13 (-0.12 to 1.01)			**0.001* (-1.56 to -0.61)**			**0.001* (-1.22 to -0.37)**			0.25 (-0.64 to 0.16)
59 - 68	24 (5.5)			0.07 (-0.07 to 1.51)			**0.001* (-2.08 to -0.75)**			0.09 (-1.11 to 0.08)			**0.02* (-1.23 to -0.09)**
Educational level													
High school				Reference			Reference			Reference			Reference
College	174 (40.09)	0.012	0.005	**0.03*(0.07 to 1.14)**	0.025	0.018	0.58 (-0.33 to 0.58)	0.063	0.056	0.24 (-0.16 to 0.63)	0.038	0.031	**0.01* (0.12 to 0.88)**
Bachelor	116 (26.73)			0.06 (-0.02 to 1.11)			0.18 (-0.15 to 0.81)			**0.003* (0.21 to 1.06)**			**0.002* (0.24 to 1.05)**
Posgrade	80 (18.43)			0.09 (-0.09 to 1.13)			**0.004* (0.23 to 1.29)**			**0.001* (0.61 to 1.52)**			**0.001* (0.44 to 1.31)**
Nationality													
Peruvian	409 (94.2)	0.000	-0.002	Reference	0.000	-0.002	Reference	0.004	0.001	Reference	0.000	-0.002	Reference
Foreigner(living in Peru)	25 (5.8)			0.93 (-0.78 to 0.72)			0.82 (-0.72 to 0.57)			0.21 (-0.21 to 0.94)			0.97 (-0.55 to 0.54)
Work													
No	185 (42.6)	0.000	-0.002	Reference	0.001	-0.001	Reference	0.001	-0.001	Reference	0.000	-0.002	Reference
Yes	249 (57.4)			0.81 (-0.31 to 0.39)			0.51 (-0.41 to 0.20)			0.48 (-0.37 to 0.17)			0.90 (-0.27 to 0.23)
Marital status													
Co-habitant	19 (4.38)			Reference			Reference			Reference			Reference
Single	309 (71.20)	0.008	0.001	0.74 (-0.72 to 1.01)	0.004	-0.003	0.38 (-1.08 to 0.42)	0.009	0.002	0.26 (-0.28 to 1.03)	0.011	0.004	0.94 (-0.59 to 0.64)
Married	98			0.59 (-1.16 to			0.27 (-1.23			0.24			0.37

	N (%)												
	(22.58)			0.67)			to 0.35)			(-0.28 to 1.12)			(-0.95 to 0.36)
Widower	8 (1.84)			0.71 (-1.83 to 1.25)			0.27 (-2.07 to 0.60)			0.45 (-1.63 to 0.72)			0.56 (-0.78 to 1.42)
Fear of contracting coronavirus (or family member)													
No	124 (28.57)	0.000	-0.002	Reference	0.003	0.000	Reference	0.000	-0.002	Reference	0.000	-0.002	Reference
Sí	310 (71.43)			0.78 (-0.33 to 0.44)			0.25 (-0.14 to 0.53)			0.92 (-0.31 to 0.28)			0.88 (-0.25 to 0.30)
Fear of products													
Little or nothing	211 (48.62)			Reference			Reference			Reference			Reference
Moderate	207 (47.70)	0.002	-0.002	0.64 (-0.44 to 0.27)	0.004	-0.000	0.42 (-0.43 to 0.18)	0.003	-0.002	0.55 (-0.35 to 0.19)	0.009	0.004	0.10 (-0.47 to 0.04)
Severe	16 (3.69)			0.35 (-1.40 to 0.50)			0.20 (-1.35 to 0.28)			0.33 (-1.08 to 0.36)			0.14 (-1.18 to 0.17)
Causes of concern													
Children and family care	44 (10.14)			Reference			Reference			Reference			Reference
Domestic work	18 (4.15)	0.009	-0.002	0.56 (-1.33 to 0.72)	0.007	-0.004	0.94 (-0.85 to 0.92)	0.008	-0.003	0.29 (-1.21 to 0.36)	0.014	0.002	0.51 (-0.97 to 0.49)
Social isolation	169 (38.94)			0.28 (-0.94 to 0.28)			0.87 (-0.58 to 0.49)			0.98 (-0.47 to 0.48)			0.74 (-0.37 to 0.51)
Not being able to work	121 (27.88)			0.12 (-1.16 to 0.13)			0.34 (-0.82 to 0.29)			0.73 (-0.57 to 0.41)			0.59 (-0.33 to 0.58)
Working without family	16 (3.69)			0.74 (-0.89 to 1.25)			0.21 (-1.51 to 0.34)			0.25 (-1.29 to 0.34)			0.37 (-1.11 to 0.42)
Teleworking	66 (15.21)			0.64 (-0.88 to 0.54)			0.64 (-0.76 to 0.47)			0.76 (-0.46 to 0.63)			0.15 (-0.13 to 0.88)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

3.4 Pearson's correlations between general health and coping strategies scale (table 5)

Table 5. *Pearson's correlations for General Health indicators (GHQ) and active and passive coping strategies (COPE)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Somatic symptoms	1																	
2. Anxiety/insomnia	.69**	1																
3. Social Dysfunction	.55**	.56**	1															
4. Severe depression	.49**	.54**	.50**	1														
5. Active	.03	.03	.02	-.12*	1													
6. Planning	-.08	-.06	-.02	-.19**	.66**	1												
7. Emotional Support	.20**	.13**	.15**	.01	.32**	.28**	1											
8. Social Support	.12*	.16**	.13**	.02	.34**	.38**	.54**	1										
9. Positive re-refraiming	-.02	.01	.05	-.10	.54**	.51**	.33**	.29**	1									
10. Acceptance	-.10*	-.10*	.02	-.11*	.52**	.53**	.15**	.28**	.56**	1								
11. Humor	.05	-.01	.09	.04	.27**	.36**	.17**	.29**	.34**	.38**	1							
12. Religion	.04	.05	.03	-.10	.35**	.34**	.39**	.32**	.34**	.29**	0	1						
13. Denial	.21**	.23**	.17**	.18**	-.07	.04	.16**	.26**	-.14*	-.10*	.10*	.12*	1					
14. Self-distraction	.15**	.27**	.26**	.15**	.43**	.48**	.29**	.39**	.50**	.45**	.34**	.31**	.04	1				
15. Self-incrimination	.23**	.26**	.29**	.41**	.21**	.18**	.17**	.24**	.16**	.10*	.35**	.02	.22**	.32**	1			
16. Disconnection	.23**	.23**	.36**	.36**	-.05	-.04	.18**	.09	.05	-.04	.16**	.05	.23**	.12*	.33**	1		
17. Relief	.16**	.15**	.20**	.19**	.32**	.29**	.32**	.32**	.25**	.20**	.28**	.19**	.14**	.34**	.38**	.22**	1	
18. Substance use	.20**	.15**	.20**	.21**	-.07	-.11*	.09	.06	-.15**	-.08	.12*	.01	.32**	.01	.22**	.19**	.15**	1

* p < 0.05; ** p < 0.01.

It is noticeable that health indicators are associated with individual reactions. In fact, table 5 describes that emotional support strategy correlates significantly positive with somatic symptoms (r = 0.20**), anxiety/insomnia (r = 0.13**) and social dysfunction (r = 0.15**). The planning strategy correlates inversely with severe depression (r = -0.19**). It is clear that the lesser the social support response, the greater the anxiety/insomnia index (r = 0.16**) and social dysfunction (r = 0.13**). The situation-acceptance strategy is a protective factor against indicators of somatic symptoms, anxiety/insomnia and severe depression (*p < 0.05). It is also evident that the active strategies of positive re-framing and humor do not correlate with any indicator measured with the general health scale (GHQ). On the contrary, passive coping styles (denial, self-distraction, self-incrimination, disconnection, venting and substance use) correlate direct and significantly with general health status (somatic symptoms, anxiety/insomnia, social dysfunction and severe depression), the only passive coping strategy that does not correlate with overall health indicators is religion.

3.5 Path analysis results related to active and passive coping strategies (Figure 2)

Results derived from standardized path analysis coefficients shows active and passive responses. As such, social acceptance and support-seeking behaviors are active strategies more likely to be used by individuals who rated with psychological problems. The model retrieved acceptable goodness-of-fit indexes (X2/gl = 3.096; GFI = 0.880; IFC = 0.851 and RMSEA = 0.109 (IC90% 0.089, 0. 129); Although it is a model that does not strictly meet the expected parameters, the values are close and indicate that the active strategies used by participants with psychological problems are acceptance (negative), social support (positive); the passive strategies such as denial (positive way), self-distraction (positive), self-incrimination (positive), disconnection (positive) and relief (negative). Except humor (active strategy) and substance use (passive strategy) that do not support the explanation. The model explains 19% of the variability (R^2 = 0.19) on the impact of the active and passive coping strategies among patients with psychological problems, with adequate adjustment index. The strategies that do not support the model are humor (active strategy) and substance use (passive strategy).

On the contrary *Figure 3* describes coefficients for active and passive strategies for participants who reported absence of psychological problems. The model has acceptable goodness-of-fit indices (X2/gl = 5.739; GFI = 0.869; IFC = 0.751 and RMSEA = 0.119 / IC90% 0.098, 0. 139), although it is a model that does not strictly comply with the expected parameters, the values are close and indicate that active strategies among participants without psychological problems are emotional support (positive), planning (positive); In particular, the passive strategies people without mental illness reported are: self-distraction (positive), self-blame (positive), disconnection (positive), for other hand active strategies that do not support the model are (humor and social support). This model (R2 = 0. 21) explain 21% of the variance, that is that 21% of the participants who do not present psychological problems use the aforementioned coping strategies, with adequate adjustment indexes.

4. Discussion

Our findings suggest that during the period of COVID-19 social isolation (April-May), during which this survey was conducted, respondents experienced psychosomatic symptoms, anxiety, social dysfunction and severe depression as assessed by GHQ-28. Gender, age, education level, and having moderate concerns about purchasing products for hygiene were associated with mental health disturbance; other factors that include nationality, employment, and marital status, and whether one is afraid of the coronavirus disease were not significantly associated with the presence of psychological symptoms. In similar research, studies in China at the beginning of the pandemic found that marital and parental status were not associated with mental health excepting employment which was associated with lower stress and anxiety (12).

Our data suggests that being female and a young adult (18-28) are associated with greater anxiety, while being older (>28-year-old) is related to higher depression as compared to men, during COVID-19 lockdowns. We also noticed that women experienced higher levels of somatic symptoms and anxiety/insomnia. Our predictive model for somatic symptoms ($R^2=0.875$) in participants with upper education may be associated to the higher access to data compared to disinformed people with lower education. This association may be explained as an interactive effect related to gender, given that our sample is mostly composed by women. These findings are consistent with previous studies that have reported not only greater levels of anxiety (12) and fear (13), but also greater depressive symptoms (46) among women. For example, worse somatic symptoms, anxiety, and depression were reported among quarantined Italians (47). Likewise, Newby's research, who identified covariates such as being older and unemployed as risk factors for depression (14). Concluding that, not only general population but also responses from a great proportion of women evinced frequent apprehensions about somatic symptoms (48).

Among the sources of concern for participants, little concern was reported for some changes in circumstances, including working without family (3.69%), doing domestic work (4.15%), and maintaining care for children and family (10.14%). A higher percentage of respondents were worried about social isolation (38.94%), and not being able to work (27.88%). These results contrast with findings from other studies that have found people reporting higher rates of anxiety due to concern for themselves and their families (49). Our findings may be in part related to the high number of young employed respondents in our study. The Peruvian population includes largely nuclear households (53.9%) including a couple with or without children, or the head of the household with children, followed by extended families (20.6%) and single person households (16.8%) (50), while our sample includes a majority of single person households. Among single respondents (71.2%), concerns were less likely to include a focus on others or concerns about working away from family. Nearly half of our respondent (47.70%) also reported significant moderate somatic symptoms related to concerns over the shortage of protective products (personal toiletries). This finding is in line with previous research that has found both higher use of tonics and medicines to not get sick or prevent physical discomfort during the COVID-19 period and increased spending on cleaning supplies and food during the pandemic (7).

Coping Strategies

Our study focused on the reporting of key active and passive coping strategies used by respondents; we found that sociodemographic including gender, age, educational status, and the likelihood of being married influenced a person's likelihood of using an active coping style. While the more recurrent active strategies were reported by women, younger groups (<39-year-old), college students, and single respondents were: planning, positive re-evaluation, and acceptance; passive strategies correspond to: self-distraction and self-incrimination. Particularly, self-distraction and self-incrimination were used by individuals of all ages except those 18 to 28 years old with postgrad studies. Analyzing religion-related coping beliefs, we found that female respondents were more likely than others to use praying as a strategy, which may be exerting a particular effect compared to other countries given the 76.0% of Peruvians indicate they are Catholic (50). A great deal of female respondent (61.3%) reported using religion-based strategies probably to mitigate stress, those results are also supported by previous recent Chinese studies in social networks, where most of women used beliefs- based responses, during the pandemic (9).

Psychological problems and use of coping strategies

In our findings, the use of coping strategies is correlated with gender differences. We found that women use positive re-evaluation strategies to a greater extent than men. Despite the fact that in other studies the result is the opposite, where young men are more likely to use positive management responses (positive re-evaluation, planning in stressful situations) (51). The reason for this is not clear but it may have something to do with the ongoing pandemic, participants responded to the questionnaire under an unusual circumstance that may have influenced and/or distorted their self-perception in the face of the uncertainty (25,52) and their ability to solve problems and analyze the situation (53).

This study confirms that women tend to use more passive strategies, except for positive re-evaluation as an active strategy. Contrastingly, Asian- based studies reported the deployment of active styles focusing on problem solving (active, social support and planning) are analyzed and can significantly predict responses of anxiety (3.4%), anger (2.2.%) and sadness (0.9%). Particularly, first-liner women workers may be more likely to use proactive, problem-centered coping in the face of the pandemic and less likely to use passive strategies than men (13). This has some minor fluctuations in North America, where women are more likely to report strategies that focus on passive behaviors such as distraction, religion, and less humor (54).

People with psychological problems are more likely to use active cognitive strategies, such as acceptance of the situation and social support seeking, in the face of uncertainty. In contrast, those participants without psychological problems were more likely to use passive forms of coping included planning, self-distraction, disconnecting from activities, followed by social support, where just social support and negative emotion acceptance were negative associated to COVID-19- related anxiety (46).

Use of cognitive coping are highly likely to be used by people with high educational status. Self-distraction was the only passive or blocking coping strategy that ranked high among adult group (>28 year old), correspondingly supported by Petzold's past research (46). Interestingly, in Singapore in late 2002, during the severe acute respiratory syndrome (SARS) pandemic, the coping strategies of denial and planning, were associated with post-traumatic disturbance. Both, lack of planning and denial are ways of reducing powerlessness in the face of stress but at the same time they are maladaptive strategies leading to psychological problems (5). We found that the use of passive responses (denial, self-distraction, self-incrimination, venting, and religion) may respond to the unprecedented impact of the COVID-19 pandemic on a country and global scale; metaphorically, it is understood as a chain of misadjusted responses that begins with rejecting the deadly consequences of the disease, not accepting reality, resorting to various activities to avoid thinking about the crisis, and avoiding confronting the problem.

Our study has been one of the first to investigate the impact of COVID-19 on mental health and coping strategies in the face of the crisis in Latin America. Our survey was conducted two weeks after emergency was declared by the Peruvian government. Additional research is urged to monitor participants in the aftermath of the pandemic, especially given the long-term need for severe restrictions and the impact on economic activity, and to examine the evolution of psychological problems after the state of emergency. Other studies on low-income populations with poor internet connection and restricted health access may provide further insight into coping strategies and the effects on mental health.

5. Conclusions

As the pandemic is now persisting into a second year, there is still a compelling need to minimize the impact of the epidemic until vaccines become predominant and this includes a greater response to the mental health needs of the population. This study reported moderate levels of psychological problems in the population in response to the COVID-19 pandemic. Greater issues with mental health problems were reported for women, those with higher education, and across all age groups except the youngest (18 to 28 years). Peruvians would still benefit from appropriate interventions to address the mental health disorders that have arisen during the pandemic. Policies are urged to support awareness and education toward active coping strategies to address mental health disorders during the pandemic. Our findings on the use of coping strategies among respondents can also inform development of timely intervention programs to address long-term problems arising during quarantine.

Limitations

An internet-based survey method was used to avoid possible coronavirus infection. We requested volunteer completion of the survey and recruited respondents through snowball sampling online. The survey had to be completed on computer or mobile

phone. Therefore, some selection bias may be present with only those with internet access via computer or mobile phone able to participate in the study. Our sample consequently under-represents those with low incomes.

Declarations

Ethics approval and Consent to participate

The study protocol was approved by the ethics committee of "Catolica de Santa Maria" University *(ref. no. 167-2020).*

Consent for publication

The authors consent the paper for publication

Availability of data and materials

Data is available for analysis

Competing Interest

The authors report that the research was developed in the absence of any commercial or financial involvement that could be deemed as a potential conflict of interest.

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Author contribution

RAG and ABP made considerable contributions to conception and drafting. RAG and JHC worked in the analysis and interpretation of data. JBH reviewed the concluding edition. All authors contributed writing, editing, and reviewing the final manuscript.

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References

1. WHO. Coronavirus Disease 2019 (COVID-19) Situation Reports. April 1 2020. Vol. 2019, WHO Situation report. 2020.
2. Adhikari SP, Meng S, Wu Y, Mao Y, Ye R, Wang Q, et al. Epidemiology , causes , clinical manifestation and diagnosis , prevention and control of coronavirus disease (COVID-19) during the early outbreak period : a scoping review. 2020;1–12.
3. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). Int J Surg [Internet]. 2020;76:71–6. Available from: https://doi.org/10.1016/j.ijsu.2020.02.034
4. Mao Y, Lin W, Wen J, Chen G. Clinical and pathological characteristics of 2019 novel coronavirus disease (COVID-19): a systematic reviews. 2020;1–31.
5. Sim K, Huak Chan Y, Chong PN, Chua HC, Wen Soon S. Psychosocial and coping responses within the community health care setting towards a national outbreak of an infectious disease. J Psychosom Res [Internet]. 2010;68(2):195–202. Available from: http://dx.doi.org/10.1016/j.jpsychores.2009.04.004
6. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. Int J Soc Psychiatry. 2020;20764020915212.
7. Öğütlü H. Turkey's Response to COVID-19 In terms of Mental Health. Ir J Psychol Med. 2020;1–11.

8. Lu W, Wang H, Lin Y, Li L. Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. Psychiatry Res [Internet]. 2020;288(April):112936. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32276196

9. Li S, Wang Y, Xue J, Zhao N, Zhu T. The impact of covid-19 epidemic declaration on psychological consequences: A study on active weibo users. Int J Environ Res Public Health. 2020;17(6).

10. Wang Y, Wang Y, Chen Y, Qin Q. Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID-19) implicate special control measures. J Med Virol. 2020;

11. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. 2020;19–21.

12. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. Int J Environ Res Public Health. 2020;17(5).

13. Huang L, Xu FM, Liu HR. Emotional responses and coping strategies of nurses and nursing college students during COVID-19 outbreak. medRxiv. 2020;2020.03.05.20031898.

14. Newby J, O'Moore K, Tang S, Christensen H, Faasse K. Acute mental health responses during the COVID-19 pandemic in Australia. medRxiv. 2020;2020.05.03.20089961.

15. Weisman LS. Y v i d. 2003;(April).

16. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet [Internet]. 2020;395(10227):912–20. Available from: http://dx.doi.org/10.1016/S0140-6736(20)30460-8

17. Lazarus RS, Folkman S. Stress, Appraisal, and Coping [Internet]. Springer Publishing Company; 1984. Available from: https://books.google.com.pe/books?id=i-ySQQuUpr8C

18. Park CL, Adler NE. Coping Style as a Predictor of Health and Well-Being Across the First Year of Medical School. Heal Psychol. 2003;22(6):627–31.

19. Smith BW, Kay VS, Hoyt T V., Bernard ML. Predicting the anticipated emotional and behavioral responses to an avian flu outbreak. Am J Infect Control. 2009;37(5):371–80.

20. van Bavel JJ, Baicker K, Boggio PS, Capraro V, Cichocka A, Cikara M, et al. COVID-19 pandemic response. Nat Hum Behav [Internet]. 2020;4(May):1–12. Available from: http://dx.doi.org/10.1038/s41562-020-0884-z

21. Ni JJ, Bordoloi S, Shao W, Garg A. COVID-19 and mental health: A review of the existing literature. Sci Total Environ [Internet]. 2019;136486. Available from: https://doi.org/10.1016/j.scitotenv.2019.136486

22. Taylor S. The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease [Internet]. Cambridge Scholars Publishing; 2019. Available from: https://books.google.com.pe/books?id=8mq1DwAAQBAJ

23. Zhang SX, Wang Y, Rauch A, Wei F. Health, Distress and Life Satisfaction of People in China One Month into the COVID-19 Outbreak. SSRN Electron J [Internet]. 2020;288(March):112958. Available from: https://doi.org/10.1016/j.psychres.2020.112958

24. Barbisch D, Koenig KL, Shih FY. Is There a Case for Quarantine? Perspectives from SARS to Ebola. Disaster Med Public Health Prep. 2015;9(5):547–53.

25. Asmundson GJG, Taylor S. Coronaphobia: Fear and the 2019-nCoV outbreak. J Anxiety Disord. 2020;70(February).

26. Weiss DS. The Impact of Event Scale: Revised. 1978;219–38.

27. Bali S, Stewart KA, Pate MA. Long shadow of fear in an epidemic: Fearonomic effects of Ebola on the private sector in Nigeria. BMJ Glob Heal. 2016;1(3):1–14.

28. Davis M, Stephenson N, Flowers P. Compliant, complacent or panicked? Investigating the problematisation of the Australian general public in pandemic influenza control. Soc Sci Med [Internet]. 2011;72(6):912–8. Available from: http://dx.doi.org/10.1016/j.socscimed.2011.01.016

29. Prensa N De. Plataforma digital del Estado Peruano. Ministerio de Salud. 2020;15–7.

30. Goldberg, D. & Williams P. Cuestionario de Salud General (GHQ-28). Masson. 1996;(Madrid).

31. Arévalo F De. Assessment of the factor structure and reliability of the 28 item version of the General Health Questionnaire (GHQ-28) in El Salvador. Int J Clin Heal Psychol. 2004;4(2):389–98.

32. Retolaza A, Mostajo A, Rica JR de la, Diaz A, Perez J, Aramberri I, et al. Validación del Cuestionario de Salud General de Goldberg (versión 28 ítems) en consultas de atención primaria. Rev Asoc Esp Neuropsiq. 1993;13(46):187–94.

33. Vallejo MA, Rivera J, Esteve-vives J, Rodríguez-Muñoz M, grupo ICAF. El cuestionario general de salud (GHQ-28) en pacientes con fibromialgia: propiedades psicométricas y adecuación. Clínica y Salud. 2014;25(2):105–10.

34. Luis J, Leon V. El coeficiente Omega: un método alternativo para la estimación de la confiabilidad. Rev Latinoam Ciencias Soc Niñez y Juv. 2017;15(1):625–7.

35. Morán C, Landero R, González MCT. COPE-28: Un análisis psicométrico de la versión en Español del brief COPE. Univ Psychol. 2010;9(2):543–52.

36. Carver CS. You want to measure coping but your protocol's too long: Consider the brief COPE. Int J Behav Med. 1997;4(1):92–100.

37. Paola S, Paola G, Judith G, Herrera-olaya GP, Sepúlveda-carrillo GJ. Confiabilidad del cuestionario Brief COPE Inventory en versión en español para evaluar estrategias de afrontamiento en pacientes con cáncer de seno. Investig en Enfermería Imagen y Desarro. 2010;12(1):7–24.

38. Huamaní Domínguez JA, Paredes Ayala AC. Estrés y estrategias de afrontamiento: Estudio en familiares de pacientes con cáncer en la ciudad de Lima, 2018 [Internet]. 2018. 1–62 p. Available from: https://repositorioacademico.upc.edu.pe/handle/10757/625147

39. StataCorp. Stata Statistical Software: Released 15. Coll Station TX StataCorp LLC. 2017;

40. Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP. Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. J Appl Psychol. 2003;88(5):879–903.

41. Bentler PM. Comparative fit indexes in structural models. Psychol Bull. 1990;107(2):238–46.

42. MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. Psychol Methods. 1996;1(2):130–49.

43. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Model. 1999;6(1):1–55.

44. Swallow BL, Lindow SW, Masson EA, Hay DM. The use of the General Health Questionnaire (GHQ-28) to estimate prevalence of psychiatric disorder in early pregnancy. Psychol Heal Med. 2003;8(2):213–7.

45. George, D. & Mallery M. Using SPSS for Windows step by step: a simple guide and reference. Allyn & Bacon. 2003;(Boston, MA).

46. Petzold MB, Bendau A, Plag J, Pyrkosch L, Mascarell Maricic L, Betzler F, et al. Risk, resilience, psychological distress, and anxiety at the beginning of the COVID-19 pandemic in Germany. Brain Behav. 2020;10(9):1–10.

47. Barari S, Caria S, Davola A, Ivchenko A, Jachimowicz J, King G, et al. Evaluating COVID-19 Public Health Messaging in Italy : Self-Reported Compliance and Growing Mental Health Concerns. medRxiv [working paper, not yet peer reviewed]. 2020. p. 1–19.

48. Eliasen M, Kreiner S, Ebstrup JF, Poulsen CH, Lau CJ, Skovbjerg S, et al. Somatic symptoms: Prevalence, Co-Occurrence and associations with self-perceived health and limitations due to physical Health - A danish population-based study. PLoS One. 2016;11(3):1–12.

49. Erceg N, Ružojčić M, Galić Z. Misbehaving in the Corona Crisis: The Role of Anxiety and Unfounded Beliefs. 2020;(April).

50. Instituto Nacional de Estadística e Informatica. Censos Nacionales 2017: XII de Población, VII de Vivienda y III de Comunidades Indígenas. 2017;641.

51. Cabanach RG, Fariña F, Freire C, González P, Ferradás M del M. Diferencias en el afrontamiento del estrés en estudiantes universitarios hombres y mujeres. Eur J Educ Psychol. 2015;6(1):19.

52. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. Brain

Behav Immun. 2020;(March):1–7.

53. Yang Y, Merrill EC. Cognitive and Personality Characteristics of Masculinity and Femininity Predict Wayfinding Competence and Strategies of Men and Women. Sex Roles. 2017;76(11–12):747–58.

54. Park CL, Russell BS, Fendrich M, Finkelstein-Fox L, Hutchison M, Becker J. Americans' COVID-19 Stress, Coping, and Adherence to CDC Guidelines. J Gen Intern Med. 2020;

Figures

	0	1	2	3	4	5	6
Active					Mo		
Planning					Mo		
Emotional support			Mo				
Social Support			Mo				
Positive re-evaluation					Mo		
Acceptance					Mo		
Humor			Mo				
Religion			Mo				
Denial	Mo						
Self-Distraction					Mo		
Self-incrimination			Mo				
Disconnection	Mo						
Desahogo			Mo				
Substance use	Mo						

Evaluation indicators	Shadow/ symbol
Minimum to maximum score	
Quartile 1 to Quartile 3	
Media	
Mode	Mo

Figure 1

Assessment Indicators Active and Passive Coping Strategies
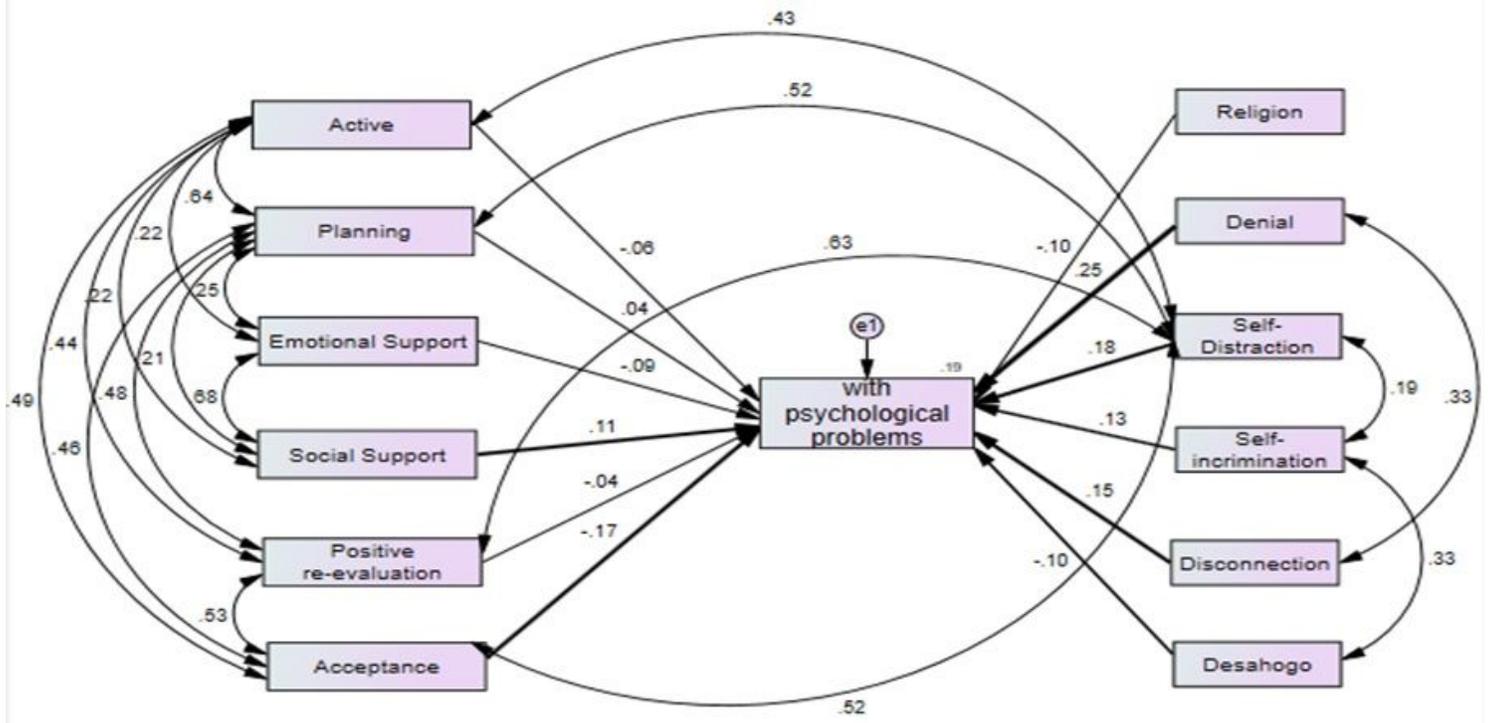
Figure 2

Report of the path analysis. Standardized coefficients of active and passive coping strategies in participants with psychological problems (N = 177; *p < .05).
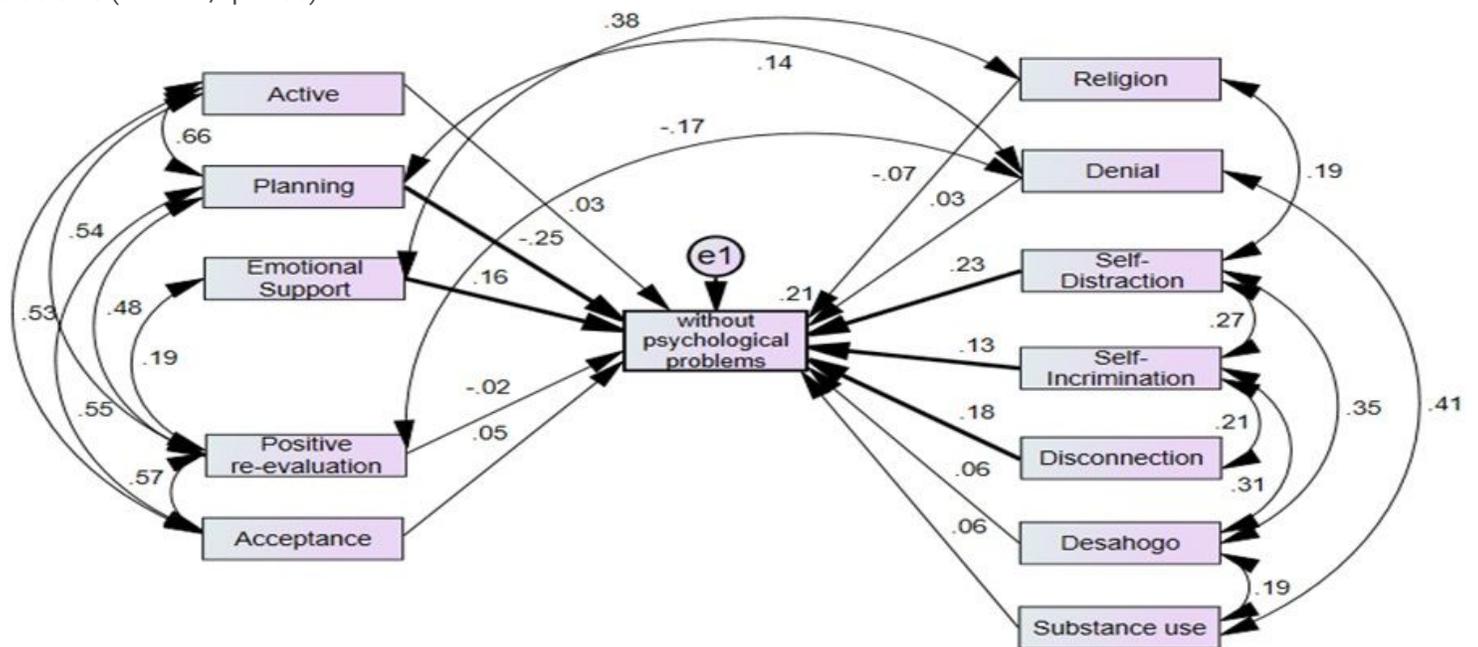
Figure 3

Report of the path analysis. Standardized coefficients of active and passive coping strategies in participants without psychological problems (N = 257; *p < .05).