Depression in Public officials during the COVID-19 Pandemic in Paraguay: A Web-based Study

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Abstract

Background: This study investigated the factors influencing depressive feelings in Paraguayan public officials caused by the coronavirus disease (COVID-19) pandemic.

Methods: This study used a web-based cross-sectional method to analyze the factors influencing COVID-19-induced depressive feelings in Paraguayan public officials. The study's research area was Asuncion and Limpio in Paraguay.

Results: The results of Model 4 indicated high levels of depressive feelings among public officials, as well as concerns about COVID-19 infection among female public officials. The study also found that public officials' high levels of depressive feelings were related to the duration of COVID-19 self-quarantine periods.

Conclusions: The conclusions drawn from these findings were as follows: First, a targeted intervention program should be developed for female public officials who were found to be more vulnerable to depressive feelings. Second, a program should be developed for people facing deteriorating mental health due to social isolation and loneliness caused by social distancing during prolonged periods of self-quarantine. Third, mental health care programs should be organized in a community-focused way, and online systems should be utilized for more effective mental health recovery.

Background

SARS-CoV-2 (COVID-19) first emerged in Wuhan City, Hubei Province, China, at the end of 2019, and rapidly spread worldwide, continuing into 2020. The World Health Organization (WHO) declared the COVID-19 outbreak a Phase VI pandemic—the highest alert level—on March 11, 2020 [1]. The disease has spread throughout South America. In Paraguay, the first confirmed case was a patient who had returned from Ecuador on March 7, 2020. Paraguay's cumulative number of confirmed cases was 208 as of April 20, 2020, with eight reported deaths, indicating a 3.85% fatality rate [2].

According to the WHO, the COVID-19 pandemic has created situations that have a negative effect on people and threaten their mental health [3]. The Centers for Disease Control and Prevention (CDC) of the US reported that the circumstances created by COVID-19 are likely to induce high levels of fear, anxiety, and stress, which may develop into symptoms such as depression and a deterioration in people's psychological health [4].

According to Jonathan Kanter, the director of the University of Washington's Center for the Science of Social Connection, social isolation, turmoil, and the extreme changes in daily activities caused by COVID-19 are highly likely to cause clinical depression in people. Further, medical staff and people in fields that deal directly with COVID-19 face even more serious threats to their psychological health [5]. The British Broadcasting Corporation in the UK and the University of Washington's Center for the Science of Social Connection in the US have predicted that the compulsory long-term quarantine and social distancing that governments use as basic strategies against COVID-19 have a high probability of inducing social isolation and loneliness that could develop into depression, with women being more vulnerable to depressive symptoms [6, 7].

Paraguay announced the *Estado de Emergencia Sanitaria* (Presidential Decree No. 3456) on March 16, 2020, which was followed by the imposition of a 24-hour restriction on movement order on March 21 [8]. The Oxford COVID-19 Government Response Stringency Index (Fig. 1) shows that the government of Paraguay has implemented strong COVID-19 response policies since March 21, with a mean score of 95.24 out of 100 [9]. However, with the global pandemic becoming more prolonged and the consequent lengthening of the 24-hour self-quarantine, it is highly probable that both physical and psychological problems will arise. Therefore, the present study aims to provide scientific evidence to support the Paraguayan government's policies, while also offering fundamental data.

This study's specific goals were as follows: First, to identify the association between COVID-19 awareness and depressive feelings in Paraguayan public officials; and Second, to identify the influencing factors of the COVID-19 pandemic on depressive feelings in Paraguayan public officials.

Methods

Study design

This study used a web-based cross-sectional method to analyze the factors influencing COVID-19-induced depressive feelings in Paraguayan public officials. The study's research area was Asuncion and Limpio in Paraguay.

Materials

This study used YGHC(Yonsei Global Health Center)'s COVID-19 online survey tool. The survey questionnaire covered sociodemographic characteristics, symptoms and physical health status, patients' contact history, precautionary measures against COVID-19 during the preceding 14 days, information related to COVID-19, and the Patient Health Questionnaire (PHQ-9). The survey tool was translated into Spanish, and the final questionnaire was completed after its validity was discussed by experts at the YGHC and professionals with Master's and Ph.D. degrees from Central and South America, including Peru, Cuba, and Paraguay.

Data collection

The subjects of this study were public officials aged ≥ 20 years, who were central government employees in Asuncion and Limpio. For information extraction, the snowball sampling technique was used. While there were no drop-outs or exclusions due to missing values in the data, 27 respondents who did not satisfy the subject criteria were excluded, and a total of 171 respondents were selected as the study subjects.

The online questionnaire used the free Google Forms service and the survey period was from April 3–17, 2020. The distribution of the online questionnaire was carried out by local government staff.

Variables

Dependent variables

In this study, each subject's score was calculated using the PHQ-9 consisting of nine items corresponding to the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) [10]. Although the PHQ-9 has not yet been used officially in Paraguayan studies, it has been applied in reports and studies that investigated factors influencing depression in Central and South American countries. Urtasun et al. [11] reported that for the people of Argentina, the optimal cut-off for the PHQ-9 was ≥ 8 (sensitivity: 88.2%; specificity: 86.6%; positive predictive value: 90.91%).

Independent variables

The independent variables in this study were demographic characteristics such as gender, age, and educational, marital, and subjective health status. COVID-19 awareness was analyzed based on the preceding 14 days' usage of the following independent variables: the number of times precautionary actions against COVID-19 had been practiced, apprehension about COVID-19 infection, and periods of self-quarantine. Age was treated as a continuous variable and gender was categorized into *male* and *female*. Educational status was divided into *undergraduate* and *graduate or higher*, marital status into *married* and *unmarried*, and subjective health status into *not bad* and *good* for the subsequent analyses. For COVID-19 awareness, the independent variables were subdivided as shown in Table I. To calculate the number of times precautionary actions against COVID-19 had been taken during the preceding 14 days, those who answered, "practiced most actions" were classified as "compliant." Regarding apprehension about COVID-19 during the preceding 14 days, the responses comprised three categories: "never worried," "occasionally worried," and "constantly worried." Lastly, for the period of self-quarantine during the preceding 14 days, the responses took the form of units of time.

Table I
Summary of the independent variables (COVID-19 awareness)

Variables	Questionnaire
COVID-19 precautionary actions practiced during the past 14 days	1) Covering one's mouth when coughing/sneezing
	2) Avoiding public transportation
	3) Washing hands using soap and water
	4) Washing hands after sneezing
	5) Wearing a face mask at all times
	6) Washing hands after touching a contaminated object
	7) Refraining from using an elevator
	8) Refraining from attending meetings of ≥10 individuals
Apprehensions about COVID-19 infection during the past 14 days	1) Never worried
	2) Occasionally worried
	3) Constantly worried
Period of self-quarantine due to COVID-19 during the past 14 days	Unit of time

Statistical analysis

The factors influencing depressive feelings in public officials in Paraguay due to the COVID-19 pandemic were analyzed using SPSS 25.0, following the methods set out below.

First, a correlation analysis was carried out to analyze the relationships between the general characteristics of the subjects, COVID-19 awareness, and depressive feelings.

Second, a hierarchical multiple regression analysis was performed to analyze the influence of COVID-19 awareness on depressive feelings in the subjects.

Results

General characteristics of the subjects

The general characteristics of this study's subjects are presented in Table II. Regarding gender distribution, there were more females (60.2%) than males (39.8%). The subjects' average age was approximately 34 years, with those in their 30 s accounting for 52.6% of the total, with 24.0% in their 20 s, and 23.4% in their 40 s or older. Regarding educational and marital status, 85.4% were undergraduates and 14.6% were graduates or higher; and 71.3% were unmarried and 28.7% were married. Regarding subjective health status, those who responded *not bad* constituted 52.6% of the total, while the balance (47.4%) responded *good.*

Table II
General characteristics of the study subjects n=171(%)

Variables	Category	n(%)
Gender	Male	68(39.8)
	Female	103(60.2)
Age (34.36±7.589)	20s	41(24.0)
	30s	90(52.6)
	40s or older	40(23.4)
Educational status	Undergraduate	146(85.4)
	Graduate or higher	25(14.6)
Marital status	Unmarried	122(71.3)
	Married	49(28.7)
Subjective health status	Not bad	90(52.6)
	Good	81(47.4)

Correlations between the main variables

The results of the correlation analysis between the main variables are given in Table III. The results showed that awareness and apprehension about COVID-19 infection were correlated with gender ($r = .169$; $p < .05$), and self-quarantine period was correlated with marital status ($r = .181$; $p < .05$) and subjective health status ($r = -.151$; $p < .05$). While the relationship between the variables and depressive feelings (PHQ-9) had the highest correlation with apprehension about COVID-19 infection ($r = .311$; $p < .01$), significant correlations were also found with subjective health status ($r = -.282$; $p < .01$), gender ($r = .242$; $p < .01$), and age ($r = -.219$; $p < .01$). In addition, depressive feelings were found to have a correlation with marital status ($r = .196$; $p < .05$) and the self-quarantine period ($r = .049$; $p < .01$).

Table III
Correlations among the main variables n=171(%)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gender (1)	1								
Age (2)	-.024	1							
Educational status (3)	-.099	-.173*	1						
Marital status (4)	.093	-.370**	.140	1					
Subjective health status (5)	-.091	-.024	-.171*	-.098	1				
Number of times precautionary measures against COVID-19 were practiced (6)	-.089	-.113	.097	-.046	-.037	1			
Apprehensions about COVID-19 infection (7)	.169*	.006	-.014	.032	-.145	-.089	1		
Period of self-quarantine due to COVID-19 (8)	.097	-.066	.117	.181*	-.151*	-.015	.057	1	
Depressive feelings (PHQ-9) (9)	.242**	-.219**	.084	.196*	-.282**	.060	.311**	.049**	1

*p<.05, **p<.01, ***p<.001

Association between depressive feelings and self-quarantine period

The results of the analysis of factors influencing depressive feelings are presented in Table IV. A hierarchical multiple regression analysis was carried out to analyze the relationship between COVID-19 awareness and depressive feelings. A four-step regression analysis was carried out to control for the subjects' general characteristics and to determine the unique influence of COVID-19 awareness. First, the variance inflation factor (VIF) index was used to examine multicollinearity among the independent variables; the results showed that their VIF was 1.158–2.891, indicating an absence of multicollinearity. In addition, testing for the independence of errors showed that the Durbin-Watson statistic was 1.818, indicating a lack of autocorrelation and suitability as a regression model.

Model 1 was based on the first input of variables after controlling for the study subjects' general characteristics, and the results indicated an 18.1% explanatory power with statistical significance. The number of times precautionary actions against COVID-19 had been taken was added to Model 1 and as a new variable in Model 2, and the explanatory power was 18.3%, without a significant change. In Model 3, the variable of apprehension about COVID-19 infection during the preceding 14 days was additionally analyzed, leading to a statistically significant result with the explanatory power increasing to 25.2%. The result of the analysis in Model 4—the final model—where period of self-quarantine during the preceding 14 days was added as a variable to complete the model, showed the explanatory power increasing to 35.8%. Among the study subjects' general characteristics, gender ($\beta = .149$; $p < .01$), age ($\beta = -.179$; $p < .01$), and subjective health status ($\beta = -.180$; $p < .01$) were found to have a statistically significant influence. The results indicated a higher level of depressive feelings in women than in men, and a lower level of depressive feelings as the subjects' age increased. Furthermore, compared to the subjects who responded *not bad* for their subjective health status, those who responded *good* were found to have fewer depressive feelings. Among the COVID-19 awareness variables, the number of times precautionary measures against COVID-19 had been taken did not exhibit statistical significance, whereas for apprehension about COVID-19 infection during the preceding 14 days, those who had responded *constantly worried* ($\beta = .323$; $p < .01$) showed higher scores for depressive feelings than those who had responded *never worried*. Regarding the self-quarantine period during the preceding 14 days, as the period increased, the scores for depressive feelings also increased, and had statistical significance ($\beta = .335$; $p < .001$).

Table IV
Association between the period of self-quarantine due to COVID-19 and depressive feelings n=171(%)

Depressive feelings (PHQ-9)								
Variables	**Model 1**		**Model 2**		**Model 3**		**Model 4**	
	β	*t(p)*	*β*	*t(p)*	*β*	*t(p)*	*β*	*t(p)*
Gender								
Male	(ref)		(ref)		(ref)		(ref)	
Female	.208	2.911**	.209	2.911**	.176	2.511**	.149	2.283**
Age	-.187	-2.441**	-.183	-2.368**	-.179	-2.368**	-.179	-2.592**
Educational status								
Graduate or higher	(ref)		(ref)		(ref)		(ref)	
Undergraduate	.018	.239	.014	.190	.009	.125	-.019	-.292
Marital status								
Married	(ref)		(ref)		(ref)		(ref)	
Unmarried	.080	1.038	.083	1.073	.080	1.072	.030	.428
Subjective health status								
Not bad	(ref)		(ref)		(ref)		(ref)	
Good	-.257	-3.554**	-.255	-3.517**	-.217	-3.079**	-.180	-2.726**
Number of times precautionary measures against COVID-19 were practiced			.040	.562	.070	1.010	.078	1.205
Apprehensions about COVID-19 infection (in the past 14 days)								
Never worried					(ref)		(ref)	
Occasionally worried					.072	.621.	.084	.782
Constantly worried					.325	2.778**	.323	2.972**
Period of self-quarantine due to COVID-19 (in the past 14 days)							.335	5.135***
F	7.303***		6.113***		6.839***		9.961***	
R^2	.181		.183		.252		.358	
Adjusted R^2	.156		.153		.216		.322	
VIF	1.158 – 2.891							
Durbin-Watson	1.818							
*p<.05, **p<.01, ***p<.001								

Discussion

This study used a hierarchical multiple regression analysis to investigate the factors influencing depressive feelings in Paraguayan public officials caused by the COVID-19 pandemic.

A high level of depressive feelings in young female public officials with a high level of apprehension about COVID-19 infection

The results of Model 4 (see Table IV) showed that young female public officials had significantly higher levels of depressive feelings, which was found to have been influenced by their constant apprehension about COVID-19. Another reason for younger age groups having higher levels of depressive feelings could be their exposure to false information. Following the announcement of a COVID-19 pandemic, the global “infodemic” (information + epidemic) phenomenon has become a grave issue, the most serious problem being false information and rumors going viral through social media that prevent the dissemination of important COVID-19 data [12]. Vulnerability to the “infodemic” phenomenon is likely to be higher in young people who spend more time using social network services. Consequently, false information and its negative influence heighten their anxiety, which in turn increase levels of depressive feelings caused by COVID-19. In Paraguay, a non-governmental organization implemented a support program using Facebook and the Internet for people vulnerable to COVID-19, but similar programs do not exist for providing psychological support to the public officials and medical staff managing COVID-19. Thus, to effectively respond to the COVID-19 pandemic, along with stringent response policies, the Paraguayan government should develop a program in the form of a “targeted intervention” to deliver mental health care and services to public officials and medical staff. In particular, there is an urgent need for a specialized program for female officials, who were found to be more vulnerable to depressive feelings.

High level of depressive feelings due to self-quarantine periods

The results of Model 4 (see Table IV) showed that when the self-quarantine period increased, levels of depressive feelings also increased. Since self-quarantine is characterized by the requirement to endure an undetermined period within a confined area, it may cause stress and anxiety and the consequent experience of depressive feelings. From March 21, 2020 to May 11, 2020, a 24-hour restriction of movement was imposed by a presidential decree in Paraguay. The New York Times predicted a “COVID-19 Great Depression” as a result of the global COVID-19 pandemic [13]. This implies the need for a program that can minimize mental health deterioration due to social isolation and loneliness caused by social distancing during periods of self-quarantine. Many countries have implemented policies to connect people who have been impacted by the pandemic to mental health care support groups. Notably, the social prescription program in the UK is one such solution. In addition, the WHO recommended staying physically active during self-quarantine and emphasized physical activities such as “taking short active breaks during the day,” “following an online exercise class,” “walking,” “standing up,” and “relaxing” [14]. Finally, mental and physical health care should be provided in tandem to combat high levels of depressive feelings during self-quarantine. Instead of waiting at home until the end of the COVID-19 pandemic, if individuals were to take light outdoor walks and embrace home-training to maximize their level of physical activity, together with strictly observing personal hygiene practices such as handwashing, it should make enduring self-quarantine less painful.

On May 11, 2020, at a COVID-19 media briefing, the WHO’s director-general commended Korea in his opening remarks for its outstanding management of the COVID-19 pandemic, and for having an effective system in place for detecting and responding to the disease’s recurrence and spread [15]. One of the many reasons for Korea’s success in responding to COVID-19 is its practice of strict social distancing such as self-quarantine.

In Korea, since there has been a decreasing trend in the number of confirmed cases, the demand for mental health care has been on the rise. Korea’s mental health care is often community focused, so the government is making efforts to provide response guidelines for maintaining mental health care services while preventing the spread of COVID-19. To illustrate, a mental health care center in Wonju City is providing phone counseling and face-to-face consultations for the management of stress and depression caused by self-quarantine, and Heungeop-myeon in Gangwon Province has a program where volunteer workers visit the elderly on a regular basis [16]. This study’s findings indicate that an increase in the period of self-quarantine and social distancing during the COVID-19 pandemic is likely to negatively influence and increase levels of depressive feelings. For individuals, a prolonged period of social distancing implies a fall in social capital, and it is crucial to restore such social capital. The best way to restore

social networks and to assist in its steady maintenance is the use of an online system. The online systems recommended by the CDC include telephone calls, e-mails, mailing letters or cards, text messages, video chats, and social media [4]. The COVID-19 psychiatric quarantine programs' effects are likely to be maximized if they are run in a community-focused way, through which the blind spots of COVID-19 mental health care can be addressed. The Paraguayan government switched to "smart quarantine" after the COVID-19 curve flattened [17]. Among the Central and South American countries, Paraguay has ensured the reliable management of COVID-19, and its government has imposed stringent policies to meet its primary goal of preventing the pandemic's spread. In this unprecedented global pandemic, Paraguay might become an even more successful model country for the management of COVID-19 if its future policies reflect the findings regarding the side effects of self-quarantine and social distancing, which affect mental health.

Conclusions

This study was aimed at determining the factors that influence depressive feelings in public officials in Paraguay caused by the COVID-19 pandemic through a web-based survey. The conclusions drawn from the study's findings are as follows:

To respond effectively to the prolonged COVID-19 pandemic, the Paraguayan government should supplement its stringent COVID-19 response policies with a policy for the vulnerable. Thus, a mental health care program in the form of a "targeted intervention" should be developed for public officials and medical staff. In particular, there is an urgent need for a specialized program for female officials, who were found to be more vulnerable to depressive feelings.

An increase in the period of self-quarantine due to COVID-19 was found to lead to higher levels of depressive feelings. As a solution, a program is required that targets people facing deteriorating mental health due to social isolation and loneliness caused by social distancing during the prolonged period of self-quarantine. Notably, the implementation of social prescribing programs has helped individuals whose mental health have been affected by COVID-19-induced depressive feelings.

Mental health care programs should be organized in a community-focused way by utilizing online systems for enhancing the effectiveness of mental health recovery. If the Paraguayan government were to analyze the side effects of self-quarantine and social distancing, and include these findings in its future policies, Paraguay could become a successful model country for the management of the COVID-19 pandemic.

Abbreviations

COVID-19: SARS-CoV-2

WHO: The World Health Organization

CDC: The Centers for Disease Control and Prevention

US: United Stats

UK: United Kingdom

YGHC: Yonsei Global Health Center

PHQ-9: the Patient Health Questionnaire

VIF: the variance inflation factor

Declarations

Ethics approval and consent to participate:

The study protocol was approved by the Institutional Review Board (IRB) of Yonsei University (IRB No. 1041849-202005-SB-057-02). All survey participants provided their informed consent prior to participation in the study.

Consent for publication:

None declared.

Availability of data and material:

The datasets used and/or analyzed during the current study are available from the corresponding author and can be released upon reasonable request.

Competing interests:

None declared

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Figures

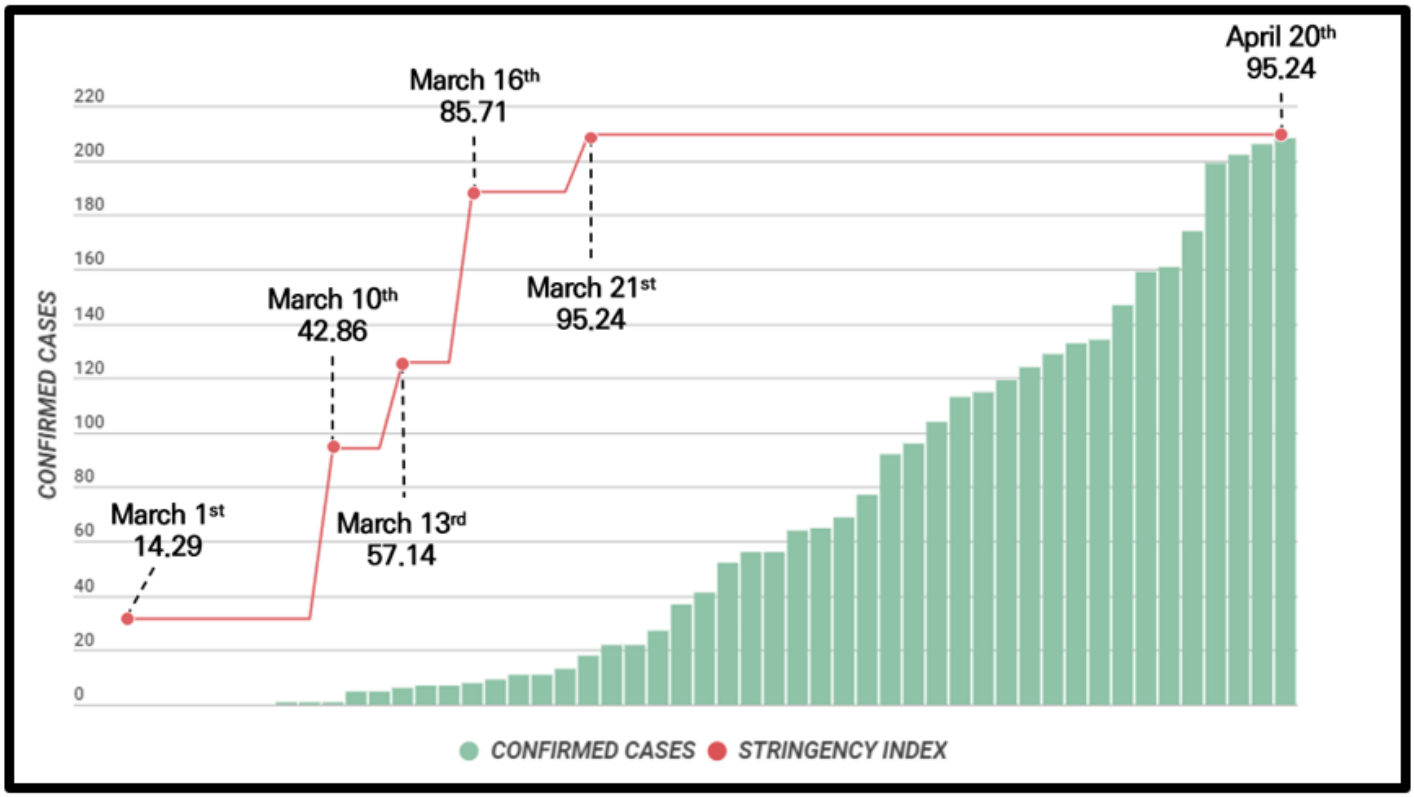

Figure 1

Current status of the COVID-19 Government Stringency Index and confirmed cases in Paraguay1) 1) DATA 2020-04-20