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ORIGINAL RESEARCH

Risk Perceptions, Level of Government Trust, and Psychological Distress During COVID-19 Pandemic in Taiwan

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Purpose: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is spreading worldwide, causing mental health concerns among people. People's perceptions of the disease affect their psychological adaptation and health outcomes. In this study, we present people's perceptions of coronavirus disease 2019 (COVID-19), level of government trust, and their psychological distress during the pandemic for examining the impact of peoples' COVID-19 perceptions on their mental health.

Patients and Methods: This cross-sectional study was conducted through a telephone survey in Taiwan in April 2020. Participants were randomly selected for telephone screening using a computer-assisted telephone interviewer system. A total of 1098 participants aged more than 20 years participated in the survey.

Results: The mean age of participants was 47.7 ± 16.4 years. After controlling for covariates, participants who were worried about contracting COVID-19, those who believed that they had a chance of being infected with COVID-19, those who were reluctant to visit the hospital for fear of contracting the virus, those who felt that the pandemic had affected their daily life, and those with low levels of trust in the government's capacity to manage the pandemic had anxiety, hostility, depression, interpersonal sensitivity/inferiority, and psychological symptoms.

Conclusion: People's perception of COVID-19 and public's trust in the government's ability to respond to the pandemic are related to psychological distress. Although the Taiwanese government may have undertaken effective epidemic control measures to address with the COVID-19 pandemic, this crisis may have still caused mental health problems in the general population. Health professionals and policy makers should pay more attention to high-risk groups among those at risk for developing mental health problems.

Keywords: COVID-19, perceptions, psychological distress, mental health, fears, trust, economic crisis

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a novel pandemic that has spread worldwide, and people are gradually becoming aware of this disease.[1] The symptoms of coronavirus disease 2019 (COVID-19) are fever, dry cough, fatigue, myalgia, slight dyspnea, and headache. Some patients in critical condition may experience pneumonia, respiratory failure, shock, or multiorgan failure.[2–4] By September 2022, the number of global COVID-19 cases had reached 606 million, and COVID-19 had caused nearly 6.49 million deaths.[5] The number of people affected by and dying from COVID-19 is rising rapidly, and this pandemic has had a negative impact on people, the global impact of the crisis is comparable to that of war.[6]

A public health emergency may negatively affect the health and safety of individuals and communities, and at a personal level, may lead to a sense of insecurity, confusion, and emotional isolation. At the society level, it may cause economic collapse, unemployment, lockdown, school closure, lack of medical resources, and insufficiency of daily necessities, consequently causing distress and psychiatric issues among people.[7] Moreover, continuous communications

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by governmental or nongovernmental sources through social media; limited knowledge; or information overload regarding COVID-19 can cause mental health problems.[8] The World Health Organization (WHO) has pointed out that enormous misinformation and gossips in media may cause the potential symptoms of stigma, fear, and anxiety.[9]

Those confirmed and suspected of having COVID-19 may suffer from loneliness, anxiety, depression, insomnia, or despair,[10,11] and more likely to increase risk of suicide.[12,13] The confinement due to the COVID-19 pandemic related to suicide and negative impact on mental health.[14–16] However, this problem arises even after the end of lock-down. Ambrosetti et al found that there was a statistically significant increase in suicidal behavior after lockdown measures were lifted compared to during lockdown.[17] During the COVID-19 pandemic, loneliness, psychosocial crises, and well-being decreased have become more common in the general population, the effects of which may be predisposing factors for suicide.[18] Patients with COVID-19 may have physical symptoms, psychosocial stressors, and post-traumatic stress symptoms, therefore, the COVID-19 survivors especially individuals with severe COVID-19 may be at high risk of suicidal.[19] Individuals suspected of having COVID-19 are unsure of their health and usually have symptoms of obsessive-compulsive disorder, such as repeatedly checking their body temperature and sanitizing their hands.[1,20,21]

Previous studies have examined the perception of COVID-19 and the mental health impact of the COVID-19.[22–29] Qi et al estimated the relationship between threatened perception types and mental status among pregnant women.[29] An online survey in China suggests that risk perception is a key factor related to mental health during the public health crisis.[27] Han et al also demonstrated that perception risk of COVID-19 was significantly associated with emotion and subsequent mental health.[30] However, these studies only focus on risk perceptions or specific populations. In this regard, our research evaluated psychological distress among Taiwanese during the COVID-19 epidemic, and examined their perceptions, fears, impact on daily life of the COVID-19, and public trust in government on their mental health.

Materials and Methods

Sampling Design and Participants

This cross-sectional study was conducted through a telephone survey in Taiwan in April 2020. People over the age of 20 living in Taiwan were the inclusion criteria for this study. Participants were randomly selected for telephone screening using a computer-assisted telephone interviewer (CATI) system. For sample selection, this study used random country- and city-stratified proportional sampling and random dialing of noninstitutionalized adults living in private households in Taiwan. According to the estimate of 19 million people more than 20 years old living in Taiwan in 2020, a representative sample size of at least 1068 was required, with a sampling error of 0.03. To ensure representativeness, after the respondent completed the survey, the ranking technology was used to weigh and adjust gender and age. A total of 1098 participants aged over 20 years participated in the survey.

Structured questionnaires were used to determine the participants' knowledge and perceptions of COVID-19 and their psychological distress. To reduce nonsampling errors caused by human error and to ensure data quality, interviewer training will be conducted on the content of the questionnaire before the formal telephone survey. All information was collected by well-trained interviewers, and a field pretest was conducted to evaluate the internal consistency and comprehensibility of the interview. The interviewer sat in front of the computer for a telephone interview and entered the answers directly into the computer. The interview procedure was simple. To prevent sampling bias, in case of unanswered phone calls, the interviewer was required to wait for the phone to ring for 30 seconds before hanging up the call and was required to make at least three attempts at different time points. To reduce allocation bias, researchers often compared the demographic distributions of the respondents to the corresponding distribution of the population of Taiwan during the interview period.

Ethical Considerations

The study was conducted through a telephone survey. This telephone questionnaire is anonymous, therefore, there is no information such as names, addresses, or personal information will be asked during the interview process. Each personal data of the case is strictly protected, and the survey data is for descriptive statistical analysis and research use. No personal data will be released, and all personnel who collected data will also be responsible for confidentiality. Generally,

telephone interviews require only the verbal consent of the interviewee. As soon as people answered the phone, the interviewer introduced themselves and told the respondent the purpose of the call, and then asked the respondent if they would like to be interviewed. In this survey, verbal consent was obtained from all participants. This study and use verbal consent to conduct this survey was approved by the Institutional Review Board of Taipei Hospital, Ministry of Health and Welfare (No. TH-IRB-0020-0005) and adhered to the ethical principles of the Declaration of Helsinki.

Measures

The study was implemented using a structured questionnaire that included demographic information, and investigated perceptions of COVID-19 and psychological distress. Information on sociodemographic characteristics including age, sex, education level, residential area, and sources of information on COVID-19 was collected. The questionnaire had six items on perceptions, namely (1) "How would you rate the degree of severity regarding COVID-19?" (Answer: "extremely/very/slightly/not at all"); (2) "Are you worried about contracting COVID-19 in Taiwan?" (Answer: "extremely/very/slightly/not at all"); (3) "Is it possible for you to be infected with COVID-19?" (Answer: "very probable/somewhat probable/neutral/somewhat improbable/not probable"); (4) "Are you scared to visit the hospital during the COVID-19 pandemic?" (Answer: "extremely/ very/ slightly/ not at all"); (5) "Does the COVID-19 pandemic affect your daily life?" (Answer: "major affect/moderate affect/no affect"); (6) "Do you have confidence in the government's ability to manage the COVID-19 pandemic?" (Answer: "completely confident/fairly confident/slightly confident/not confident at all"). The questionnaire was validated in terms of content validity through expert judgement.

This study used the 5-item Brief Symptom Rating Scale (BSRS-5) to measure psychological distress experienced by participants in the past week. The BSRS-5 is derived from the 50-item Brief Symptom Rating Scale, which measures anxiety, depression, hostility, interpersonal sensitivity/inferiority, and insomnia.[31] Each item is scored on a 5-point Likert-style scale, with 0 indicating "not at all", 1 indicating "a little bit", 2 indicating "moderately", 3 indicating "quite a bit", and 4 indicating "extremely." A cut-off total score of BSRS-5 of ≥6 indicates psychological morbidity; this score is determined through receiver operating characteristic curve analysis.[32] The BSRS-5 is a global measurement and case-finding screening instrument with high reliability and validity.[31,33] It is widely used for evaluation in psychiatric and nonpsychiatric medical settings.[34,35]

Study Variables and Definitions

This study divided people's perception to COVID-19 into two categories based on the following criteria: (1) "How would you rate the degree of severity regarding COVID-19?" was divided into "mild (slightly and not at all)" and "severe (extremely and very)"; (2) "Are you worried about contracting COVID-19 in Taiwan?" was divided into "no (slightly and not at all)" and "yes (extremely and very)"; (3) "Is it possible for you to be infected with COVID-19?" was divided into "no (neutral, somewhat improbable, and not probable)" and "yes (very probable and somewhat probable)"; (4) "Are you scared to visit the hospital during the COVID-19 pandemic?" was divided into "no (slightly and not at all)" and "yes (extremely and very)"; (5) "Does the COVID-19 pandemic affect your daily life?" was divided into "no (no affect)" and "yes (major affect and moderate affect)"; (6) "Do you have confidence in the government's ability to manage the COVID-19 pandemic?" was divided into "no (slightly confident and not confident at all)" and "yes (completely confident and fairly confident)."

The responses for the 5-item psychological distress questionnaire (anxiety, depression, hostility, interpersonal sensitivity/ inferiority, and insomnia) were dichotomized as "no" versus "yes" based on the following criteria: an item score of 0 indicated no psychological distress, and scores greater than 1 indicated having psychological distress. Total BSRS-5 score <5 indicated no psychological morbidity, and the total BSRS-5 score ≥6 indicated the presence of psychological morbidity.

Statistical Analysis

Participant characteristics were analyzed based on descriptive statistics. The chi-square test was used to determine significant differences between participants with and without psychological distress, including anxiety, depression, hostility, interpersonal sensitivity/inferiority, and insomnia. After adjusting for age, sex, education level, and residential

area, we used multiple logistic regression to identify statistically significant associations between perceptions and psychological distress. Odds ratio (OR) with 95% confidence interval (CI) was calculated for each independent variable in multiple logistic regression. The results were considered statistically significant if p values were less than 0.05. All analyses and calculations were performed using SPSS Version 18 (SPSS Inc., Chicago, IL, USA).

Results

Table 1 lists the baseline demographics of the study participants. The mean age of participants was 47.7 ± 16.4 years, and most of them (48.1%) were aged 20–45 years. The majority (51.6%) of participants were female, 42.4% had studied up to junior college or above, and 69.5% lived in urban areas. With regard to the information sources of COVID-19, 74.1% of participants had received COVID-19-related information from the television. The prevalence of psychological distress among participants was as follows: 14.9% of them had insomnia, 22.4% had anxiety, 14% experienced hostility, 16.1% had depression, 6.1% experienced interpersonal sensitivity/inferiority, 5.3% had psychological morbidity, and 1% had suicidal ideation.

With regard to perceptions of COVID-19, the majority of participants believed that COVID-19 infection was serious. Nearly 80% of participants were worried about contracting COVID-19 (31.6% were "extremely worried", and 47.4% were

Table 1 The Demographic of Participants (n=1098)

Variable	n	%
Sex		
Male	532	48.4
Female	566	51.6
Age, year (means, sd)	47.7	16.4
20–45	525	48.1
46–64	383	35.1
≥65	183	16.8
Education level		
Junior high school or below	183	16.7
Senior high school	448	40.9
Junior college or above	465	42.4
Residential area		
Urban[a]	763	69.5
Suburb	335	30.5
Information Sources of COVID-19		
Television	813	74.1
Websites	141	12.9
Social Media	46	4.2
Group Messaging Apps / Live stream	48	4.4
Newspapers	30	2.7
Others[b]	19	1.7
Psychological distress		
Insomnia	164	14.9
Anxiety	246	22.4
Hostility	154	14.0
Depression	177	16.1
Interpersonal sensitivity/inferiority	67	6.1
Psychological morbidity		
Without	1040	94.7
With	58	5.3
Suicidal ideation	11	1.0

Notes: [a]Urban including Taipei City, New Taipei City, Taoyuan City, Taichung City, Kaohsiung City. [b]Hospitals, doctors, nurse, pharmacists, Ministry of Health, relatives and friends, schools.

"very worried"), and about half of the participants believed that they had a chance of being infected with COVID-19. Moreover, only 24.9% of participants were reluctant to visit the hospital for fear of contracting the virus (7.8% were "extremely scared", and 17.1% were "very scared"). Approximately 73.5% of participants reported that the pandemic has affected their daily life (19.9% thought that it had a "major effect", and 53.6% thought that it had a "moderate effect"). Lastly, most (93.4%) participants indicated that they were confident in the government's ability to manage the pandemic (Table 2).

Table 3 shows the distribution of psychological distress according to the demographics of participants and their perception of COVID-19. A significantly higher percentage of female patients than male patients had insomnia (60.4%), anxiety (61.8%), hostility (64.9%), and depression (63.3%). A significantly higher percentage of participants who were worried about contracting COVID-19 had anxiety (93.5%) and depression (87.6%) than participants who were not worried. A significantly higher percentage of participants who believed that they had a chance of being infected with COVID-19 had insomnia (50.0%), anxiety (53.4%), hostility (53.2%), depression (54.5%), and suicidal ideation (81.8%) than participants who believed that it was impossible for them to be infected. A significantly higher percentage of participants who were reluctant to visit the hospital for fear of contracting the virus had insomnia (40.9%), anxiety (41.6%), hostility (34.4%), depression (37.3%), and interpersonal sensitivity/inferiority (41.5%) than participants who were not afraid. A significantly higher percentage of participants who reported that the pandemic had affected their daily life exhibited insomnia (86.0%), anxiety (89.8%), hostility (93.5%), depression (92.7%), and interpersonal sensitivity/

Table 2 Perceptions Towards COVID-19

Variable	n	%
How would you rate the severity of COVID-19 infection?		
Extremely	917	84.1
Very	154	14.1
Slightly	18	1.7
Not at all	1	0.1
Are you worried about contracting COVID-19 in Taiwan?		
Extremely	346	31.6
Very	519	47.4
Slightly	184	16.8
Not at all	47	4.3
Is it possible for you to be infected with COVID-19?		
Very probable	60	5.5
Somewhat probable	407	37.1
Neutral	109	9.9
Somewhat improbable	452	41.2
Not probable	70	6.4
Are you scared to go to the hospital because you are fear of contracting COVID-19?		
Extremely	85	7.8
Very	187	17.1
Slightly	369	33.8
Not at all	451	41.3
Does the COVID-19 pandemic affect your daily life?		
Major affect	219	19.9
Moderate affect	589	53.6
No affect	290	26.4
Do you have confidence in the government's ability to handle the COVID-19 pandemic?		
Completely confident	594	54.4
Fairly confident	425	39.0
Slightly confident	54	4.9
Not confident at all	18	1.6

Table 3 The Distribution of the Psychological Distress by Demographic of Participants and Perception to COVID-19

Variable	Insomnia					Anxiety					Hostility				
	No		Yes		P-value	No		Yes		P-value	No		Yes		P-value
	n	%	n	%		n	%	n	%		n	%	n	%	
Sex					0.019					<0.001					<0.001
Male	466	49.9	65	39.6		438	51.4	94	38.2		478	50.6	54	35.1	
Female	467	50.1	99	60.4		414	48.6	152	61.8		466	49.4	100	64.9	
Age, year					0.071					0.389					0.278
20–45	455	49.1	69	42.1		407	48.2	118	48.0		446	47.6	79	51.3	
46–64	326	35.2	58	35.4		290	34.3	93	37.8		327	34.9	56	36.4	
≥65	146	15.7	37	22.6		148	17.5	35	14.2		164	17.5	19	12.3	
Education level					0.431					0.385					0.147
Junior high school or below	150	16.1	32	19.5		142	16.7	41	16.7		163	17.3	21	13.6	
Senior high school	388	41.6	61	37.2		357	42.0	92	37.4		392	41.6	57	37.0	
Junior college or above	394	42.3	71	43.3		352	41.4	113	45.9		388	41.1	76	49.4	
Residential area					0.510					1.000					0.927
Urban[a]	644	69.0	118	72.0		592	69.5	171	69.5		655	69.4	108	70.1	
Suburb	289	31.0	46	28.0		260	30.5	75	30.5		289	30.6	46	29.9	
How would you rate the severity of COVID-19 infection?					0.839					0.326					0.588
Mild	17	1.8	2	1.2		17	2.0	2	0.8		15	1.6	4	2.6	
Severe	910	98.2	159	98.8		828	98.0	243	99.2		921	98.4	150	97.4	
Are you worried about contracting COVID-19 in Taiwan?					0.540					<0.001					0.219
No	199	21.4	31	18.9		215	25.3	16	6.5		205	21.7	26	17.0	
Yes	732	78.6	133	81.1		635	74.7	230	93.5		738	78.3	127	83.0	
Is it possible for you to be infected with COVID-19?					0.045					<0.001					0.005
No	548	58.7	82	50.0		516	60.6	115	46.6		559	59.2	72	46.8	
Yes	385	41.3	82	50.0		335	39.4	132	53.4		385	40.8	82	53.2	
Are you scared to go to the hospital because you are fear of contracting COVID-19?					<0.001					<0.001					0.004
No	723	77.9	97	59.1		667	79.9	143	58.4		719	76.7	101	65.6	
Yes	205	22.1	67	40.9		170	20.1	102	41.6		219	23.3	53	34.4	
Does the COVID-19 pandemic affect your daily life?					<0.001					<0.001					<0.001
No	267	28.6	23	14.0		265	31.1	25	10.2		280	29.7	10	6.5	
Yes	665	71.4	141	86.0		586	68.9	221	89.8		663	70.3	144	93.5	
Do you have confidence in the government's ability to handle the COVID-19 pandemic?					0.784					0.131					<0.001
No	60	6.5	12	7.4		51	6.0	22	9.0		51	5.4	21	13.9	
Yes	868	93.5	150	92.6		797	94.0	222	91.0		888	94.6	130	86.1	

Variable	Depression					Interpersonal sensitivity/ inferiority					Suicidal ideation				
	No		Yes		P-value	No		Yes		P-value	No		Yes		P-value
	n	%	n	%		n	%	n	%		n	%	n	%	
Sex					0.001					0.637					1.000
Male	467	50.7	65	36.7		499	48.5	30	44.8		527	48.5	5	45.5	
Female	454	49.3	112	63.3		529	51.5	37	55.2		560	51.5	6	54.5	
Age, year					0.379					0.105					0.561
20–45	447	48.9	78	44.1		482	47.2	40	60.6		518	47.9	7	63.6	
46–64	313	34.2	70	39.5		365	35.7	18	27.3		381	35.2	3	27.3	
≥65	155	16.9	29	16.4		175	17.1	8	12.1		183	16.9	1	9.1	
Education level					0.536					0.113					0.643
Junior high school or below	157	17.1	27	15.2		176	17.1	7	10.4		181	16.7	3	27.3	
Senior high school	380	41.3	69	38.8		425	41.3	24	35.8		445	40.9	4	36.4	
Junior college or above	383	41.6	82	46.1		427	41.5	36	53.7		461	42.4	4	36.4	
Residential area					0.789					0.344					0.574
Urban[a]	638	69.3	125	70.6		720	70.0	42	63.6		755	69.4	9	81.8	
Suburb	283	30.7	52	29.4		309	30.0	24	36.4		333	30.6	2	18.2	
How would you rate the severity of COVID-19 infection?					1.000					1.000					1.000
Mild	15	1.6	3	1.7		18	1.8	1	1.5		19	1.8	0	0	
Severe	900	98.4	170	98.3		1003	98.2	65	98.5		1060	98.2	11	100	
Are you worried about contracting COVID-19 in Taiwan?					0.003					0.637					1.000
No	209	22.7	22	12.4		217	21.1	12	17.9		229	21.1	2	18.2	
Yes	710	77.3	155	87.6		810	78.9	55	82.1		857	78.9	9	81.8	
Is it possible for you to be infected with COVID-19?					0.001					0.103					0.019
No	550	59.8	81	45.5		597	58.0	31	47.0		629	57.9	2	18.2	
Yes	370	40.2	97	54.5		432	42.0	35	53.0		458	42.1	9	81.8	
Are you scared to go to the hospital because you are fear of contracting COVID-19?					<0.001					0.002					0.593
No	710	77.5	111	62.7		780	76.1	38	58.5		814	75.2	7	63.6	
Yes	206	22.5	66	37.3		245	23.9	27	41.5		268	24.8	4	36.4	
Does the COVID-19 pandemic affect your daily life?					<0.001					0.003					0.098
No	277	30.1	13	7.3		284	27.6	7	10.4		290	26.7	0	0	
Yes	643	69.9	164	92.7		745	72.4	60	89.6		797	73.3	11	100	
Do you have confidence in the government's ability to handle the COVID-19 pandemic?					<0.001					0.563					0.282
No	49	5.4	24	13.6		66	6.5	6	9.1		70	6.5	2	20.0	
Yes	866	94.6	152	86.4		956	93.5	60	90.9		1011	93.5	8	80.0	

Notes: [a]Urban including Taipei City, New Taipei City, Taoyuan City, Taichung City, Kaohsiung City.

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inferiority (89.6%) than participants who reported that the pandemic did not affect their daily life. A significantly higher percentage of participants who had confidence in the government's ability to manage the pandemic had hostility (86.1%) and depression (86.4%) than participants who were not confident.

Table 4 shows the distribution of psychological morbidity according to the demographics of participants and their perception of COVID-19. More participants without psychological morbidity were reluctant to visit the hospital for fear of contracting the virus (51.7%), reported that the pandemic had affected their daily life (91.4%), and had confidence in the government's ability to manage the pandemic (93.8%).

Table 5 shows the psychological distress experienced by participants and the relevant factors. After controlling for covariates, being worried about contracting COVID-19 was positively associated with a higher odds of having anxiety (OR = 4.57, 95% CI: 2.69–7.75) and depression (OR = 1.91, 95% CI: 1.18–3.07) than not being worried. After controlling for covariates, a belief of a chance of being infected with COVID-19 was positively associated with a higher odds of having insomnia (OR = 1.44, 95% CI: 1.03–2.02), anxiety (OR = 1.74, 95% CI: 1.30–2.33), hostility (OR = 1.54,

Table 4 The Distribution of the Psychological Morbidity by Demographic of Participants and Perception to COVID-19

Variable	Without		With		P-value
	n	%	n	%	
Sex					0.331
Male	508	48.8	24	41.4	
Female	532	51.2	34	58.6	
Age, year					0.333
20–45	500	48.4	25	42.4	
46–64	363	35.1	20	33.9	
≥65	170	16.5	14	23.7	
Education level					0.301
Junior high school or below	170	16.4	13	22.0	
Senior high school	430	41.4	19	32.2	
Junior college or above	438	42.2	27	45.8	
Residential area					0.888
Urban[a]	722	39.4	42	71.2	
Suburb	318	30.6	17	28.8	
How would you rate the severity of COVID-19 infection?					1.000
Mild	18	1.7	1	1.8	
Severe	1015	98.3	55	98.2	
Are you worried about contracting COVID-19 in Taiwan?					0.367
No	222	21.4	9	15.5	
Yes	816	78.6	49	84.5	
Is it possible for you to be infected with COVID-19?					0.007
No	608	58.5	23	39.7	
Yes	431	41.5	35	60.3	
Are you scared to go to the hospital because you are fear of contracting COVID-19?					<0.001
No	792	76.6	28	48.3	
Yes	242	23.4	30	51.7	
Does the COVID-19 pandemic affect your daily life?					0.003
No	285	27.4	5	8.6	
Yes	754	72.6	53	91.4	
Do you have confidence in the government's ability to handle the COVID-19 pandemic?					0.040
No	64	6.2	8	14.0	
Yes	970	93.8	49	86.0	

Notes: [a]Urban including Taipei City, New Taipei City, Taoyuan City, Taichung City, Kaohsiung City.

Table 5 Crude and Multiple Logistic Regression of Psychological Distress by Perception to COVID-19

Variable	Insomnia						Anxiety					
	Crude			Adjusted[a]			Crude			Adjusted[a]		
	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value
How would you rate the severity of COVID-19 infection?												
Mild	1			1			1			1		
Severe	1.31	(0.32–5.38)	0.706	1.34	(0.32–5.53)	0.687	2.07	(0.52–8.18)	0.301	2.11	(0.53–8.43)	0.291
Are you worried about contracting COVID-19 in Taiwan?												
No	1			1			1			1		
Yes	1.17	(0.77–1.78)	0.465	1.07	(0.70–1.65)	0.746	4.75	(2.81–8.04)	<0.001	4.57	(2.69–7.75)	<0.001
Is it possible for you to be infected with COVID-19?												
No	1			1			1			1		
Yes	1.41	(1.01–1.97)	0.043	1.44	(1.03–2.02)	0.035	1.77	(1.33–2.35)	<0.001	1.74	(1.30–2.33)	<0.001
Are you scared to go to the hospital because you are fear of contracting COVID-19?												
No	1			1			1			1		
Yes	2.42	(1.71–3.43)	<0.001	2.33	(1.64–3.31)	<0.001	2.85	(2.10–3.87)	<0.001	2.87	(2.10–3.91)	<0.001
Does the COVID-19 pandemic affect your daily life?												
No	1			1			1			1		
Yes	2.47	(1.55–3.92)	<0.001	2.58	(1.60–4.16)	<0.001	3.99	(2.57–6.18)	<0.001	3.92	(2.50–6.13)	<0.001
Do you have confidence in the government's ability to handle the COVID-19 pandemic?												
No	1			1			1			1		
Yes	0.84	(0.45–1.58)	0.589	0.92	(0.48–1.74)	0.788	0.65	(0.39–1.10)	0.108	0.68	(0.40–1.16)	0.160
Variable	**Hostility**						**Depression**					
	Crude			Adjusted[a]			Crude			Adjusted[a]		
	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value	OR	95% CI	P-value
How would you rate the severity of COVID-19 infection?												
Mild	1			1			1			1		
Severe	0.60	(0.20–1.81)	0.362	0.60	(0.19–1.86)	0.378	0.83	(0.26–2.69)	0.760	0.84	(0.26–2.74)	0.771
Are you worried about contracting COVID-19 in Taiwan?												
No	1			1			1			1		
Yes	1.36	(0.85–2.09)	0.204	1.25	(0.79–1.96)	0.338	2.07	(1.29–3.31)	0.003	1.91	(1.18–3.07)	0.008
Is it possible for you to be infected with COVID-19?												
No	1			1			1			1		

(*Continued*)

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Table 5 (Continued).

Yes	1.63	(1.16–2.30)	0.005	1.54	(1.09–2.18)	0.015	1.78	(1.29–2.46)	<0.001	1.74	(1.25–2.42)	0.001
Are you scared to go to the hospital because you are fear of contracting COVID-19?												
No	1			1			1			1		
Yes	1.71	(1.18–2.46)	0.004	1.70	(1.17–2.46)	0.005	2.04	(1.45–2.87)	<0.001	1.95	(1.38–2.77)	<0.001
Does the COVID-19 pandemic affect your daily life?												
No	1			1			1			1		
Yes	6.21	(3.21–12.03)	<0.001	5.79	(2.97–11.32)	<0.001	5.32	(2.99–9.47)	<0.001	5.15	(2.87–9.26)	<0.001
Do you have confidence in the government's ability to handle the COVID-19 pandemic?												
No	1			1			1			1		
Yes	0.36	(0.21–0.61)	<0.001	0.37	(0.21–0.64)	<0.001	0.36	(0.21–0.61)	<0.001	0.38	(0.22–0.65)	<0.001
Variable	**Interpersonal sensitivity/inferiority**						**Psychological morbidity**					
	Crude			**Adjusted[a]**			**Crude**			**Adjusted[a]**		
	OR	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**	**OR**	**95% CI**	**P-value**
How would you rate the severity of COVID-19 infection?												
Mild	1			1			1			1		
Severe	1.85	(0.15–22.73)	0.632	2.01	(0.16–25.07)	0.588	1.56	(0.13–19.20)	0.730	1.61	(0.13–19.98)	0.711
Are you worried about contracting COVID-19 in Taiwan?												
No	1			1			1			1		
Yes	1.25	(0.66–2.40)	0.495	1.28	(0.66–2.46)	0.465	1.51	(0.73–3.12)	0.271	1.42	(0.68–2.96)	0.353
Is it possible for you to be infected with COVID-19?												
No	1			1			1			1		
Yes	1.58	(0.96–2.59)	0.073	1.48	(0.89–2.44)	0.130	2.19	(1.278–3.767)	0.004	2.29	(1.32–3.97)	0.003
Are you scared to go to the hospital because you are fear of contracting COVID-19?												
No	1			1			1			1		
Yes	2.28	(1.37–3.81)	0.002	2.45	(1.46–4.11)	0.001	3.42	(2.00–5.82)	<0.001	3.35	(1.96–5.75)	<0.001
Does the COVID-19 pandemic affect your daily life?												
No	1			1			1			1		
Yes	3.41	(1.52–7.69)	0.003	3.19	(1.40–7.26)	0.006	3.74	(1.52–9.20)	0.004	4.01	(1.60–10.04)	0.003
Do you have confidence in the government's ability to handle the COVID-19 pandemic?												
No	1			1			1			1		
Yes	0.68	(0.27–1.62)	0.384	0.66	(0.28–1.59)	0.359	0.39	(0.18–0.85)	0.017	0.42	(0.19–0.92)	0.030

Notes: [a]Odds ratio were adjusted for covariate factors, including age, sex, education level, and residential area.
Abbreviations: OR, odds ratio; CI, confidence interval.

95% CI: 1.09–2.18), depression (OR = 1.74, 95% CI: 1.25–2.42), and psychological symptoms (OR = 2.29, 95% CI: 1.32–3.97) than a belief the impossibility of infection. After controlling for covariates, reluctance to visit the hospital for fear of contracting the virus was positively associated with a high odds of having insomnia (OR = 2.33, 95% CI: 1.64–3.31), anxiety (OR = 2.87, 95% CI: 2.10–3.91), hostility (OR = 1.70, 95% CI: 1.17–2.46), depression (OR = 1.95, 95% CI: 1.38–2.77), interpersonal sensitivity/inferiority (OR = 2.45, 95% CI: 1.46–4.11), and psychological symptoms (OR = 3.35, 95% CI: 1.96–5.75) compared with not being afraid. After controlling for covariates, reporting that the pandemic had affected their daily life was positively associated with high odds of having insomnia (OR = 2.58, 95% CI: 1.60–4.16), anxiety (OR = 3.92, 95% CI: 2.50–6.13), hostility (OR = 5.79, 95% CI: 2.97–11.32), depression (OR = 5.15, 95% CI: 2.87–9.26), interpersonal sensitivity/inferiority (OR = 3.19, 95% CI: 1.40–7.26), and psychological symptoms (OR = 4.01, 95% CI: 1.60–10.04) compared with a report that the pandemic did not affect daily life. After controlling for covariates, having confidence in the government's ability to manage the pandemic was negatively associated with a low odds of hostility (OR = 0.37, 95% CI: 0.21–0.64), depression (OR = 0.38, 95% CI: 0.22–0.65), and psychological morbidity (OR = 0.42, 95% CI: 0.19–0.92) compared with not being confident.

Discussion

This cross-sectional study conducted through telephone surveys investigated whether people's perceptions of COVID-19 were associated with psychological distress during the COVID-19 outbreak. As a matter of fact, during the investigation of this study in April 2020, COVID-19 had already spread and affected numerous people around the world. At that time, the pandemic condition in Taiwan was not critical. Apart from for a few sporadic clusters and infections overseas, the cumulative number of confirmed cases of COVID-19 were only about 400, and the cumulative death toll was less than 10. However, at that moment, there was a lot of news about COVID-19 on social media, there was no vaccine and specific treatments for COVID-19, and there was a shortage of personal protective equipment, which effects on people's emotional wellbeing. Therefore, regardless of the spread and severity of the COVID-19 pandemic in each country, perceptions of COVID-19 are factors that affect people's mental health. We found that participants who were worried about contracting COVID-19, who believed that they had a chance of being infected with COVID-19, who were reluctant to visit the hospital for fear of contracting the virus, who believed that the pandemic had affected their daily life, and who had high levels of trust in the government's capacity to manage the pandemic experienced anxiety, hostility, depression, interpersonal sensitivity/inferiority, and psychological symptoms. To the best of our knowledge, this is the first study to investigate the impact of the perceptions of Taiwanese residents about COVID-19 on their mental health.

Our findings are similar to those of previous studies, which have reported that public health emergencies may lead to a universal psychological crisis, such as that observed during severe acute respiratory syndrome (SARS),[36] the 2009–2010 swine flu (influenza H1N1),[37] the 2014–2016 Ebola epidemic,[38] and the 2015–2016 Zika virus.[39] Our data indicated that the fear of contracting the coronavirus was positively related to psychological distress. Fear is an adaptive emotion that can mobilize the energy to cope with potential danger. However, severe fears may have adverse effects on an individual. A cross-sectional online survey indicated that health-related anxiety was related to the increased fear of the current coronavirus pandemic.[40] Perceived stress related to COVID-19 was significantly associated with high suicide risk during confinement.[41] A previous systematic review and meta-analysis concluded that mental health problems during COVID-19 include anxiety, depression, insomnia, post-traumatic stress disorder, and psychological distress.[42] Costanza et al investigated different types of COVID-19-related fear in patients admitted to the psychiatric emergency department during the lockdown and post-lockdown periods.[43] The patients were more fearful of losing their jobs or deteriorating work status during the lockdown compared to the post-lockdown.[43] During the post-lockdown periods, the feeling of hopelessness became more prominent.[43]

In the present study, we investigated whether the belief that the COVID-19 pandemic has affected their daily life was associated with several mental health issues. To control the spread of infectious diseases, many strict public health measures have been implemented, including applying strict personal hygiene, mandatory wearing of masks, restricting social gatherings, maintaining a social distance of more than 1 m outdoors and 1.5 m indoors, strict quarantine, and restricting travel between countries.[44] A previous systematic review and meta-analysis concluded that social isolation is associated with physical and mental health problems, such as increased risks of early mortality, depression, and anxiety.[45]

A cross-country study on Polish and Chinese populations indicated that wearing face masks could lead to public anxiety and confusion.[46] A cohort study of students from the University of Pittsburgh demonstrated that lifestyle disruptions lead to an increased risk of depression during the pandemic.[47] The implementation and enforcement of strict regulations and preventive strategies are critical risk factors for poor physical and mental health.[48]

Our data indicated that the majority of the public trusted the government's effective response to the COVID-19 pandemic. A significant association was observed between the public's trust in the government's ability to respond to the pandemic and the mental health of the public. During the COVID-19 public health emergency, the Taiwanese government established the "Central Epidemic Command Center", an epidemic information platform. From January 23, 2020, daily press conferences were held to keep the public informed of the progress of the epidemic and policy changes and to clarify misinformation.[49,50] Risk communication is an important precedent for physical and mental health during a pandemic.[48,51] Daily risk communication by providing the public with factual information about the current situation can relieve physical and mental tension.[48] The public's trust in risk communication by the government may affect their perceived self-efficacy in practicing preventive measures and voluntary adherence with policy programs,[52,53] which is positively related to mental health.[48] In times of instability or economic crisis, the "interpersonal trust" among individuals was a protective factor for mental health problems, and people with low interpersonal trust were significantly associated with suicidal ideation.[54] During the Covid-19 pandemic, social networking, family support, and interpersonal trust could reduce feelings of loneliness and suicidal ideation.[55] Furthermore, having trust in institutions, such as trust in the government policy measures including interventions for the unemployed, sustained welfare, and activating labor market programs, can be effective in preventing suicide.[55]

The present study demonstrated that women experience more insomnia, anxiety, hostility, and depression than men. A cross-sectional study in Poland showed that female gender is one of the risk factors for depression and anxiety.[56] A cross-country epidemiologic survey comparing populations from China and Poland reported that men showed significantly lower scores of the Impact of Event Scale-Revised and Depression and the Anxiety and Stress Scale during the COVID-19 pandemic.[46] Many studies have also shown that the prevalence of anxiety,[57] panic disorder,[57] depression,[58] and trauma- and stress-related disorders[57,59] is higher in women than in men, which might be attributable to environmental risk factors, gender-specific biological factors such as latent gender-dimorphic temperamental factors,[57] and changes in ovarian hormones.[60] Recent empirical research showed that women have a higher incidence of severe emotional exhaustion than men among Chilean higher education students during the COVID-19 pandemic.[61] A systematic review of nine studies involving 106,814 higher education students demonstrated that health, psychological, ethnographic, and contextual factors were associated with suicidal thoughts and ideation during the COVID-19 pandemic.[62]

Our study has strengths and originality. This is the large population-based survey in Taiwan to investigated people's perceptions or fear of the impact of COVID-19 on mental health. Our study specifically examined the confidence in the measures taken by the government and the psychological distress or psychiatric conditions during COVID-19 pandemic. However, the study has some limitations. First, the COVID-19 pandemic has affected Taiwan at different times and to varying degrees. This research survey represents people's perception of COVID-19 and their psychological distress only in April 2020. Second, a bias exists in data collected through CATI, which is a noncoverage bias among citizens whose households do not have telephones. Third, our study also lacks information of potential confounding factors, such as personal mental disorder history, work condition, socioeconomic state. Fourth, we absence of methods to ensure inter-rater reliability between interviewers. However, before the interviewer conducts the formal investigation, interviewer training will be performed on the content of the questionnaire so that the interviewer can understand the purpose and content of the investigation for the interview in advance. Finally, the cross-sectional study design makes it impossible to make a causal inference.

Conclusion

This study showed that during the pandemic, the general population experienced a high rate of insomnia, anxiety, hostility, and depression. People's perception of COVID-19 is related to psychological distress. In particular, we observed that the public's trust in the government's ability to respond to the pandemic was significantly associated with the mental health of the public. Although the Taiwanese government can take effective epidemic control measures to

manage the COVID-19 pandemic, this crisis may still cause mental health problems in the general population. Therefore, we recommend raising awareness of the importance of mental health during the COVID-19 pandemic. Health professionals and policy makers should pay more attention to high-risk groups among those at risk for developing mental health problems. In addition, the impact of the COVID-19 on health, economy, and social environment may cause psychological problems in the next period. Therefore, government policies on mental health should be a long-term plan, and we also suggest that future research on such topics must constantly explore the mental health issues of the high-risk groups in the post-pandemic era.

Disclosure

The authors report no conflicts of interest in this work.

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