

A Study of the Psychological Impacts of COVID-19 Pandemic

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ABSTRACT

Background: World Health organization announced COVID-19 pandemic by March 11,2020. As a result, Saudi Arabia started strict precautionary measurements to minimize the implications of this pandemic. In spite of most individuals accept these measures, they experienced psychological distress.

Objective: To assess the early psychological reactions to COVID-19 pandemic and investigate the possible explanation of them. **Methods:** the study included 1588 participants who are responded to structured online questionnaire. Demographic characteristics, source of pandemic news, history of coming from infected countries or contact with infected persons, physical symptoms suggesting COVID-19 infection and opinion about precautionary measures are assessed. Early psychological impacts are assessed by Arabic version of the Depression, Anxiety and Stress Scale (DASS-21). Defense mechanisms used by respondents are assessed by Arabic version of Defense Style Questionnaire 40 (DSQ-40).

Results: Social media was the main source of information for COVID-19 pandemic. Stress, anxiety and depression significantly ($p < 0.001$) more among female ($X^2=20.4$, $X^2=46.14$, $X^2=15.67$ respectively), those younger than 50 years ($X^2=80.78$, $X^2=156.9$, $X^2=80.97$ respectively), and non-health care providers ($X^2=208.38$, $X^2=311.3$, $X^2=304.74$ respectively). Home quarantine was significantly associated with stress ($X^2=37.33$, $p < 0.001$), anxiety ($X^2=6.812$, $p < 0.009$) and depression ($X^2=15.41$, $p < 0.001$). **Limitations:** Causal relationship cannot be inferred due to the cross-sectional design of the current study.

Conclusions: Psychological distress may be an early implication to COVID-19 pandemic. Precautionary measures, source of information and defense mechanisms used by participants may represent be contributing factors for psychological reactions.

Keywords: Stress; Anxiety; Depression; COVID-19 pandemic; Psychological impacts

INTRODUCTION

In late December 2019, China reported many cases with pneumonia that progressed rapidly to fatal pneumonia. This illness later identified as severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) [1-3]. Because of this syndrome occurred in 2019, patients with the illness called coronavirus disease 2019 (COVID-19) [4]. On March 11, 2020, the World Health Organization reported COVID-19 to be pandemic [5]. On March 2, 2020, Saudi Arabia confirmed its first case with COVID-19 for a Saudi national returning from Iran via Bahrain. Every day at 3 pm, the Ministry of Health in Saudi Arabia holds a press conference to announce

the number of new infected and dead cases, as well as recoveries. On February 27, 2020 and before registering any confirmed case, Saudi Arabia announced temporary suspension of entry for individuals wanting to perform the Umrah pilgrimage in Mecca or to visit the Prophet's Mosque in Madinah, as well as passengers. The rule was also extended to visitors traveling from countries where COVID-19 is a risk. With the increase in the number of positive cases, Saudi Arabia began to increase the precautionary measures, which included closing schools and universities, making online learning, then prohibition of prayer in mosques, curfew and finally considering some big cities like Riyadh, Makkah, Madinah and Jeddah as closed cities. Furthermore, the Minister of health

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announced that everyone suspected to have COVID-19 infection must isolate himself at home for at least 14 days. The flow of information about COVID-19 is fast, some of which are confirmed and many of which are rumors. The main source of rumors is coming from the social media. Social media displays many conflicting information from lay person who aren't professional, which leads to a lot of confusion. People of Saudi Arabia are suddenly exposed to COVID-19 pandemic with the consequences of social isolation, the situation that made them vulnerable to a lot of stress and conflicts. Plus, the unparalleled and possibility inconsistent information and precautions in the surrounding. People differ in their interaction with acute stress and conflicts, according to their abilities to adapt and vulnerability to mental illness [6]. The coping strategies in stressful events are ranged from consciously problem-solving strategy by helping and seeking help from others or using unconscious defense mechanisms in maladaptive pattern that lead to psychological symptoms [7]. The aims of this study are to: 1) assess the prevalence of early psychological reactions in person living in Saudi Arabia, Al Kharj governorate; 2) analyze the possible explanations of these reactions.

MATERIALS AND METHODS

Study design and participants

The current study is a cross-sectional observational study. It was designed to assess the early psychological reactions to COVID-19 pandemic by using structured online questionnaire. The study was focused on Al-Kharj community, Kingdom of Saudi Arabia.

Tools of the study

The structured questionnaire was designed to cover the followed areas: 1) demographic characteristics; 2) pattern of use of social media as a source of information; 3) coming from country with COVID-19 pandemic or contact history with COVID-19 patients in the past 14 days; 4) current or history of physical symptoms suggesting possible COVID-19 infection in the past 14 days; 5) opinion about precautionary measures against COVID-19 outbreak; 6) psychological impacts of precautionary measures against COVID-19 outbreak; 7) psychological symptoms as a result of COVID-19 outbreak; 8) psychological defense mechanisms used against COVID-19 outbreak.

Psychological symptoms were assessed by Arabic version of the Depression, Anxiety and Stress Scale (DASS-21) [8]. The rating scale was as follows: 0 = did not apply to me at all; 1= applied to me to some degree or some of the time; 2 = applied to me as a considerable degree or a good part of time; 3 = applied to me very much or most of the time. The interpretation of DASS-21 scores were as follows: questions (1,6,8,11,12,14,18) measures stress; questions (4,7,9,15,19,20) measures anxiety; questions (3,5,10,13,16,17,21) measures depression. The total score of the stress was divided into normal (0-10), mild (11-18), moderate (19-26), severe (27-34) and extremely severe (35-42). The total score of anxiety was divided into normal (0-6), mild (7-9), moderate (10-14), severe (15-19), and extremely severe (20-42). The total score of depression was divided into normal (0-9), mild (10-12), moderate (13-20), severe (21-27), and extremely severe (28-42).

Psychological defense mechanisms were assessed by Arabic version of Defense Style Questionnaire 40 (DSQ-40) [9]. The DSQ-40 is consisted of 40 items to assess 20 defense mechanisms as

follows: mature defenses (anticipation, humor, sublimation and suppression); neurotic defenses (rationalization, isolation, reaction formation, pseudo-altruism and undoing); and immature defenses (acting out, autistic fantasy, denial, passive aggression, splitting, projection, dissociation, devaluation, displacement, isolation, and somatization). The rating scale format is Likert-type scale as follows: 1-4 = did not agree, 5 = undefined, 6-9 = strongly agree. Individual defenses were assessed by calculating the mean score on the two items for each of the 20 defenses [10].

Procedure

As Kingdom of Saudi Arabia Government precautionary measurements to minimize spread of COVID-19 infection by minimize the physical contact of public people and home isolation for the suspected cases and their contacts. Participants were enrolled to this study by completing the structured scale in Arabic through online site. To avoid boredom and exhaustion of the participants, we selected 7 defense mechanisms which are commonly used by individuals suffering from stress, anxiety and or depression. Age of the enrolled individuals was expressed as younger or older than 50. According to the results of Clara Bonnanad et al. [11], mortality was around 1% in patients aged <50 and it increased exponentially after that age. The study was approved by the Institutional Review Board of Prince Sattam Bin Abdulaziz University, which conformed to the principles embodied in the Declaration of Helsinki. All participants provided informed consent after the research team declared that all information will remain confidential and will be used only within the scientific framework of this research. Data collection took place over three days after Kingdom of Saudi Arabia Government announcement of the start of curfew and social isolation.

Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) 13.0. Descriptive statistics were calculated. Difference between non-parametric variables were tested for using a Chi Squared test. Values of $p < 0.05$ were considered to be statistically significant.

RESULTS

We received responses from 1681 respondents from Al Kharj governorate, 93 of them did not complete the questionnaires. So, we included 1588 responses in the final analysis. Most of the respondents submitted the questionnaires on the first day and the remaining submitted their response on the second and third days. More than half of the respondents were female (57%), age group was less than 50 year (65.9%), (58.6%) of them were married, and (87.5%) were non-health care providers (Table 1). All of our represented population got their information about COVID-19 pandemics from social media and (47.5%) of them reported that their psychological states became worse although most of them (71.3%) spent less than an hour on following pandemic news. Overall, (2.6%) of the respondents had been in contact with suspected or infected patients with COVID-19, (1.6%) had come recently from infected country and (6.2%) had experienced symptoms that look like COVID-19 infection. Ninety two percent accepted the curfew as a precautionary measure to control the COVID-19 outbreak but at the same time (40%) of the responders reported that home quarantine affects their psychological state (Table 2).

Twenty one percent, (32.4%) and (31.1%) of the represented sample expressed mild to moderate stress, anxiety, and depression respectively. The commonest defense mechanisms used were regression (68.1%) followed by reaction formation (41.2%), rationalization (40.5%) and denial (33.6%). Whereas, the least used were projection (27.1%), displacement (18.2%) and sublimation (11%) (Table 3).

Stress, anxiety, and depression were significantly ($p < 0.001$) more common among females ($X^2=20.4$, $X^2=46.14$, $X^2=15.67$ respectively), those younger than 50 years ($X^2=80.78$, $X^2=156.9$, $X^2=80.97$ respectively), and non-health care providers ($X^2=208.38$, $X^2=311.3$, $X^2=304.74$ respectively) (Table 4). Furthermore, stress ($X^2=37.33$, $p < 0.001$), anxiety ($X^2=6.812$, $p < 0.009$) and depression ($X^2=15.41$, $p < 0.001$) were significantly related to home quarantine (Table 5).

Females, younger persons, married participants, and non-health care providers were significantly ($p < 0.001$) more commonly to use defense mechanisms [rationalization ($X^2=48.72$, $X^2=80.13$, $X^2=26.68$, $X^2=354$ respectively), projection ($X^2=14.13$, $X^2=58.05$, $X^2=15.63$, $X^2=256.6$ respectively), displacement ($X^2=21.59$, $X^2=41.11$, $X^2=4.737$, $X^2=181.4$ respectively), reaction formation ($X^2=42.13$, $X^2=135.7$, $X^2=9.786$, $X^2=355.2$ respectively) and regression ($X^2=39.98$, $X^2=110.6$, $X^2=33.36$, $X^2=606.3$)] than males, older persons, single participants, and health care providers. Moreover, denial was significantly ($p < 0.001$) more among young persons ($X^2=49.14$), married ($X^2=5.064$) and non-health care providers ($X^2=317.8$) and rationalization was significantly ($p < 0.001$) used by young individuals ($X^2=30.18$) and non-health care providers ($X^2=354$) (Table 6).

Stress and anxiety were significant present in participants who

Table 1: Demographic characteristics of the responders.

Variables	Number	%	
Gender	Male	683	43
	Female	905	57
Age group	< 50 year	1047	65.9
	≥ 50 year	541	34.1
Nationality	Saudi	1512	95.2
	Non-Saudi	76	4.8
Marrital status	Married	931	58.6
	Single	657	41.4
Occupation	Heath care providers	198	12.5
	Non-health care providers	1390	87.5

Table 2: Pattern and effect of social media, come from infected country, contact history with suspected or infected person, symptoms look like COVID-19 infection, psychological effects of home quarantine and supporting of curfew of COVID-19 pandemic.

Variables	Number	%	
Time spent on social media per day	≤ One hour	1133	71.3
	> One hour	455	28.7
Effect of social media news on psychological status	Good effect	278	17.5
	Bad effect	758	47.5
Persons come recently from an infected country	26	1.6	
Persons have been in contact with suspected or infected person	42	2.6	
Persons experienced symptoms that look like infection with the new corona virus	98	6.2	
Psychological effects of home quarantine	Present	651	41
	Absent	937	59
Persons supporting curfew	1463	92.1	

Table 3: Psychological impacts and defense mechanisms used by responders of COVID-19 pandemic.

Variables	Number	%
Stress	337	21.2
Anxiety	514	32.4
Depression	494	31.1
Rationalization	643	40.5
Projection	430	27.1
Sublimation	175	11
Denial	534	33.6
Displacement	289	18.2
Reaction formation	654	41.2
Regression	1082	68.1

Table 4: Association between demographic characteristics and psychological implications of COVID-19 pandemic.

Variables	Gender		Age groups				Marital status			Occupation		
	M	F	X ²	< 50 year	≥ 50 year	X ²	S	M	X ²	HCP	NHCP	X ²
	No. %	No. %	P	No. %	No. %	P	No. %	No. %	P	No. %	No. %	P
Stress	127	210	20.44	251	86	80.78	172	165	0.145	36	301	208.38
	37.7	62.3	<0.001	74.5	25.5	<0.001	51	49	0.703	10.7	89.3	<0.001
Anxiety	180	334	46.14	399	115	156.9	261	253	0.125	57	457	311.3
	35	65	<0.001	77.6	22.4	<0.001	50.8	49.2	0.724	11.1	88.9	<0.001
Depression	203	291	15.67	347	147	80.97	238	256	.656	53	441	304.74
	41.1	58.9	<0.001	70.2	29.8	<0.001	48.2	51.8	0.418	10.7	89.3	<0.001

HCP=Health care providers, NHCP=Non-health care providers, M=Male, F=Female, S=Single, M, Married

Table 5: Association between psychological impacts and effect of home quarantine and used defense mechanisms of COVID-19 pandemic.

Variables		Stress (N=337)				Anxiety (N=514)				Depression (N=494)			
		No.	%	X ²	P	No.	%	X ²	P	No.	%	X ²	P
Psychological effect of home quarantine	Present	225	66.8	37.33	<0.001	287	55.8	6.812	0.009	291	58.9	15.41	<0.001
	Absent	112	33.2			227	44.2			203	41.1		
Rationalization	Used	203	60.2	14.12	<0.001	282	54.9	4.864	0.027	268	54.3	3.571	0.059
	Not used	134	39.8			232	45.1			226	45.7		
Projection	Used	193	57.3	7.125	<0.008	304	59.1	17.19	0.001	302	61.1	24.49	<0.001
	Not used	144	42.7			210	40.9			192	38.9		
Sublimation	Used	75	22.3	103.8	<0.001	95	18.5	204.2	0.001	98	19.8	179.7	<0.001
	Not used	262	77.7			419	81.5			396	80.2		
Denial	Used	249	73.9	76.91	<0.001	377	73.3	112	0.001	354	71.7	92.70	<0.001
	Not used	88	26.1			137	26.7			140	28.3		
Displacement	Used	204	60.5	14.95	<0.001	354	68.9	73.22	0.001	341	69	71.54	<0.001
	Not used	133	39.5			160	31.1			153	31		
Reaction formation	Used	241	71.5	62.38	<0.001	372	72.4	102.9	0.001	328	66.4	53.12	<0.001
	Not used	96	28.5			142	27.6			166	33.6		
Regression	Used	255	75.7	88.81	<0.001	393	76.5	143.9	0.001	382	77.3	147.5	<0.001
	Not used	82	24.3			121	23.5			112	22.7		

Table 6: Association between demographic characteristics and used defense mechanisms of COVID-19 pandemic

Variables	Gender		Age groups				Marital status			Occupation		
	M	F	X ²	< 50 year	≥ 50 year	X ²	S	M	X ²	HCP	NHCP	X ²
	No. %	No. %	P	No. %	No. %	P	No. %	No. %	P	No. %	No. %	P
Rationalization	233	410	48.72	435	208	80.13	256	387	26.68	86	557	354
	36.2	63.8	<0.001	67.7	32.3	<0.001	39.8	60.2	<0.001	13.4	86.6	<0.001
Projection	176	254	14.14	294	136	58.05	174	256	15.63	46	384	265.6
	40.9	59.1	<0.001	68.4	31.6	<0.001	40.5	59.5	<0.001	10.7	89.3	<0.001
Sublimation	86	89	0.051	95	80	0.965	81	94	.966	85	90	0.053
	49.1	50.9	0.821	54.3	45.7	0.315	46.3	53.7	0.326	48.6	51.4	0.810
Denial	253	281	1.468	348	186	49.14	241	293	5.064	61	473	317.8
	47.4	52.6	0.226	65.2	34.8	<0.001	45.1	54.9	<0.024	11.4	88.6	<0.001
Displacement	105	184	21.59	199	90	41.11	126	163	4.737	30	259	181.4
	36.3	63.7	<0.001	68.9	31.1	<0.001	43.6	56.4	<0.030	10.4	89.6	<0.001
Reaction formation	244	410	42.13	476	178	135.7	287	367	9.786	86	568	355.2
	37.3	62.7	<0.001	72.8	27.2	<0.001	43.9	56.1	<0.002	13.1	86.9	<0.001
Regression	437	645	39.98	714	368	110.6	446	636	33.36	136	946	606.3
	40.4	59.6	<0.001	66	34	<0.001	41.2	58.8	<0.001	12.6	87.4	<0.001

HCP=Health Care Provider, NHCP=Non-Health Care Provider, M=Male, F=Female, S=Single, M, Married

used defense mechanisms like rationalization ($X^2=14.12$, 4.864), projection ($X^2=7.125$, 17.19), denial ($X^2=76.91$, 112), displacement ($X^2=14.95$, 73.22), reaction formation ($X^2=62.38$, 102.9) and regression ($X^2=88.81$, 143.9) [respectively], while sublimation was not used commonly in persons with stress, anxiety, and depression.

DISCUSSION

Based on the overall results of the current study, 32% of our sample experienced mild to moderate anxiety, 31% presented with mild to moderate depression and 21% suffering from mild to moderate stress. According to World Health Organization the prevalence of anxiety and depression was 4.3% and 4.5% respectively [6]. Our finding was in line with the finding of Wang et al. [12]. They investigate the immediate psychological response to COVID-19 outbreak among general population in China and concluded that more than half of their participants were experienced psychological distress. We started applying the questionnaire to assess the early psychological impact of COVID-19 pandemic to the participants on March, 28, 2020 for three days. According to the official report of WHO the total number of confirmed COVID-19 infection in Saudi Arabia was 1104 and only 3 deaths were reported [13]. Very few respondents had experienced symptoms that look like infection with the COVID-19 have been in contact with suspected or infected person or came recently from an infected country. In our study the psychological impact of COVID-19 pandemic was high. This discrepancy, may be explained by 1) the drawback effect of the social media. In our study the social media was the main source of information about COVID-19 pandemic and near half of the respondents reported that they became more psychologically distressed when follow the social media to get the updated news of COVID-19 pandemic. Appel et al. [14] reported that people who used social media as a source of news were suffering from uncertainty, ambiguity and social comparison bias. 2) our participants were used more immature (projection, regression, denial, displacement), neurotic (rationalization, reaction formation) defense mechanisms and less mature (sublimation) defense mechanism. Mature defense mechanisms were associated with adaptive functioning while immature and neurotic defense mechanisms were associated with high level of distress. They represent the individual's effort to preserve the psychological balance in response to a stressful external event [15,16]. 3) Nearly half of our participants related their psychological distress to home quarantine. Home quarantine is a necessary preventive measure during major infectious disease outbreak. However, many studies suggested that quarantine is associated with negative psychological impact [17-21]. Female gender was more experiencing psychological distress. Our finding was supported by the finding of Wang et al. [12]. They concluded that female gender was associated with greater psychological impact of COVID-19 outbreak and higher levels of stress, anxiety and depression. Beside to the biological explanation, our results reported that immature and neurotic defense mechanisms were more used by female participants that contribute in the development of psychological distress. Furthermore, social factors in our Arabic culture like less opportunities for education, work and make decision may also explain this finding. In the current study young participants were more distressed. In contrary to our finding Wang et al. [12] in their study reported that age was not associated with psychological distress. This difference may be explained by about 66% of our sample was below 50 years old. Also, immature and neurotic defense mechanisms were more employed by young participants of our study that may explain the presence of

psychological distress. Furthermore, The Arab Youth Survey [22] reported that 9 of 10 young Arabs use at least one social media channel every day and half of Arab adult get their news from social media on daily basis. As we suggested above, use of social media as a source of news may contribute in the development of psychological distress. Our results reported that psychological distress was less among health care providers than general population. This finding may be explained by the health care providers were in direct contact with official health organization and get the scientific medical information from their official source while the general population depend on the social media as a main source of information that contain many rumors, biased, non-scientific and contradictory news. Our explanation was in line with Zhu et al. [23] study. They concluded that non-medical health personnel and general public are at highest risk for psychological distress during the COVID-19 outbreak than medical health care providers. They explain their finding by less first-hand information on the pandemic, reduced accessibility to formal psychological support.

STUDY LIMITATIONS

Based on the precautionary measurements to minimize spread of COVID-19 infection by social separation to avoid physical contact we adopted online distribution of the study questionnaire. There was oversampling of particular families and peers leading to selection bias. As a result, we cannot generalize our conclusion on the entire population of Al kharj governorate. Another limitation is the self-reported nature of psychological impact assessment questionnaire may be non-consistent like assessment by mental health propriospinal. Lastly, the number of respondents who came from infected country, with contact history with suspected or infected persons with COVID-19 infection and has physical symptoms like COVID-19 infections was very few. So, we cannot generalize our conclusion on the individuals who exposed to or experienced with COVID-19 infection.

CONCLUSION

COVID-19 pandemic is associated with early psychological distress in the form of stress, anxiety and depression in individuals who live in Al kharj governorate. Female gender, young participants, home quarantine, used more immature and neurotic defense mechanisms and following outbreak news from social media may contribute in the appearance of these psychological implications.

AUTHOR'S CONTRIBUTORS

Ahmed M. Kamal and Ali Abdullah Alaseeri designed the study. Farraj Mohammed Alshalwi, Abdulrahman khulaif Alenezi, Sultan Mohmammd Alkahtani, Turkey Saad Algraene and Abdulsalam Saud Alharbi designed and conducted the online questionnaire. Mamdouh Ali Korb performed the statistical analysis. All authors conceptualized, edited and approved the final manuscript.

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