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Psychological State and Low Immunity during Corona Season in KSA

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: In March 2020, WHO declared COVID-19 as pandemic with very high incidence of case-fatality, after that COVID-19 Pandemic was found in China, Europe and USA where these regions were the most affected areas. The new virus attack patients with low-immunity than healthier population causing many psychological conditions. In this study, we aimed to assess prevalence of patient have low immunity symptoms, determine general psychological state in corona season, and demographic factors affecting both variable.

Methodology: This is an analytical cross-sectional study conducted in kingdom of Saudi Arabia (General population) from 19/7/2020 till 25/10/2020. The study depended on online self-report questionnaire which assessing demographic factors including age and nationality besides disease-related information.

Results: We had received 228 responses to our questionnaire where three quarter of them were female (75.9%). 21.1% of the participants were between 19-25 years old while 19.7% were between 36-40 while most of the sample had bachelor (73.7%). It was found that the most common symptoms were having trouble sleeping, low energy, felling tired, having to change the diet and having asthma where 8.8% had at least one symptom, 8.3% had two symptoms and 14.2% had 3 or more symptoms. Considering psychological status, we had found that the most common symptoms reported by participants were concerning about future, the always need for naps and caffeine, afraid of getting sick, afraid of worsen health, and extreme mood change. It was found that gender had a significant effect on developing both low immunity and poor psychological status (P=0.029, 0.02) where female seems to have more low immunity and poorer psychological status than male. Age is another significant factor in determining low immunity and poor psychological status (P=0.026, 0.001) where younger participants reported more symptoms of low immunity and poor psychological than older participants where the most affected age interval was 19-25 years old.

Conclusion: we had found high prevalence of low immune status and poor psychological status which were more associated with females and younger populations. Moreover, there is a significant correlation between poor psychological status and low immune status.

Keywords: Psychological; low immunity; COVID-19; prevalence.

1. INTRODUCTION

Over the last twenty years, many acute respiratory infection diseases had emerged the plant including severe acute respiratory syndrome which then known as SARS epidemic which occur in 2003 in Guangdong Province, China, and had a significant impact on public health worldwide [1]. In December 2019, a new human coronavirus was reported in Wuhan, China [2,3]. The new virus was named as COVID-19 which affect health care systems in almost every country by storm without proper defense mechanisms to cope with [4]. In March 2020, WHO declared COVID-19 as pandemic with very high incidence of case-fatality(ref), after that COVID-19 Pandemic was found in China, Europe and USA where these regions were the most affected areas [5, 6]. The new epidemic is caused by a novel coronavirus (SARS- CoV-2) [7]. Including the new virus, the world had known six different strain of Human Coronaviruses [8,9]. Patients with COVID-19 in most cases suffer from fever, dry cough, shortness of breath, malaise and respiratory distress [3]. However, these symptoms vary with the severity of the disease where in hospitalized patients with COVID-19 had symptoms of fever, cough and breathing shortage more than those milder disease where older patients with medical comorbidities may have delayed the presentation of these symptoms [7,10]. However, COVID-19 is accompanied with severe risk of pulmonary infection and death especially in elderly and those with other comorbidities [11,12]. Severe disease of COVID-19 was noticed in higher prevalence in patients with underlying health conditions including diabetics, hypertension, asthma, lung diseases and obesity [13,14].

Low immune systems make people more likely to catch many infections including COVID-19 especially in people of under and over ages. The immune system is built on the beneficial live bacteria that lives in the gut and have a great role in protecting the human body from different diseases. However, when this the immune system response is low, weak, or damaged, it becomes an open invite for infections such as coronavirus or other diseases like diabetes, heart

disease, or cancer [15]. Moreover, many studies had found a relation between infections and inadequate psychological status as depression, anxiety and stress disorder [16,17].

This research would add to other research many questions marks about the association of weak immunity and the psychological state, especially in the season of Corona, which is considered a pandemic that affected the world in terms of fear of infection with this disease, that fear that affected the immunity of the body and also affected their psychological state and increased from they may have the disease. Therefore, in this study we aimed to assess prevalence of patient have low immunity symptoms, determine general psychological state in corona season, and demographic factors affecting both variable.

2. METHODOLOGY

This is an analytical cross-sectional study conducted in kingdom of Saudi Arabia (General population) from 19/7/2020 till 25/10/2020. Sample size was calculated using OpenEpi for sample size calculation for cross sectional where inclusion criteria including patient with past history signs of low immunity. The study depended on online self-report questionnaire which assessing demographic factors including age and nationality besides disease-related information. Moreover, it consists of 27 questions determining the prevalence of some symptoms of low immunity status and poor psychological status of participants. In order to reduce the effect of random choice bias we included a 5 scale to answer these questions of never, rarely, sometimes, often and always.

Data was entered and analyzed using SPSS version 25. Descriptive statistics was performed and categorical data was displayed as frequencies and percentages while measures of central tendencies and measures and dispersion was used to summarize continuous variables. Univariate and multivariate analysis was performed to investigate association between exposure factors and associated disease. statistical significance is set at a P value of 0.05 or less.

3. RESULTS

We had received 228 responses to our questionnaire where three quarter of them were female (75.9%). 21.1% of the participants were between 19-25 years old while 19.7% were between 36-40, and 18.9 % were 31-35 years old. Moreover, almost all of the samples were Saudi Arabia (96.1%). Finally, most of the sample had bachelor (73.7%), while 24.1% had secondary education, 1.8% with primary education and 0.4% had no education (Table 1).

In Table 2, we assess the prevalence of some symptoms that indicate weak immune system. It was found that the most common symptoms were having trouble sleeping**,** low energy, felling tired, having to change the diet and having asthma (Table 2). Considering choosing of never, rarely and sometimes indicating no affected by symptoms and often and always mean having it, it was found that 68.4% of participants had no symptoms of low immune system while 8.8% had at least one symptom, 8.3% had two symptoms and 14.2% had 3 or more symptoms.

Table 1. Demographic factors

Demographic factors	Variable	Frequency	Percent
Gender	Male	55	24.1
	Female	173	75.9
Age	19 – 25	48	21.1
	26 – 30	29	12.7
	31-35	43	18.9
	36 – 40	45	19.7
	41 – 45	28	12.3
	46 – 50	21	9.2
	above than 50 years	14	6.1
Nationality	Saudi	219	96.1
	Non-Saudi	9	3.9
Education level	No education	1	.4
	Primary education	4	1.8
	Secondary education	55	24.1
	Bachelor	168	73.7

Table 2. Symptoms of weak immune system

Symptoms of weak immune system	Never	Rarely	Sometimes	Often	Always
1. I had a cough and/or phlegm	62.7	17.5	16.7	1.8	1.3
2. I felt tired	33.3	22.8	33.3	6.1	4.4
3. I had discomfort and/or pain in my joints	34.6	26.8	29.4	5.3	3.9
4. I had to change my diet	38.6	24.1	25.4	7.9	3.9
5. I had diarrhea	65.4	19.7	11.8	1.8	1.3
6. I have allergy or asthma	74.6	11.4	8.8	4.4	0.9
7. I have low energy level	32.0	26.3	28.1	7.0	6.6
8. I catch cold easily	43.4	27.2	21.9	3.9	3.5
9. I have high blood sugar	83.6	9.6	3.9	1.8	0.9
10. I have digestive issue	55.3	14.9	22.8	3.9	3.1
11. i have food sensitivities	75.4	11.4	10.1	1.3	1.8
12. I have high blood pressure	80.7	7.5	11.0	0.4	0.4
13. I have trouble sleeping	38.6	25.0	26.3	3.9	6.1
14. I have chronic skin condition	75.9	11.4	5.7	4.4	2.6
15. I have difficult to recover from injury or exercise	63.2	21.1	10.5	3.1	2.2

Table 3. Symptoms of psychological status

Symptoms of psychological status	Never	Rarely	Sometimes	Often	Always
1. I feel sad	8.8	21.1	57.5	10.5	2.2
2. I'm confused thinking or reduced ability to concentrate.	23.2	28.9	36.4	7.5	3.9
3. I feel excessive fears or worries, or extreme feelings of guilt	29.4	27.6	31.6	7.5	3.9
4. I feel Extreme mood changes	18.9	25.9	39.0	9.6	6.6
5. I feel Withdrawal from friends and activities	25.0	21.9	36.4	11.4	5.3
6. I had to give up making long-term plans	40.4	22.4	25.9	7.5	3.9
7. I was afraid that my health might worsen	37.7	25.0	23.2	7.0	7.0
8. I was concerned about my future	28.1	20.2	31.6	8.8	11.4
9. It was hard to do my usual work/studies	36.8	23.2	28.1	3.5	8.3
10. I was afraid of getting sick	23.2	25.4	34.2	9.6	7.5
11. I need naps or caffeine	22.4	21.9	35.5	10.5	9.6
12. My mind feels foggy	57.9	18.9	14.5	3.5	5.3

Considering psychological status, we had found that the most common symptoms reported by participants were concerning about future, the always need for naps and caffeine, afraid of getting sick, afraid of worsen health, and extreme mood change (Table 3). Moreover, 61.4% of participants did not have any symptoms indicating bad psychological status, while 8.8 % had at least one symptom, 6.1% had two symptoms and 23.7% of them had 3 or more symptoms.

Moreover, we had encoded choices of never, rarely and sometimes as zero while usually and always were encoded as one and mean and SD had been calculated for both symptoms of low immune system and poor psychological status and comparing it with age, gender, nationality and education level. The results are found in table 4, where it was found that gender had a significant effect on developing both low immunity and poor psychological status (P=0.029, 0.02) where female seems to have more low immunity and poorer psychological status than male. Age is another significant factor in determining low immunity and poor psychological status (P=0.026, 0.001) where younger participants reported more symptoms of low immunity and poor psychological than older participants where the most affected age interval was 19-25 years old. On the other hand, either nationality not educational level had effect on developing poor psychological or low immunity status.

Finally, it was found that there is a significant positive correlation between low immunity status of patients and poor psychological status of them (Table 5)

4. DISCUSSION

In this study, we aimed to assess the prevalence of low immune symptoms among population in Saudi Arabia in the time of COVID-19 and the related psychological status of them. It is known that COVID-19 is affecting population with low-immunity status in a prevalence higher than normal population [16]. However, no previous study had studied the effect of psychological status on immune status in population during COVID-19 pandemic. In this study we had received 228 responses to our questionnaire where three quarter of them were female (75.9%). 21.1 % of the participants were between 19-25 years old while 19.7% were between 36-40. Moreover, the prevalence of low immune system symptoms was 31.6% were 8.8% had at least one symptom, 8.3% had two symptoms and 14.2% had 3 or more symptoms. Furthermore, the most common symptoms were having trouble sleeping, low energy, felling tired, having to change the diet and having asthma. The is similar to the finding of M. Al GHobain where the prevalence of asthma was 10.6% in Saudi Arabia [18]. Asthma is an important disease as it is found that 25% of 19 COVID-19 patients who die because of the virus had asthma [19] therefore, assess the prevalence of asthma among Saudi Arabia is very important.

Considering psychological status, we had found that the most common symptoms reported by participants were concerning about future, the always need for naps and caffeine, afraid of getting sick, afraid of worsen health, and extreme mood change. Many studies had found that psychological status became poorer in the time of COVID-19 [20, 21, 22]. In this study, we had found a significant correlation between poor psychological status of participants and low immune status. Understanding of the nature of the association between stress and the immune system have changed over time [23]. It was found that stress as psychological disorder is broadly immunosuppressive [24] which is similar to our results. Early human studies reinforced this model, reporting that chronic forms of stress were accompanied by reduced natural killer cell cytotoxicity, suppressed lymphocyte proliferative responses, and blunted humoral responses to immunization [25,26].

Table 4. Demographic factors and immunity and psychological status

Demographic factors and immunity and psychological status		Immunity system		P - value	Psychological system		P - Value
		Mean	Standard deviation		Mean	Standard deviation	
Gender	Male	.51	1.10	0.029*	.87	1.77	0.02*
	Female	1.23	2.36		1.87	3.00	
Age	19 - 25	1.77	2.64	0.026*	3.13	3.33	0.001*
	26 - 30	1.59	2.90		2.00	3.27	
	31-35	1.19	2.26		1.47	2.68	
	36 - 40	.73	1.64		1.09	1.99	
	41 - 45	.43	1.29		.75	2.37	
	46 - 50	.52	1.25		1.00	2.41	
	above than 50 years	.21	.58		.71	1.38	
Nationality	Saudi	1.05	2.12	0.694	1.64	2.81	0.744
	Non-Saudi	1.33	2.69		1.33	1.94	
The educational level	No education	.00	.00	0.886	.00	.00	0.572
	Primary education	.50	1.00		.25	.50	
	Secondary education	.98	2.31		1.40	2.99	
	Bachelor	1.10	2.12		1.75	2.75	

Table 5. ANOVA test between immunity score and psychological score

ANOVA test between immunity score and psychological score			Sum of squares	df	Mean square	F	Sig.
Immunity system * psychological system	Between groups	(Combined)	707.902	11	64.355	41.574	.000
	Within Groups		334.357	216	1.548		
	Total		1042.259	227			

Moreover, we had found that low immune status and poor psychological status are significantly associated with younger age and female gender. Similar results had been found in the study of R Rodriguez et.al, who found that women showed significantly higher levels in poor psychological status including stress and fear moreover, they found a significant correlation between age and psychological status where participants with age of 18-24 years old had the highest psychological impact [27]. Moreover, we had found that educational level of participants did not affect the psychological status of them however, in other studies, it was found that higher educational level is associated with low psychological impact [27].

This study had some un-avoided limitations including the depending on online self-reported questionnaire which in one hand has a advantages of enabling us to collect large sample in shorter time, it possess some bias including that some participants may choose the answers that they thought that author want to hear, besides random selection of answers. Moreover, online questionnaire prevent those participants who could not use online mean from participants in the study including older participants and those with no education.

5. CONCLUSION

In conclusion, we had found high prevalence of low immune status and poor psychological status which were more associated with females and younger populations. Moreover, there is a significant correlation between poor psychological status and low immune status.

CONSENT AND ETHICAL APPROVAL

Administrative approval was sought from the unit of biomedical ethics research committee, king Abdulaziz university. An informed consent was sought from the participants.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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