

# Does COVID-19 Pandemic Affect Medication Compliance Among Chronic Patients?



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**Abstract**—The recent COVID-19 pandemic has imposed a great global challenge. Patients with chronic illnesses may have drug adherence difficulties during the curfew. The aim of this study is to evaluate medication adherence among chronic patients during the pandemic era, and to report this section of the population's knowledge and perception of the health services within the same period. A cross sectional questionnaire-based survey was performed. It was electronically distributed to people from Gulf Cooperation Council nations with a special emphasis on Saudi Arabia. Included in this study, were those who suffered of chronic diseases, respondents who did not suffer any chronic illness were excluded. Our study results have shown that 1066 of the participants suffered of chronic diseases. Among them; 78 different chronic disorders were encountered. Those who were not regularly adherent to their medications during the pandemic era, constituted 29.2% of the study population, 68.3% expressed hesitancy to visit healthcare centers during that time. This was attributed to their fear of contracting the viral infection. In conclusion, Chronic patients during the COVID-19 pandemic may have a higher morbidity and mortality risks. This may be explained by their reluctance to visit the health care facilities during the crisis. They should be targeted by further educational programs to encourage them for a regular health facility visits to keep adherent to their medications. The social media may have a great role for this task.

**Keywords**— COVID-19, chronic diseases, hesitancy, medication adherence.

## 1. Introduction

COVID-19 is a newly emerging highly contagious viral disease that originates from the corona virus groups. This viral infection was obscure before its flaring-up in China by the end of 2019.[1] Corona virus is a huge family of viruses that induce different pathological scopes.[2] These extend from mild respiratory tract affection to more serious diseases.[3] The most common clinical presentations of the disease are; fever, fatigue, and dry cough.[4] However, some patients may also present with diffuse body ache, nasal congestion, runny nose, sore throat, diarrhea, as well as some ophthalmological and cardiac manifestations.[5] Such clinical manifestations may be mild, although they may progress later on.[6] The spread of COVID-19 infection is currently not fully elaborated. Yet, droplet infection, touching contaminated objects and mucus membrane of the eyes may be the main sources of its contagion. [7] Nevertheless, certain population groups such as geriatrics as well as chronic medical diseased patients like those with Hypertension, heart diseases, diabetes mellitus, renal or liver diseases, are highly susceptible to suffer a higher degree of morbidity and mortality. [8] These chronic disorders do exist among the Saudi populations. Although most of them are not diagnosed. They might not be properly managed in most instances. [9] This may be attributed to the low medication adherence. COVID-19 pandemic has imposed an extra challenge to global health services, ending up in over burden and exhaustions. [10] The current study aimed to evaluate the population knowledge and perception to this viral pandemic with special emphasis on drug compliance for chronic patients during this era.

## 2. Methodology

The ethical approval was obtained from our Institutional Research Board (IRB) concerning all the study ethically- related issues. This cross-sectional anonymous questionnaire-based survey was conducted targeting the populations of GCC countries. These include Saudi Arabia, Bahrain, Oman, UAE and Kuwait. A Special Arabic-Language questionnaire form was created including varieties of questions. The questionnaire was electronically distributed (Appendix1). Some parents and caregivers were also permitted to answer the questionnaire. It constituted 18 sections, concerned with chronic diseases that may affect the different body systems. It also included questions to evaluate the sociodemographic data in relation to drug compliance. Obtained data were statically analyzed using the Statistical Package for Software Sciences (SPSS) for Windows version 26.0 software program, Armonk, New York, IBM corporation. Data were presented in tables and figures. The continuous variables presented in the form of means  $\pm$  standard deviations.

## 3. Results

One thousand and sixty-six of the studied participants had chronic diseases. Among them; 78 different chronic disorders were encountered. These mainly include Diabetes Mellitus, Hypertension, Bronchial Asthma, Hypothyroidism, and Osteoarthritis. Patients who were not regularly adherent to their medications constituted 29.2% during the pandemic era. Moreover, 68.3% expressed hesitancy to visit healthcare centers during that time. This was attributed to their fear of having the COVID-19 infection. The whole chronic diseases encountered in this study are demonstrated in (Table 1). Five hundred and four patients (47.27%) had a chronic illness that necessitate their visits to hospital during the pandemic time. Out of them, 68.3% were hesitant to visit health facilities during the pandemic era. Additionally, 29.2% were not regularly adhered to their medications during the lockdown. (Table 2). Sociodemographic particulars highly influenced their decision of medication compliance during the pandemic time (Table3). Their causes of not being adhered to medications is shown in Figure 1.

## 4. Discussion

The current COVID-19 pandemic constitutes a global health threat.[10] People with chronic health problems pose a great challenge to all health facilities. The main problem during such pandemic may be patients' hesitancy to have a proper medical care. The current study has investigated this notion. It involved 78 different chronic diseases. They were predominantly; Diabetes Mellitus, Hypertension, Bronchial Asthma, Hypothyroidism, and Osteoarthritis plus other diseases. It was reported that 382 million persons worldwide, with a prevalence of 8.3% do suffer Diabetes Mellitus. [11]Saudi Arabia is among the top global ten nations that have the highest disease prevalence. [12] Furthermore, other recent studies showed a higher percentage of Diabetes Mellitus in the kingdom with a prevalence of 23.9%. [13] These data support the high disease prevalence among our current studied population. Hypertension and other chronic diseases revealed a lower prevalence among our studied sample contrary to what was anticipated. This may be due to the population unawareness of diseases or even lack of proper diagnosis. The data coincide with those of the United States of America National Health and Nutrition Examination Survey III (NHANES III) study. The American study concluded that the populations unawareness of having hypertension or even its misdiagnosis to reach 37.9%. [14] Success in treating those patients with chronic diseases may be highly related to their medication's adherence. [15] In a previous similar study of 212 patients, 35.8% had a high adherence rate to their antidiabetic medication. [16]Moreover, other reports including Saudi Arabia have expressed a different percentages scope of medication compliance. [17-23]In a comprehensive study of 375 uncontrolled hypertensive patients, 53% of the studied group were non-adherent to their treatment. [24-25]Similarly, literature data stated 30 to 40% medication non-adherence among bronchial asthma patient. [26-29] Other studies demonstrated that only a low percentage of patients with hypothyroidism adhered to their drug medications (levothyroxine therapy).[30] However, Previous reports denoted that 27.3% of hypothyroidism patients were completely non-adherent to their medication protocols while 40.48% were not regularly

following their medications protocols. [30] Notably, during the COVID-19 pandemic, rheumatic diseased patients had a limited adherence to their medication (15%). [31] Within the current studied sample, only 29.3% of the participants were not adherent to their medications during the pandemic. Respondents to our questionnaire denoted considerable hesitancy to visit health care centers during the pandemic era. This may be attributed to their fear of contracting COVID-19 infection.

Among the GCC states, extra efforts were paid to promote the continuity of securing free public medications to chronic diseases within the pandemic time. Yet, social distancing and curfew may have jeopardized the availability of these free public drugs. Hence, a recognized decrease in the availability of the effective medications for those vulnerable patients may occur during this era. Community pharmacies recommended mobile delivery and courier services in order to support medication supplies to those patients in need. Extra tools may be applied by pharmacists to electronically remind the chronic diseased patients to be adherent to their medications. This may be done by direct phone calls, short messages (SMS) as well as other social media platforms. [32-34] Our study data showed a significantly higher males' compliance to medications in relation to females. It was directly related to the patients age, *i.e.* the higher the age, the more the adherence. When marital status was concerned, widows constituted the highest medication adherence, followed by; married couples, divorced patients and finally singles. The level of education has played an important role in the medication adherence. The uneducated persons formed the majority of noncompliance percentages. Additionally, the profession was an important factor, as it represented retirees to be the keenest to treatments compliance. Likewise, financial status was another significant influencer for such drug compliance *i.e.* the higher finance level the greater the adherence to therapy. This coincides with previously published literature which reported similar relationship between the patients' social context and medications adherence. [35]

Although the current study questions were clearly formulated, it showed some respondents, especially those with lower educational profile to have experienced some difficulties in answering the questions. Nonetheless, other similar study supported this notion. [36]

## 5. Conclusion

Chronic diseased patients may have a higher morbidity and mortality risks during the COVID-19 pandemic era. This may be related to their reluctance to visit the health care facilities. Further special care educational programs must be adopted to those patients with chronic diseases in order to encourage them to have regular health centers visits. This may positively influence their therapeutic compliance during the lock down.

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## Tables Legend

**Table 1:** Chronic diseases encountered and their prevalence.

**Table 2:** Chronic diseased patients' perceptions of visits to health care facilities during the COVID-19 pandemic.

**Table 3:** Sociodemographic data in relation to treatment adherence during COVID-19 pandemic.

### **Figures Legend**

**Figure 1:** Participants perception toward reasons for non-adherence to Medication during the COVID-19 Pandemic.

**Table 1:** Chronic diseases encountered and their prevalence.

	<b>The disease</b>	<b>n</b>	<b>%</b>
1	Diabetes Mellitus	168	14.69%
2	Hypertension	150	13.11%
3	Asthma	121	10.58%
4	Hypothyroidism	62	5.42%
5	osteoarthritis	48	4.20%
6	Sickle cell anemia	42	3.67%
7	Chronic sinusitis	31	2.71%
8	Tumors or Cancerous diseases	29	2.53%
9	Arrhythmias	27	2.36%
10	(G6PD) deficiency	26	2.27%
11	Gastroesophageal reflux disease	26	2.27%
12	Eczema	26	2.27%
13	Chronic back pain	24	2.10%
14	Iron deficiency anemia	16	1.40%
15	Coronary artery diseases	15	1.31%
16	Obesity	14	1.22%
17	Psoriasis	14	1.22%
18	Valvar heart disease	12	1.05%
19	Systemic lupus erythematosus	12	1.05%
20	Allergic rhinitis	12	1.05%
21	Peptic ulcer	10	0.87%
22	Crohn's disease	10	0.87%
23	Ulcerative colitis	10	0.87%
24	Hyperthyroidism	10	0.87%
25	Migraine	10	0.87%
26	Epilepsy	10	0.87%
27	STD or unpleasant vaginal discharges	9	0.79%
28	Osteoporosis	9	0.79%
29	Acne	9	0.79%
30	Multiple sclerosis	9	0.79%
31	Congenital heart diseases	8	0.70%
32	Peripheral arterial disease	7	0.61%
33	Kidney failure	7	0.61%
34	Chronic constipation	7	0.61%
35	Polycystic ovarian syndrome	7	0.61%
36	Depression	7	0.61%
37	Acute respiratory distress syndrome	6	0.52%
38	Keratitis and conjunctivitis	6	0.52%
39	Diabetic retinopathy	6	0.52%
40	Angina pectoris	5	0.44%
41	Diabetic nephropathy	5	0.44%
42	Colon polyps	5	0.44%
43	Fibroids	5	0.44%

44	Rheumatoid arthritis	5	0.44%
45	Chronic otitis media	5	0.44%
46	Glaucoma	5	0.44%
47	Cataract	5	0.44%
48	Heart failure	4	0.35%
49	Thalassemia	4	0.35%
50	Kidney stones	4	0.35%
51	Cushing syndrome	4	0.35%
52	Ankylosing spondylitis	4	0.35%
53	Hemiplegia	4	0.35%
54	Nephritic syndrome	3	0.26%
55	Nephrotic syndrome	3	0.26%
56	Coeliac disease	3	0.26%
57	Chronic diarrhea	3	0.26%
58	Scleroderma	3	0.26%
59	Myasthenia gravis	3	0.26%
60	Anxiety disorder	3	0.26%
61	Obsessive compulsive disorder	3	0.26%
62	Chronic venous insufficiency	2	0.17%
63	Liver cirrhosis	2	0.17%
64	Hepatitis	2	0.17%
65	Vitiligo	2	0.17%
66	Alopecia	2	0.17%
67	Chronic laryngitis	2	0.17%
68	Myopia	2	0.17%
69	Chronic Obstructive Pulmonary Disease	1	0.09%
70	Polycystic kidney	1	0.09%
71	Liver fibrosis	1	0.09%
72	Chronic pancreatitis	1	0.09%
73	Endometriosis	1	0.09%
74	Clubfoot	1	0.09%
75	Alzheimer	1	0.09%
76	Amyotrophic lateral sclerosis	1	0.09%
77	Schizophrenia	1	0.09%
78	Bipolar disorder	1	0.09%

n = number

**Table 2:** Chronic diseased patients' perceptions of visits to health care facilities during the COVID- 19 pandemic.

Questions	n	%
<b>Do you have a chronic disease that forces you to go to the hospital?</b>		
Yes	504	16.2
Yes, But It doesn't force me to go to the hospital	562	18
No	2050	65.8
<b>Do you take specific medications/drugs for this disease?</b>		
Yes	798	74.9
No	139	13
No, only non-pharmacological therapies	129	12.1
<b>Are you adherent to these treatments during this COVID-19 pandemic?</b>		
Yes	713	70.7
No	99	9.8
Irregularly	196	19.4
<b>Do you hesitate to go to hospital during the current pandemic?</b>		
Yes	728	68.3
No	338	31.7

n = number

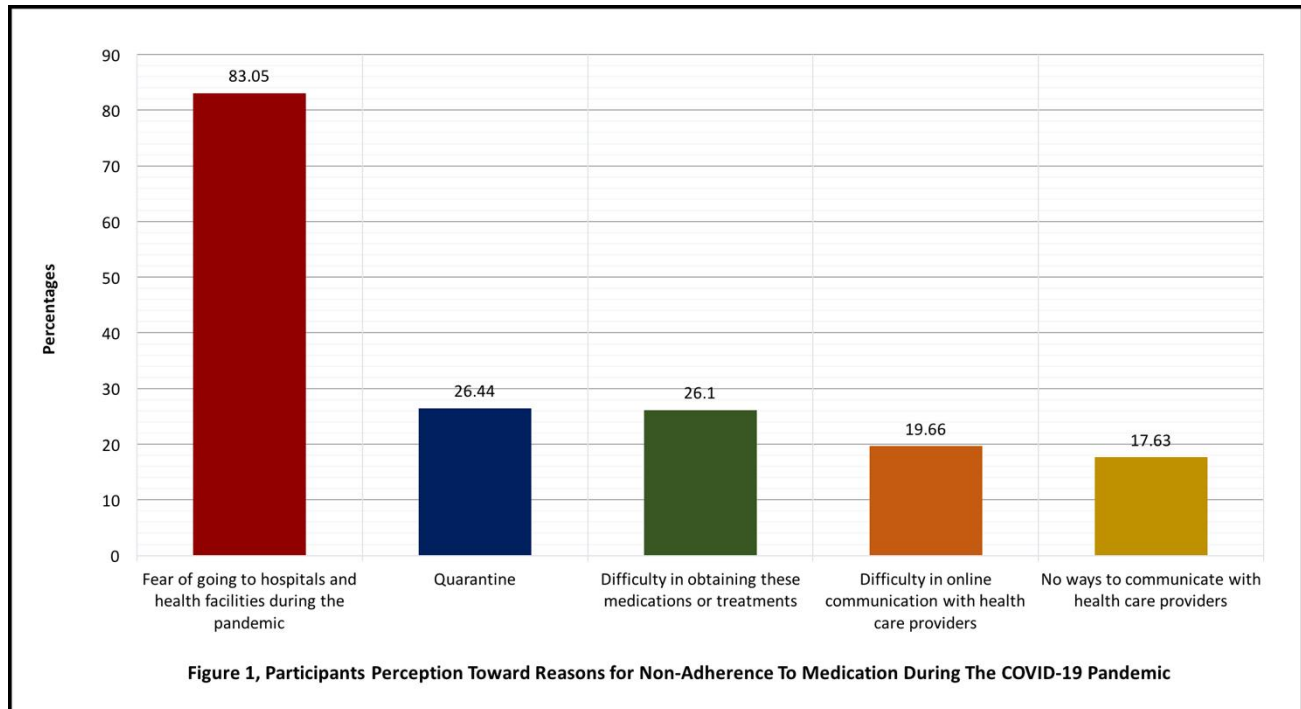
**Table 3:** Sociodemographic data in relation to treatment adherence during COVID-19 pandemic.

Socio-Demographical Characteristic	Are you adherent to these treatments during this COVID-19 pandemic?			<i>P-Value</i>
	Yes	No	Irregularly	
Gender				
Male	216 (78%)	24 (8.7%)	37 (13.4%)	0.005*
Female	497 (68%)	75 (10.3%)	159 (21.8%)	
Age (Mean, SD)	44.69 +/- 14.88	34.72 +/- 14.83	37.31 +/- 14.20	< 0.001*
Nationality				
Saudi	647 (70.9%)	87 (9.5%)	179 (19.6%)	0.471
Kuwaiti	21 (72.4%)	5 (17.2%)	3 (10.3%)	
Emirati	3 (50%)	0	3 (50%)	
Bahraini	3 (50%)	1 (16.7%)	2 (33.3%)	
Omani	28 (68.3%)	5 (12.2%)	8 (19.5%)	
Non-Saudi	11 (86.6%)	1 (7.7%)	1 (7.7%)	
Marital Status				
Single	140 (57.4%)	45 (18.4%)	59 (24.2%)	< 0.001*
Married	511 (74.9%)	46 (6.7%)	125 (18.3%)	
Divorced	23 (69.7%)	5 (15.2%)	5 (15.2%)	
Widow/er	39 (79.6%)	3 (6.1%)	7 (14.3%)	
Place of Residency				
Eastern Region - Urban	431 (71.7%)	51 (8.5%)	119 (19.8%)	0.167
Eastern Region - Rural	44 (68.8%)	9 (14.1%)	11 (17.2%)	
Western Region - Urban	62 (70.5%)	6 (6.8%)	20 (27.7%)	
Western Region - Rural	8 (72.7%)	1 (9.1%)	2 (18.2%)	
Central Region - Urban	62 (68.9%)	13 (14.4%)	15 (16.7%)	

Central Region - Rural	0	1 (33.3%)	2 (66.7%)	
Northern Region - Urban	27 (69.2%)	6 (15.4%)	6 (15.4%)	
Northern Region - Rural	7 (53.8%)	4 (30.8%)	2 (15.4%)	
Southern Region - Urban	48 (77.4%)	4 (6.5%)	10 (16.1%)	
Southern Region - Rural	24 (64.9%)	4 (10.8%)	9 (24.3%)	
<b>Educational level</b>				
Uneducated	24 (66.7%)	3 (8.3%)	9 (25%)	0.04*
Elementary school	30 (78.9%)	3 (7.9%)	5 (13.2%)	
Middle school	37 (84.1%)	1 (2.3%)	6 (13.6%)	
High School	130 (67.4%)	14 (7.3%)	49 (25.4%)	
Diploma	74 (77.1%)	8 (8.3%)	14 (14.6%)	
Bachelor	340 (67.7%)	64 (12.7%)	98 (19.5%)	
Higher Education	78 (78.8%)	6 (6.1%)	15 (15.2%)	
<b>Profession</b>				
Student	97 (56.1%)	35 (20.2%)	41 (23.7%)	< 0.001*
Unemployed	36 (52.9%)	12 (17.6%)	20 (29.4%)	
Governmental employee	179 (76.2%)	19 (8.1%)	37 (15.7%)	
Private Sector employee	89 (70.1%)	9 (7.1%)	29 (22.8%)	
Housewife	185 (73.1%)	18 (7.1%)	50 (19.8%)	
Retired	127 (83.6%)	6 (3.9%)	19 (12.5%)	
<b>Income Level</b>				
1000 - 5000	212 (61.8%)	46 (13.4%)	85 (24.8%)	< 0.001*
5000 - 10000	163 (71.5%)	19 (8.3%)	46 (20.2%)	
10000 - 15000	151 (71.6%)	20 (9.5%)	40 (19%)	
15000 - 30000	149 (83.2%)	10 (5.6%)	20 (11.2%)	
More than 30000	38 (80.9%)	4 (8.5%)	5 (10.6%)	

\* Significant at level 0.05.

n = number



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