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Abstract

Purpose: Since the declaration of the wide and progressive spread of COVID-19 as a pandemic, the health systems worldwide are facing challenges in the balance between applying recommended precautionary measures for COVID-19, while maintain providing essential routine health care to other groups like chronic diseases' patients. The current study aims to explore impact of precautionary measures of COVID-19 on chronic diseases' patients in Jeddah, Saudi Arabia.

Methodology: Through an analytical cross-sectional study; a representative sample of chronic diseases' patients were selected randomly from primary health care centers in Jeddah. They were invited to respond to a valid questionnaire designed to collect data about the impact of Covid 19 pandemic measures on chronic diseases' patients. The questionnaire is adapted from valid published questionnaires conceptualized around the impact of Covid 19 measures on chronic patients. Chi-square test was used to identify association between the health status and the independent variables. P-value <0.05 was considered as an indication for significance.

Results: Out of all respondents (n=386) there was almost equal distribution of females (52.3%) and males (47.7%), and remarkable dominance of Saudis (91.7%); two thirds (62.7%) reported one chronic disease while the rest had two or more diseases. Considerable proportions faced difficulties in medical appointments (43.8%), reaching physicians (30.1%) and obtaining medicines (16.6%) during the pandemic. The health status of 23.3% became worse; especially among those with low income (46.4%), those who needed emergency care (57.1%) and all who did not get it p<0.005.

Conclusion and recommendations: The precautionary measures of COVID-19 have an impact on the care, health status of chronic diseases' patients. Efforts should be made to plan for innovative measures to ensure providing essential health care to chronic diseases' patients during pandemics.

Keywords: *Chronic diseases' patients, Covid-19, pandemic, health care services.*

Introduction

In December 2019, a large number of cases with "pneumonia of unknown origin" was detected in a wholesale market in Wuhan, China, that was defined later as a Novel Coronavirus (COVID-19).(1) With the global spread of the disease, the World Health Organization declared it as COVID-19 pandemic on March 2020.(2) According to the WHO report, although the new coronavirus can affect people in all age, but the risk is high in older age group and people with preexisting Non Communicable Diseases (NCDs).(3) Chronic diseases' patients are facing substantial threats during pandemics, either of being more vulnerable to get infected because of compromised health status, and difficulties in receiving essential routine health care due to redirection of health resources towards control of the pandemic.(4–7) The most common comorbidity observed in critical COVID-19 patients who were admitted in the critical care units in most countries were hypertension, diabetes, and chronic respiratory problems.(8,9) The unprecedented near-complete global lockdown due to COVID-19 pandemic has created major dilemmas for providers in all areas of health-care delivery. The rapid spread of the virus disclosed the weaknesses in health systems. Lack of adequate health-care infrastructure and human resources, serious supply-chain disruptions, and widespread fear among patients and health-care workers have resulted in serious threatening of the patient care and safety.(10) In June, 2020, based on a global survey covering 155 countries worldwide, WHO issued the results which showed that the regular management for NCDs had been severely disrupted since the COVID-19 pandemic began.(11) In Saudi Arabia, the first case was reported on 2nd of March 2020, a Saudi native way back to country from Iran via Bahrain. After that, number of cases increased rapidly. Therefore as a preventive step; lockdown was declared with restriction of tourists and visitors fand the Great Mosque has been closed for safety and sterilization purposes.(12) The review of the published researches showed that there is no previous study on the impact of the precautionary measures on the management of patients with chronic diseases in Jeddah. This study aims to determine the impact of the measures associated with Covid 19 pandemic on the patients with chronic diseases and to identify factors affecting the health status and outcome of chronic diseases patients during the pandemic.

Material and methods:

Through a cross-sectional analytic study design, 386 chronic diseases' patients were selected randomly from log books of chronic diseases' clinics in primary health care centers. The study included adult diabetic and hypertensive patients who fulfilled the following criteria: Diagnosed since at least six months, has medical record and following the same primary health care center for at least six months. The data were collected by using a questionnaire designed for the impact of Covid 19 pandemic measures on chronic diseases' patients. The questionnaire is comprised of three main domains, first describing demographic characteristics of the respondents; second defining the chronic diseases and the third domain including 12 questions outlining expected impact of Covid 19 precautionary measures on the respondents. The

questionnaire is adapted from valid published questionnaires conceptualized around the impact of Covid 19 measures on chronic patients.(13,14) Data entry and statistical analysis was done using Statistical Package for Social Science (SPSS) version (20). Quality control was done at the stages of coding and data entry. Categorical variables presented as frequency distribution and percentages. Chi-square test was used to identify any association between the health status and the independent variables Statistical significance was set at P-value <0.05 and confidence interval of (95%). Results are presented in frequency distribution tables, contingency tables and pie charts. The research was approved from the local Institutional Research Board (IRB) in Jeddah before conducting the research.

Results

Table 1 shows demographic characteristics of the patients (n=386).

Table 1: Socio demographic Characteristics of the study group (n=**386**).

Characteristics	No.	Percentage
Gender:		
Male	184	47.7
Female	202	52.3
Nationality:		
Saudi	354	91.7
Non Saudi	32	8.3
Age categories:		
<20 years	9	2.3
20-<40 years	130	33.7
40-<60 years	143	37.0
≥60 years	104	26.9
Marital status:		
Single	71	18.4
Married	280	72.5
Divorced	27	7.0
Widowed	8	2.1
Education level:		
Primary	14	3.6
Intermediate	24	6.2
Secondary	117	30.3
University or higher	231	59.8
Monthly income:		
<5,000 SR	69	17.9
5,000-<10,000 SR	120	31.1

≥10,000 SR	197	51.0
Job:		
Has a job	167	43.3
Jobless	219	56.7
Type of housing:		
Flat	182	47.2
Villa	177	45.8
Others	27	7.0
Number of household individuals:		
<4 individuals	88	22.8
4-6 individuals	203	52.6
>6 individuals	95	24.6

There was an almost equal distribution of females (52.3%) and males (47.7%), with marked dominance of Saudis (91.7%). The great majority of the participants aged 20 years or older (a total of 97.3%), and the married formed 72.5%. More than one half of them (59.8%) had university qualification or higher; with only 17.9% who had monthly income less than 5,000 SR (≈ $1,333); and 43.3% pointed that they had a job. Those who are living in flats constituted 47.2% while those who are living in villas were 45.8%. Most of the participants (77.2%) were living within families with an average of four individuals or more **[Table 1]**.

Figure 1 displays distribution of the patients according to the number of chronic diseases they had reported.

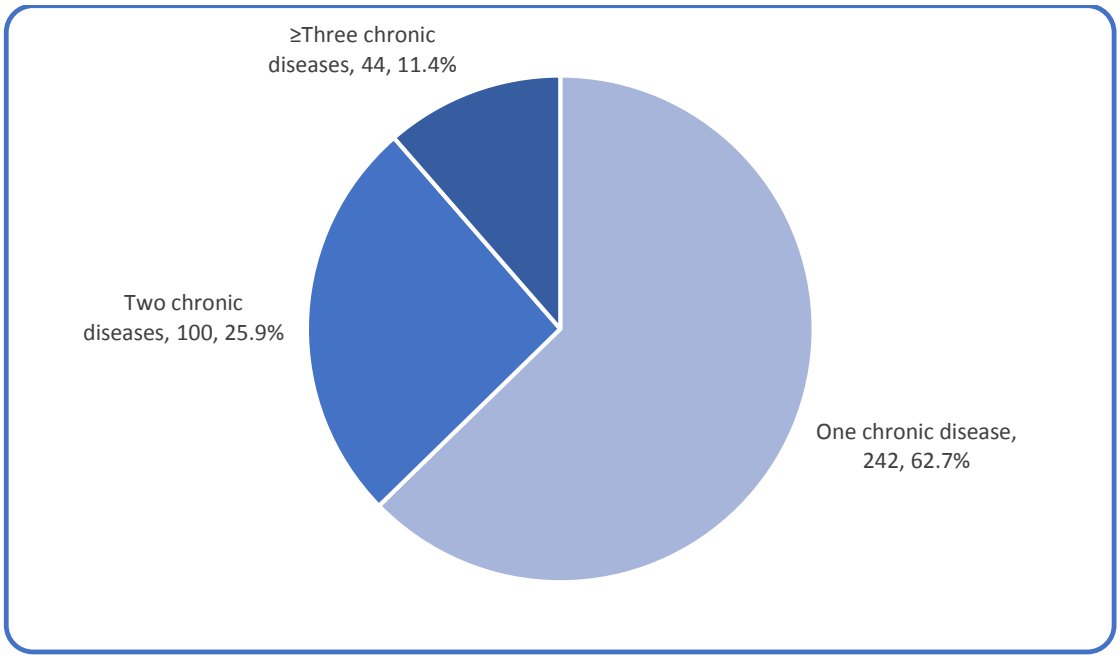

Figure 1: Number of chronic diseases reported by the respondents.

Almost two thirds of the respondents (62.7%) reported one chronic disease, while one quarter of them (25.9%) reported two chronic diseases and 11.4% had three or more chronic diseases **[Figure 1]**.

Table 2 demonstrates relevant clinical characteristics of the chronic diseases' patients during the pandemic.

Table 2: Clinical characteristics of the patients during the pandemic.

Clinical aspects	No.	Percentage
Exposure to Covid-19:		
Got infected	68	17.6
A household individual got infected	103	26.7
Other family member got infected	105	27.2
Medical care for the chronic disease:		
Faced difficulty to obtain medicines	64	16.6
Faced difficulty in reaching physicians	116	30.1
Change or difficulty to get appointment	169	43.8
Harmed from irregular medical care	83	21.5
Needed emergency care	77	19.9
Got the emergency care when needed (n=77)	58	75.3
Did not get the emergency care when needed (n=77)	19	24.7
Changes in the disease episodes:		
No change	286	74.1
Increased frequency of episodes	89	23.1
Decreased frequency of episodes	11	2.8

The table shows that 17.6% of the patients addressed that they had been affected by Covid-12 and 26.7% had one or more of the direct household individuals affected by Covid-19. Regarding the received medical care during the pandemic, 16.6% of the participants claimed that they faced difficulties in obtaining their medicine, and slightly less than one half (43.8%) found difficulty or change in the appointments and almost one third of them (30.1%) pointed that they faced difficulties in reaching their treating physicians. One of each five patients (21.5%) expressed that they got harmed from the irregular medical care during the pandemic, and 24.7% of the patients who needed emergency care did not get it. Moreover, an overall 23.1% of the patients expressed that they suffered from increased episodes of the chronic disease **[Table 2]**.

Table 3 illustrates the perceived fears of the chronic diseases patients they had encountered during the pandemic.

Table 3: Perceived fears of the chronic diseases' patients during the pandemic.

Perceived fears	No.	Percentage
Fears of getting infection while visiting treating physician:		
Yes	254	65.8
No	132	34.2
Fears of becoming so ill with unapproachable medical care:		
Yes	248	64.2
No	138	35.8

Two thirds of the patients (65.8%) felt afraid of getting infected with Covid-19 while visiting their treating physician, and equal percentage (64.2%) had fears of becoming so ill in milieu of difficult approach to medical care **[Table 3]**.

Figure 2 displays the self-rating of the chronic diseases' patients to the changes of their health status during the pandemic.

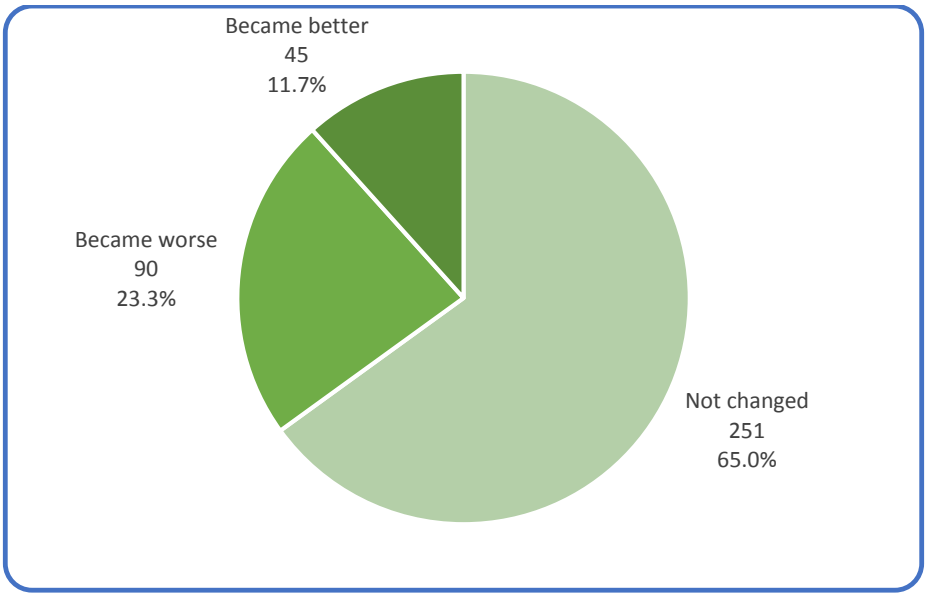

Figure 2: Self-rating for the change in health status during the pandemic.

One quarter of the patients (23.3%) claimed that their health status became worse during the pandemic, and the rest were either not changed (65%) or became better (11.7%) **[Figure 2].** Table 4 illustrates the differences in the self-rated changes in the health status of the chronic diseases' patients along the pandemic according to their demographic characteristics.

Table 4: Changes in self-rated changes in the health status of the patients during the pandemic according to their demographic characteristics.

Demographic characteristics	Self-rated health status				X^2	P*
	No change or improved		Became worse			
	No	%	No	%		
Gender:						
Male	140	76.1%	44	23.9%		
Female	156	77.2%	46	22.8%	0.070	0.791
Nationality:						
Saudi	269	76.0%	85	24.0%		
Non Saudi	27	84.4%	5	15.6%	1.154	0.283
Age categories:						
<20 years	8	88.9%	1	11.1%		
20-<40 years	89	68.5%	41	31.5%		
40-<60 years	114	79.7%	29	20.3%	7.884	0.048**
≥60 years	85	81.7%	19	18.3%		
Education level:						
Primary	9	64.3%	5	35.7%		
Intermediate	20	83.3%	4	16.7%	2.156	0.541
Secondary	92	78.6%	25	21.4%		
University or higher	175	75.8%	56	24.2%		
Marital status:						
Single	46	64.8%	25	35.2%		
Married	220	78.6%	60	21.4%		
Divorced	23	85.2%	4	14.8%	7.792	0.051
Widowed	7	87.5%	1	12.5%		
Monthly income:						
<5,000 SR	37	53.6%	32	46.4%		
5,000-<10,000 SR	93	77.5%	27	22.5%	26.898	<0.001**
≥10,000 SR	166	84.3%	31	15.7%		
Job:						
Has a job	133	79.6%	34	20.4%		
Jobless	163	74.4%	56	25.6%	1.439	0.230
Type of housing:						
Flat	125	68.7%	57	31.3%		
Villa	151	85.3%	26	14.7%	13.989	0.001**
Others	20	74.1%	7	25.9%		
Number of household individuals:						
<4 individuals	65	73.9%	23	26.1%		
4-6 individuals	160	78.8%	43	21.2%	1.110	0.574
>6 individuals	71	74.7%	24	25.3%		

* Based on Chi Square ** Statistically significant

The percentage of those who had worse health status was significantly higher in patients aged 20-<40 years (31.5%), those who had monthly income <5,000 SR (46.4%) and those who are living in flats (31.3%) p<0.05. On the other hand, although the percentages were higher in males (23.9%), Saudis (24%), those who had low education level (35.7%), single persons (35.2%), jobless (25.6%) and those living in a relatively small families (26.1%), nevertheless, these differences are not statistically significant p>0.05 **[Table 4]**.

Table 5 illustrates the differences in the self-rated changes in the health status of the chronic diseases' patients along the pandemic according to the relevant clinical characteristics.

Table 5: Changes in self-rated health status of the patients during the pandemic according to their clinical characteristics.

Clinical characteristics	Self-rated health status				X^2	P*
	No change or improved		Became worse			
	No	%	No	%		
Affected by Covid-19:						
Yes	47	69.1%	21	30.9%		
No	249	78.3%	69	21.7%	2.643	0.104
A household individual affected by Covid-19:						
Yes	71	68.9%	32	31.1%	4.722	0.030**
No	225	79.5%	58	20.5%		
Other family member got affected by Covid-19:						
Yes	214	76.2%	67	23.8%	0.161	0.689
No	82	78.1%	23	21.9%		
Faced difficulty in obtaining medicines:						
Yes	28	43.8%	36	56.3%	46.541	<0.001**
No	268	83.2%	54	16.8%		
Faced difficulty in reaching physicians:						
Yes	72	62.1%	44	37.9%	19.812	<0.001**
No	224	83.0%	46	17.0%		
Change or difficulty to get appointment:						
Yes	115	68.0%	54	32.0%	12.541	<0.001**
No	181	83.4%	36	16.6%		
Harmed from irregular medical care:						
Yes	35	42.2%	48	57.8%	70.541	<0.001**
No	261	86.1%	42	13.9%		

Needed emergency care:						
Yes	33	42.9%	44	57.1%	61.558	0.001**
No	263	85.1%	46	14.9%		
Changes in the disease episodes:						
No change	255	89.2%	31	10.8%		
Increased	33	37.1%	56	62.9%	103.707	0.001**
Decreased	8	72.7%	3	27.3%		
Got the emergency care when needed:						
Yes	33	56.9%	25	43.1%	18.918	0.001**
No	0	0.0%	19	100.0%		

* Based on Chi Square ** Statistically significant

The percentages of those who had worse status were significantly higher in patients who faced difficulties in reaching their treating physicians (37.9%), those who had difficulties in getting medical appointment (32%), those who got harmed from irregular medical care (57.8%), those who needed emergency care (57.1%), those who experienced increase in the disease episodes (62.9%) and all patients (100%) who needed emergency care and did not get it $p<0.05$ **[Table 5]**.

Discussion

In March 2020, the world health organization (WHO) declared that rapid and aggressive spread of COVID-19 as a pandemic;(11) since then, most of the countries worldwide urgently reallocated its health resources and put the major concern on prevention and control of COVID-19 cases. Accordingly, the Health Economics predicted that "treating patients with chronic conditions would be one of the top challenges facing doctors in 2020".(15) Accordingly, Singh et al (2021) added that "people living with chronic conditions experience the syndemic phenomenon in which the COVID-19 pandemic exacerbates their pre-existing chronic condition, already occurring alongside other potentially marginalizing sociopolitical and ecological factors.(16) By time, it was evident that the preventive measures including lockdown and curfew; besides relative shortage of health services provided to routine patients created unprecedent situation. Many subgroups of patients were negatively affected. One of these groups is the chronic diseases patients. The current study showed that a considerable proportion of the chronic diseases' patients faced difficulties in the medical appointments (43.8%), reaching their treating physicians (30.1%) or obtaining medicines (16.6%).

These findings came in accordance to what had been reported in most of the reviewed researches from different countries worldwide; that had been explained by the limited available health resources and restricted transportations as consequences of the lockdowns and preventive measures of COVID-19.(7,17–19) Another reason explaining the difficulties

claimed by the patients was the limited socialization. Social distancing could play direct and indirect roles in the ability of the caregivers to help some chronic diseases patients to reach health services when needed or bringing medicines.(20,21) Also, the distancing could threaten adherence of the patients to their treatment, particularly in elderly patients.(21) Moreover, the disruption in the routine health services could be attributed to the patients themselves, as shown in the current study, where the patients expressed their fears of getting infected with COVID-19 while visiting their treating physicians (65.8%); these fears are accentuated by the fears of getting infected and become so ill in the milieu of insufficient health care services. Barach et al (2020) stated that "we must realize that many more serious illnesses and avoidable deaths are likely, not just from COVID-19, but as a consequence of the social disruption it has caused, including the fear, and lack of trust, and structural dysfunction in accessing and paying for medical care".(22) In the current study, the disruption in the health services resulted in worsening of the health status of almost one quarter of our patients (23.3%).

The multivariate analysis showed that the worsening was not even in all subgroups. For example, worsening was significantly higher among patients with low monthly income; that could be explained by inability to purchase health services from private sector when it is not feasible in public institutes. Similar findings was addressed by Singh et al (2021) in India.(21) Most of our patients who experienced irregular medical care and increased episodes of the disease claimed that their health status became worse. In this respect, Jacobson et al (2017), through a comparative study for the irregular versus continuous clinical follow-up of diabetic patients, found that patients with irregular follow-up were more likely to experience poor glycemic control and more episodes of diabetic ketoacidosis. Moreover, they were more likely to develop retinopathy due to irregular follow-up.(23) Worsening of the health status was significantly higher in patients who needed emergency care during the pandemic; especially among those who did not get the service when needed. In USA, the researchers recognized a remarkable decline in the ED visits after prioritizing urgent visits to mitigate the spread of COVID-19 in health care settings. The decline included life-threatening health conditions that always necessitate immediate emergency care, the delay or foregone of the needed care might result in serious disability or death.(24) Finally, worse health status was significantly much prominent in patients who expressed that one of the household individuals got COVID-19. In this regards, Adom et al (2020) pointed that "when a person is reported positive for COVID-19, the family are usually singled out from the community" with increase in the time spent indoors which rise common risk factors such as lack of exercise and increased risk.(25) Moreover, it is well understood that the principle concern of the family members are often diverted towards the affected person with COVID-19 rather than any member else, even if being a chronic disease patient.

Conclusion and recommendations

The health care professionals are facing challenges in caring for chronic diseases' patients, since they have to balance between protecting them from COVID-19, while managing their chronic condition effectively. A considerable proportion of the patients experienced difficulty to access essential health care, therefore, almost one quarter had worse health status during the pandemic, especially in the relatively low socioeconomic and those who needed emergency care. Basic interventions should be applied using innovative measures such as digital healthcare as mHealth to ensure adequate health services to the chronic diseases' patients during pandemics.

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