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Impact of COVID-19 related movement restrictions on the follow-up care visits of adults with chronic conditions: A Saudi arabian survey study

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ABSTRACT

Aims: Lockdown measures implemented during the initial phase of the pandemic resulted in the delay and disruption of healthcare utilization for individuals with chronic conditions. We aimed to evaluate the impact of COVID-19 movement restrictions on the follow-up care visits of individuals with chronic illnesses. We also assessed the possible reasons patients missed their follow-ups and the potential barriers impeding follow-up during the pandemic.

Methods: A total of 397 adults with pre-existing medical conditions participated in an online cross-sectional survey from October to December 2022. The study sample comprised 57 % females and 43 % males, with a mean age of 43 years. A 36-item online self-report survey was used for data collection. **Results:** Fifty-five percent of participants reported missing their follow-up during COVID-19 pandemic, and 14 % made emergency department visits due to their missed follow-up appointments. In addition, 24 % experienced complications due to their missed appointments. The mean score on the fear of COVID-19 scale was 17.8 ± 6.5 (SD). For the majority of participants (60 %), pandemic-related restrictions were the predominant barrier to their follow-up visits. Additionally, we found that as individuals' COVID-19 fear scores increased, the likelihood of missing a follow-up care visit also increased (AOR: 1.067; p-value = 0.001). However, participants who did not perceive COVID-19 pandemic-related restrictions as a barrier were less likely to miss their follow-up visits (AOR: 0.581; p-value = 0.031). Furthermore, those who understood the significance of follow-up care were less likely to miss any of their follow-up visits (AOR: 0.224; p-value < 0.001) than those who had limited understanding of its importance.

Conclusion: The results showed that pandemic-related movement restrictions negatively affected attendance at follow-up visits for people with pre-existing health conditions. Initiatives should therefore be undertaken during global public health emergencies to provide medical and psychological support to vulnerable and high-risk groups.

1. Introduction

By the second week of March 2023, over 760 million individuals worldwide had been diagnosed with COVID-19, and well over 6.9 million individuals had already died from it (World Health Organization (WHO)). Saudi Arabia reported around 829,000 diagnosed cases and

over 9,600 deaths during this period (WHO). Individuals from many cultures and of various ages have been adversely impacted by the COVID-19 pandemic, which has led to widespread psychological distress, depression, and anxiety (BinDhim et al., 2021, Elhessewi et al., 2021, Joseph et al., 2021, Meraya et al., 2021). Furthermore, healthcare utilization was affected and reduced during the COVID-19 pandemic due

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to movement restrictions and healthcare facility closures worldwide (Kendzierska et al., 2021).

Moreover, the COVID-19 pandemic significantly disrupted the provision of routine healthcare services. The preventive measures taken to prevent the spread of the virus led to the reorganization of healthcare systems and the prioritization of available resources (Kendzierska et al., 2021, Parkinson et al., 2022). Lockdown measures implemented during the initial phase of the pandemic resulted in the delay and disruption of follow-up visits for many individuals with chronic illnesses, owing to strict restrictions on non-essential travel (Hacker et al., 2021, Kendzierska et al., 2021, Parkinson et al., 2022). These restrictive measures affected the health management of individuals with chronic illnesses, who often require constant medical attention. Many individuals reported skipping their scheduled appointments during the pandemic due to logistical issues and a widespread fear of possible contagion (Rashid and Tsao 2021, Valenti et al., 2021, Ayele et al., 2022). Ayele et al. (2022) reported that the COVID-19 pandemic has indeed led to a drastic decline in the number of follow-up visits for patients with chronic illnesses, including diabetes, hypertension, and heart disease. The impact of COVID-19 movement restrictions on managing individuals with chronic conditions has been particularly significant and severely debilitating for vulnerable individuals with limited resources. Ayele et al. (Ayele et al., 2022) reported that lack of transport was the most common reason for missing follow-up care visits.

To address these concerns, healthcare systems must provide social support, home healthcare, and virtual healthcare during pandemics and movement restrictions. The Saudi government took several measures to increase access to healthcare during the COVID-19 pandemic. The Ministry of Health (MOH) launched mobile applications such as Sehhaty and Mawid, which provide individuals in Saudi Arabia with access to medical appointments, virtual clinics, and medication delivery to their home (Alassaf et al., 2021, Alkhalifah et al., 2022). Furthermore, the MOH launched Seha Virtual Hospital in 2022 (Alkhalifah et al., 2022).

Nevertheless, little is known about the missed follow-up care visits and the associated factors among individuals with chronic conditions in Saudi Arabia during the COVID-19 pandemic. Therefore, the current study aims to evaluate the impact of COVID-19 movement restrictions on the follow-up visits of individuals with chronic diseases. We also aimed to assess the possible reasons for missed follow-up care and the potential barriers impeding it during the pandemic.

2. Methods

2.1. Study design and study population

An anonymous online cross-sectional survey was used for data collection in the current study among a sample of 397 Saudi males and females aged 18 and over. The study was conducted between October 1, 2022, and December 31, 2022, across multiple regions of Saudi Arabia. For participant selection, convenience sampling was used. All the study participants completed a 36-item self-administered questionnaire.

2.2. Inclusion and exclusion criteria

To be included in the current study, the participants were required to (i) be Saudi males and females at least 18 years of age and residing in Saudi Arabia, (ii) have an appropriate understanding of the Arabic language, (iii) provide their informed consent, and (iv) agree to participate in the study by answering all items and sections of the questionnaire. Those participants who did not fulfill the inclusion criteria were consequently excluded from the study.

2.3. Data collection tools

The data collection tool in the current study was a pre-coded, structured 36-item self-administered questionnaire. The questionnaire

in the current study was validated using face and content validation. The self-administered questionnaire comprised five sections. Section 1 consisted of 16 questions regarding sample characteristics. Section 2 comprised a list of chronic diseases. Section 3 included five questions about the impact of COVID-19 on the participants' follow-up visits. Section 4 consisted of seven questions about the barriers to follow-up during the COVID-19 pandemic. Lastly, section 5 comprised seven questions from the fear of COVID-19 scale. The study questionnaire was prepared after systematic consideration and a wide-ranging review of related literature (Aklilu et al., 2020, Subathra et al., 2021, Mazidimoradi et al., 2022) by all the study authors. Following a comprehensive review and based on thorough deliberations, the final version of the study questionnaire was prepared and subsequently approved by all the study authors. The final approved questionnaire comprised 36 items across five sections.

2.4. Measures

2.4.1. Demographics

Participants in the current study reported their gender (male, female), age (in years), educational qualifications (illiterate, literate), employment status (employed, unemployed), area of current residence (urban, rural), family income (in Saudi riyals/month), and living status (alone, family/friends). The participants also reported their anthropometric measurements. Unfortunately, research on the distance to the nearest healthcare setting (primary or hospital) in Saudi Arabia is scarce. Murad, Abdulkader, and Nichols et al. indicated that 30 min of drive time is acceptable. Therefore, we choose < 30 km and ≥ 30 km as cutoffs within these limits (Nichols et al., 2014, Murad 2018).

2.4.2. Personal health Practices

Participants also reported their smoking status (non-smoker, past smoker, currently smoking) and body mass index (BMI) (underweight, healthy weight, overweight and obese).

2.4.3. Participants' list of chronic diseases

Participants were asked to report whether they had any chronic conditions diagnosed by a healthcare professional, such as hypertension, diabetes, heart diseases, respiratory diseases, gastrointestinal diseases, mental illnesses, or any other diseases. The response options for each condition were binary, with 0 (no) or 1 (yes).

2.4.4. Barriers to follow-up during the COVID-19 pandemic

The participants also responded to questions about the potential barriers to follow-up that they encountered during the COVID-19 pandemic (COVID-19-pandemic restrictions, lack of transportation, financial issues, lack of caregivers, follow the recommendations to not visit healthcare settings, not understanding the importance of follow-up care). These questions also had binary responses of 0 (no) or 1 (yes).

2.4.5. Fear of COVID-19 scale

The seven-item fear of COVID-19 scale was used in the current study to assess the participants' anxiety around COVID-19. An item example from the above scale is as follows: "I am most afraid of Corona." The responses to these items were scored on a five-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). The total scores range from 7 to 35, where a higher score indicates greater fear of COVID-19 (Ahorsu et al., 2020).

2.4.6. Loss of follow-up during the COVID-19 pandemic

The participants also responded to questions about whether they missed any follow-up visits, were admitted to the emergency department, suffered from complications associated with loss of follow-up, were able to contact their doctors, or had access to telemedicine during the pandemic. The responses to these questions were also binary responses of 0 (no) or 1 (yes).

2.5. Development, validation, translation, and piloting of the study questionnaire

We used the forward–backward method for translating the survey instrument into Arabic (Beaton et al., 2000). Content and face validation were used to validate the study questionnaire. A focus group comprising 10 % of the estimated sample size was used to pilot the final approved version of the questionnaire and assess the ease of use and the survey completion time (Treece and Treece, 1977, Hill 1998, Hertzog 2008). A completion time of approximately 12–14 min was observed in the pilot study, and participants understood all the survey questions with relative ease. The pilot sample was also used to test the reliability and internal consistency of the study instrument. Cronbach's alpha was used for the reliability test. The final analysis did not include any data from the pilot study.

2.6. Data collection

Google Forms was used for preparing and hosting the study's self-administered questionnaire. The invitation link to the study was disseminated on various social media platforms (WhatsApp, Facebook, and Twitter). Data was collected for three months, from October 1, 2022, to December 31, 2022. Sharing of the invitation link among the participants' contacts was highly encouraged.

2.7. Sample size calculation

The present study's target population included Saudi males and females above 18 years of age. The population size for Saudi individuals was therefore retrieved from the national statistical database of Saudi Arabia (Saudi General Authority for Statistics, 2023). The population of Saudi males and females by the end of 2021 was 18,380,669, which was used to calculate the sample size for the present study. For this purpose, an online sample size calculator (Raosoft) was employed, wherein the margin of error was set at 5 % with a 95 % confidence interval, a power ($1-\beta$) of 0.80, and a 50 % response distribution (Raosoft 2023). The calculated sample size was cross-verified with OpenEpi (Dean AG et al., 2013) with a similar margin of error, confidence interval, power, and response distribution. Both calculations yielded an estimated sample size of 385.

2.8. Ethical considerations

The current study was conducted after receiving the appropriate approval from the Standing Committee for Scientific Research at Jazan University, Saudi Arabia (HAPO-10-Z-001) (Approval Reference No.: REC-44/03/319). The participants were required to provide their informed consent before participating in the study.

2.9. Data analysis

Data analysis in the current study was carried out using Stata 16.0 statistical software (Stata Corp LP, College Station, USA). The Google Forms data were downloaded as a Microsoft Excel sheet. All the responses on the Excel sheet were coded and anonymized. Descriptive statistics were used to express the sample characteristics and report them as frequencies, total percentages, means, and standard deviations. Cross-tabulations with Pearson's chi-square test were used for evaluating any statistically significant associations between different study variables. T-tests were computed to assess the relationships between continuous variables and missed follow-up care visits. Binary logistic regression using the stepwise procedure in Stata was computed to assess the adjusted relationships between the explanatory variables and missed follow-up care visits. The final model included gender; employment status; income; distance to nearest healthcare institution; smoking status; body mass index; presence of hypertension, respiratory diseases,

and gastrointestinal diseases; COVID-19 fear; COVID-19 pandemic restrictions; access to transportation; financial issues; and level of understanding about the importance of follow-up care. The alpha level of $p < 0.05$ was used to determine statistical significance.

3. Results

3.1. Description of the study sample

3.1.1. Demographics and personal health practices

The mean age of participants was 43 years with a standard deviation of 18.3. Most of the study sample were female (57 %), unemployed (65 %), and living in an urban area (80 %). Most of the adults in the sample were non-smokers (78 %) and overweight or obese (56.9 %). Table 1 shows descriptive statistics of all the variables in the study.

3.1.2. Chronic physical and mental conditions

A high percentage of the adults in the sample had hypertension (53 %) and diabetes (58 %). Nearly a quarter of the adults (24 %) had gastrointestinal diseases, while only 12 % had mental illnesses. Of the study adults, 23 % reported having other chronic conditions, including seizures, chronic kidney disease, and others.

3.1.3. Barriers to follow-up care

The mean score for COVID-19 fear was 17.8, with a standard deviation of 6.5. Sixty percent of the adults in the sample reported that COVID-19-pandemic restrictions were a barrier to follow-up care visits. Likewise, a high percentage of the participants reported missing follow-up care visits due to following the recommendations to avoid visiting healthcare settings (63 %) and not understanding the importance of follow-up care (40 %).

3.1.4. Follow-up care

More than half of the participants (55 %) reported missing follow-up care visits during the COVID-19 pandemic in Saudi Arabia. Likewise, 52 % were unable to contact their doctors during the pandemic. Furthermore, 26 % of the participants reported visiting the emergency department during the pandemic, and 14 % visited the emergency department due to missing follow-up care appointments. Similarly, 24 % experienced complications because of missing their medical follow-up appointments.

3.2. Explanatory variables and missed follow-up care visits

Table 2 displays the relationships between the explanatory variables and missed follow-up care visits in the bivariate analysis. There were significant relationships between the following variables and missed follow-up care visits: employment status, the presence of gastrointestinal diseases, the presence of mental illnesses, COVID-19 fear, COVID-19 pandemic restrictions, lack of transportation, and a poor understanding of the importance of follow-up care. A higher percentage of adults who reported COVID-19 pandemic restrictions (68 % vs. 32 %) and did not understand the importance of follow-up care (55 % vs. 45 %) as barriers missed a follow-up care visit. Additionally, adults who missed a follow-up care visit had a significantly higher mean score on the COVID-19 fear scale (19.0 vs. 16.0) than those who did not miss a visit.

Table 3 displays the adjusted relationships between the explanatory variables and missing a follow-up care visit. Adults who are currently smokers were more likely to miss a follow-up care visit (AOR: 3.385; p -value = 0.004) compared to non-smokers. Furthermore, as the COVID-19 fear score increases, the likelihood of missing a follow-up care visit also increases (AOR: 1.067; p -value = 0.001). Additionally, adults who did not perceive COVID-19-pandemic restrictions as a barrier were less likely to miss a follow-up care visit (AOR: 0.581; p -value = 0.031). Finally, adults who indicated that they understand the importance of follow-up care were less likely to miss a follow-up care visit (AOR:

Table 1
Descriptive statistics of categorical and continuous variables.

Demographics	
Age (Mean(sd))	43(18.3)
Gender	N(%)
Male	172 (43.3 %)
Female	225 (56.7 %)
Education	
Illiterate	45 (11.3 %)
Literate	352 (88.7 %)
Employment status	
Employed	141 (35.5 %)
Unemployed	256 (64.5 %)
Area	
Urban	319 (80.4 %)
Rural	78 (19.6 %)
Income	
<5000 SR	78 (19.6 %)
5000–10,000 SR	129 (32.5 %)
>10,000 SR	190 (47.9 %)
Living status	
Alone	33 (8.3 %)
Family/Friends	364 (91.7 %)
Distance to healthcare setting	
<30 Kilometre	329 (82.9 %)
≥30 Kilometre	68 (17.1 %)
Personal Health Practices	
Smoking status	
Non-Smoker	310 (78.1 %)
Past-Smoker	38 (9.6 %)
Currently Smoking	49 (12.3 %)
Body mass index	
Underweight	19 (4.8 %)
Healthy weight	152 (38.3 %)
Overweight	122 (30.7 %)
Obese	104 (26.2 %)
Chronic Conditions	
Hypertension	
Yes	211 (53.1 %)
No	186 (46.9 %)
Diabetes	
Yes	232 (58.4 %)
No	165 (41.6 %)
Heart diseases	
Yes	66 (16.6 %)
No	331 (83.4 %)
Respiratory diseases	
Yes	73 (18.4 %)
No	324 (81.6 %)
Gastrointestinal diseases	

Table 1 (continued)

Demographics	
Age (Mean(sd))	43(18.3)
Yes	96 (24.2 %)
No	301 (75.8 %)
Mental illnesses	
Yes	48 (12.1 %)
No	349 (87.9 %)
Other diseases	
Yes	91 (22.9 %)
No	306 (77.1 %)
Barriers	
Covid-19 fear (Mean (sd))	17.8(6.5)
COVID-19-pandemic restrictions	N(%)
Yes	240 (60.5 %)
No	157 (39.5 %)
Lack of transportation	
Yes	57 (14.4 %)
No	340 (85.6 %)
Financial issues	
Yes	69 (17.4 %)
No	328 (82.6 %)
Lack of caregivers	
Yes	64 (16.1 %)
No	333 (83.9 %)
Follow the recommendations to not visit healthcare settings	
Yes	249 (62.7 %)
No	148 (37.3 %)
Not understanding the importance of follow-up care	
Yes	159 (40.1 %)
No	238 (59.9 %)
Follow-up Care	
Have you missed medical follow-up appointment due to pandemic-related movement restrictions?	
Yes	217 (54.7 %)
No	180 (45.3 %)
Did you visit the ER during COVID-19 Pandemic?	
Yes	104 (26.2 %)
No	293 (73.8 %)
Did you visit the ER because of missing your medical follow-up appointments?	
Yes	54 (13.6 %)
No	343 (86.4 %)
Did you experience any complications because of missing your medical follow-up appointments?	
Yes	96 (24.2 %)
No	301 (75.8 %)
Were you able to contact you doctor during COVID-19 pandemic?	
Yes	206 (51.9 %)
No	191 (48.1 %)

Note: based on 397 adults, age over 18 years, who had at least one chronic condition.

sd: Standard Deviation; SR: Saudi Riyals.

0.224; p-value < 0.001).

4. Discussion

The current study examined missed follow-up care visits and the associated factors among adults with chronic conditions during the COVID-19 pandemic in Saudi Arabia. The study found that a significant number of individuals reported missing a follow-up care visit, and many experienced complications or a need for emergency services due to a lack of follow-up care during the pandemic. Another concerning finding was that more than half of the respondents were unable to contact their doctor during the pandemic. This lack of access to follow-up is particularly alarming given its crucial role when managing chronic physical and mental conditions (Nolte and McKee 2008, Ito et al., 2015, Lall et al., 2018, Meraya, 2022). Consistent evidence from numerous studies has highlighted the importance of regular follow-up care for individuals with chronic conditions, as it not only improves health outcomes but also prevents disease-related complications (Nolte and McKee 2008, Ito et al., 2015, Lall et al., 2018, Meraya, 2022).

Healthcare utilization services around the world were significantly impacted due to the COVID-19 pandemic, the resultant movement restrictions, and the closure of healthcare facilities (Kendzierska et al., 2021). The Saudi government responded to these challenges by implementing measures such as enhanced access to virtual healthcare by establishing virtual clinics across the country during the pandemic (Alassaf et al., 2021). In addition to these measures, the notable launch of Seha Virtual Hospital in 2022 further broadened the availability of virtual healthcare services for the public (Alkhalifah et al., 2022). These measures were aimed at bridging the existing gap in accessing healthcare services so patients can receive much-needed follow-up care remotely when face-to-face visits are not practicable. Nevertheless, further support initiatives should be undertaken during times of global public health emergencies to provide medical and psychological support to vulnerable and high-risk groups (individuals over age 65, individuals with comorbidities, immune-suppressed patients, and individuals with histories of mental illnesses and addiction).

The results of our study indicate that individuals with high scores for COVID-19 fear were more likely to miss follow-up care visits. Studies have shown that individuals with chronic conditions experience poor healthcare management after experiencing a major health shock such as cancer (Garg et al., 2018, Signal et al., 2020). Mental health interventions and support programs are also crucial to improve mental health during crises, especially among individuals with chronic conditions. Furthermore, this study found that adults who understood the importance of follow-up care were less likely to miss follow-up care visits. However, 40 % of the participants indicated that they did not understand the importance of follow-up care.

Our results indicate that barriers such as COVID-19 pandemic restrictions, lack of transportation, and financial issues impeded follow-up care among adults with chronic conditions. Telemedicine and virtual healthcare have been shown to improve access to healthcare among older adults who experience mobility issues (Alassaf et al., 2021, Alkhalifah et al., 2022). Additionally, home health care services can provide follow-up care for individuals with low literacy and for those who experience difficulties with technology.

The current study was not without limitations. As it employed a self-reporting questionnaire, there are risks of self-selection, desirability, or recall bias. Furthermore, the study results cannot be generalized owing to its cross-sectional design. Future studies could employ structured interviews to gain a deeper understanding of the barriers to follow-up visits during the pandemic.

However, the present study nevertheless has significant implications

Table 2

Bivariate analysis of the explanatory variables and missed/not missed follow-up care visits.

Variable	Missed Follow-up Visit (Yes) n = 217	Missed Follow-up Visit (No) n = 180	p-Value
Demographics			
Age (Mean(sd)) ^a	43.7(17.6)	44.25(19.2)	0.779
Gender (%)			0.067
Male	39.2	48.3	
Female	60.8	51.7	
Education			0.898
Illiterate	11.5	11.1	
Literate	88.5	88.9	
Employment status			0.012
Employed	41.0	28.9	
Unemployed	59.0	71.1	
Area			0.872
Urban	80.6	80.0	
Rural	19.4	20.0	
Income			0.184
<5000 SR	18.9	20.6	
5000-10,000 SR	36.4	27.8	
>10,000 SR	44.7	51.7	
Living status			0.279
Alone	9.7	6.7	
Family/friends	90.3	93.3	
Distance to Healthcare setting			0.305
<30 km	81.1	85.0	
>=30 km	18.9	15.0	
Personal Health Practices			
Smoking status			
Non-smoker	73.7	83.3	0.050
Past smoker	10.6	8.3	
Currently smoking	15.7	8.3	
Body mass index			
Underweight	5.5	3.9	0.815
Healthy weight	37.3	39.4	
Overweight	30.0	31.7	
Obese	27.2	25.0	
Chronic Conditions			
Hypertension			
Yes	52.1	54.4	0.637
No	47.9	45.6	
Diabetes			
Yes	54.4	63.3	0.071
No	45.6	36.7	
Heart diseases			
Yes	17.1	16.1	0.802
No	82.9	83.9	
Respiratory diseases			
Yes	21.7	14.4	0.065
No	78.3	85.6	
Gastrointestinal diseases			
Yes	29.5	17.8	0.007
No	70.5	82.2	
Mental illnesses			
Yes	15.7	7.8	0.016
No	84.3	92.2	
Other diseases			
Yes	24.9	20.6	0.307
No	75.1	79.4	
Barriers			
COVID-19 Fear (Mean (sd))			
COVID-19-pandemic restrictions (%)	19.0(6.6)	16.3(6.0)	<0.001
Yes	68.2	51.1	0.001
No	31.8	48.9	
Lack of Transportation			
Yes	20.3	7.2	<0.001
No	79.7	92.8	
Financial issues			
Yes	18.4	16.1	0.543
No	81.6	83.9	
Lack of Caregivers			
Yes			0.054

(continued on next page)

Table 2 (continued)

Variable	Missed Follow-up Visit (Yes) n = 217	Missed Follow-up Visit (No) n = 180	p-Value
No			
Follow the recommendations to not visit healthcare settings			0.064
Yes	66.8	57.8	
No	33.2	42.2	
Not Understanding the importance of follow-up care			<0.001
Yes	54.8	22.2	
No	45.2	77.8	

Note: based on 397 adults, age over 18 years, who had at least one chronic condition.

sd: Standard Deviation; SR: Saudi Riyals. P-values are based on chi-square tests for categorical variables and t-tests for continuous variables.

Table 3

Adjusted Odds Ratio and 95 % Confidence Intervals from Logistic Regression (Stepwise Procedure) on Missed Follow-up visit (N = 397).

Explanatory Variable	AOR	95 % Confidence Interval	P-Value
Demographics			
Gender			
Male	Reference		
Female	1.668	(0.942 – 2.953)	0.079
Employment status			
Employed	Reference		
Unemployed	0.449	(0.261 – 0.772)	0.004
Income			
<5000 SR	Reference		
5000–10,000 SR	1.569	(0.781 – 3.152)	0.206
>10,000 SR	1.004	(0.524 – 1.922)	0.990
Distance to healthcare setting			
<30 km	Reference		
≥30 km	1.522	(0.81 – 2.859)	0.192
Personal Health Practices			
Smoking status			
Non-smoker	Reference		
Past smoker	1.712	(0.706 – 4.149)	0.234
Currently smoking	3.385	(1.486 – 7.711)	0.004
Body mass index			
Underweight	Reference		
Healthy weight	0.672	(0.227 – 1.989)	0.473
Overweight	0.676	(0.223 – 2.05)	0.489
Obese	1.196	(0.385 – 3.714)	0.756
Chronic Conditions			
Hypertension			
Yes	Reference		
No	1.536	(0.928 – 2.544)	0.095
Respiratory diseases			
Yes	Reference		
No	0.62	(0.336 – 1.145)	0.127
Gastrointestinal diseases			
Yes	Reference		
No	0.643	(0.365 – 1.133)	0.127
Barriers			
COVID-19 fear	1.067	(1.027 – 1.109)	0.001
COVID-19-pandemic restrictions			
Yes	Reference		
No	0.581	(0.355 – 0.953)	0.031
Lack of transportation			
Yes	Reference		
No	0.322	(0.146 – 0.71)	0.005
Financial issues			
Yes	Reference		
No	3.097	(1.526 – 6.286)	0.002
Not understanding the importance of follow-up care			
Yes	Reference		
No	0.224	(0.134 – 0.374)	<0.001

Note: based on 397 adults, age over 18 years, who had at least one chronic condition.

AOR: Adjusted Odds Ratio; CI: Confidence Intervals.

for clinical practice. Our findings highlight the adverse effects of pandemic-related movement restrictions on the follow-up visits of individuals with chronic health conditions, along with some associated barriers. The findings are significant because regular follow-up visits are imperative in the management and monitoring of chronic conditions, ensuring that appropriate treatment adjustments are performed when needed and preventing disease progression. Moreover, our study emphasizes the need for targeted initiatives during global public health emergencies in order to provide comprehensive medical and psychological support to high-risk and vulnerable groups. Healthcare professionals can better adapt their clinical practice by recognizing the challenges that individuals with chronic conditions face, especially during pandemic-related movement restrictions. Solutions may involve the implementation of remote monitoring solutions to ensure continuity and address patient needs, thus improving their health outcomes and minimizing the impact of future crises on their health and well-being. The study's insights can provide baseline data for developing patient-centered policies that prioritize the healthcare needs of individuals with chronic conditions during times of restricted movement, such as pandemic situations.

5. Conclusion

The present study found that more than half of individuals with chronic conditions missed follow-up care visits during the COVID-19 pandemic. Initiatives and health programs should therefore be implemented to increase access to follow-up care during global public health emergencies, especially among individuals with chronic conditions. Additionally, health programs should be tailored to increase awareness about the importance of follow-up care among individuals with chronic conditions.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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