



Factors disrupting the continuity of care for patients with chronic disease during the pandemics: A systematic review

Mohadeseh Ghanbari-Jahromi¹  | Erfan Kharazmi²  | Peivand Bastani³ |
Mesbah Shams⁴ | Milad Ahmadi Marzaleh⁵  | Mohammad Amin Bahrami² 

¹Department of Healthcare Management, Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

²Department of Healthcare Management, Health Human Resources Research Center, School of Health Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

³College of Business, Government and Law, Flinders University, Adelaide, South Australia, Australia

⁴Department of Internal Medicine, Endocrinology and Metabolism Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

⁵Department of Health in Disasters and Emergencies, School of Health Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

Correspondence

Mohammad Amin Bahrami, Department of Healthcare Management, Health Human Resources Research Center, School of Health Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: aminbahrami1359@gmail.com

Funding information

Shiraz University of Medical Sciences, Grant/Award Number: 23745

Abstract

Background and Aims: Continuous routine care is necessary to prevent long-term complications of chronic diseases and improve patients' health conditions. This review study was conducted to determine the factors disrupting continuity of care for patients with chronic diseases during the pandemic.

Methods: All original articles published on factors disrupting continuity of care for patients with chronic disease during a pandemic between December 2019 and June 28, 2023, in PubMed, Web of Science, Scopus, and ProQuest databases were searched. Selection of articles, data extraction, and qualitative evaluation of articles (through STROBE and COREQ checklist) were done by two researchers separately. Data graphing form was used to extract the data of each study and then the data were classified by thematic analysis method.

Results: Out of 1708 articles reviewed from the databases, 22 were included. The factors disrupting the continuity of care for patients with chronic diseases during the epidemics were classified into two main categories: patient-side factors and health system-side factors. Patient-side factors including psychological, individual and social, disease-related, and health system-side factors including provider access, health system institutional, and infrastructural and financial problems were among the subcategories disrupting the continuity of care for patients with chronic diseases during the pandemic. Based on the studies, psychological factors and access to the provider were among the most frequent factors affecting the continuity of care for patients with chronic diseases in the pandemic.

Conclusion: Considering the factors disrupting the continuity of care and applying appropriate interventions based on them, can guarantee the continuity of providing services to chronic patients in health crises.

KEYWORDS

chronic disease, continuity of patient care, pandemics, systematic review

1 | INTRODUCTION

Since chronic diseases have a high prevalence and significant complications, continuity of care is important. Better continuity of care can cause mutual trust between patients and doctors, greater consensus about the drugs, and the goal of treatment. In other words, better continuous routine care cause better patient compliance with doctor's recommendations, prescribed drugs,^{1,2} and favorable health care outcomes or reduced health care use.^{1,3} On the other hand, a lack of continuity of care in patients cause higher costs and low-quality of treatment.^{4,5}

Covid-19 pandemic affected the continuity of care for patients with chronic disease. With the spread of the pandemic, in-person visits to clinics decreased. Also, telemedicine visits increased, but the number of visits decreased.⁶ During the pandemic, laboratory tests and face-to-face examinations decreased and negatively affected clinical decision-making.^{7,8} Also, the number of hospitalizations, visits to the emergency department, and visits to inpatient clinics for patients with chronic disease decreased.⁹ Reducing the number of referrals in patients with chronic disease worsens the health condition.¹⁰ Patients who missed more medical appointments were more at risk of mortality.¹¹

Studies showed during the pandemic, the continuing of care for patients with chronic disease is disrupted. For example, a study in Belgium showed primary care in patients with chronic diseases suffered from disorders.¹² During the pandemic, people with chronic diseases experienced an unbalanced diet,¹³ decreased physical activity, inability to see family and friends, anxiety, and psychological distress.⁹ A study showed Covid-19 harmed diabetic foot screening.¹⁴ Another study in the United Kingdom and the United States found people's mental health had worsened compared to before the

pandemic.¹⁵ Patients with chronic diseases were psychologically more affected by Covid-19 than other diseases.^{16,17} This disorder has serious long-term consequences for the patient, society, and the health system.

Due to the importance of continuity of care for patients with chronic diseases in the time of Covid-19, the present review study was conducted to extract and categorize the factors disrupting continuing of care for patients with chronic diseases during the pandemic.

2 | METHODS

2.1 | Eligibility criteria and search strategies

A systematic review was conducted according to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.¹⁸ First, a specific question was designed based on the elements of PICO (population, intervention, comparison, and outcomes) and patients with chronic disease over 18 years of age (population), continuity of care and related keywords listed in Table 1 (outcomes), and covid-19 (intervention). The comparison was not included in this study due to the absence of a comparison group. Classification of chronic diseases based on the Cochrane systematic review database included asthma, chronic obstructive pulmonary disease, diabetes mellitus, heart disease, hypertension, lipids, arthritis, and osteoporosis.¹⁹ The research question was raised as follows: What are the factors disrupting the continuity of care for patients with chronic diseases during the epidemic? Then, a systematic review of the literature, including all studies related to "Continuity of care for patients with chronic diseases during an epidemic" in different

TABLE 1 The search strategy of the research.

Search strategy		
Databases: PubMed, Scopus, ISI Web of Science, ProQuest (2019–2023)		
Limits: Language (resources in English) and date (published after December 29, 2019)		
Date: up to June 28, 2023		
Strategy: #1 AND #2 AND #3 in title and abstract		
#1	P	"Chronic disease" OR "chronic illness" OR "Chronic Condition*" OR "chronic care" OR "noncommunicable diseases" OR "non-communicable diseases" OR "non-infectious diseases" OR "noninfectious diseases" OR heart OR cardi* OR lipid* OR asthma OR "Chronic Obstructive Pulmonary Disease*" OR "chronic obstructive lung disease" OR diabet* OR hypertension OR "High Blood Pressure*" OR arthritis OR osteoporosis
#2	I	outbreak* OR epidemic* OR pandemic* OR "2019-nCoV Infection" OR covid-19* OR "SARS CoV 2*" OR coronavirus* OR "Coronavirus Disease 2019" OR "Coronavirus Pandemic" OR "COVID-19 Pandemic*" OR "SARS CoV 2 Infection" OR "SARS-CoV 2 Virus" OR "COVID 19 Epidemic" OR "2019 Novel Coronavirus Disease" OR "coronavirus disease 2019"
#3	O	"Care Continuity" OR "Continuum of Care" OR "Care Continuum" OR "Continuity of Care" OR "Treatment Continuity" OR "Continuity of Patient Care" OR "healthcare Continuity" OR "health care Continuity" OR "health service Continuity" OR "continuity of essential health services" OR "Care Management" OR "follow-up care*" OR "routine care" OR "aftercare"

countries was conducted. So, all relevant studies conducted from December 29, 2019, to June 8, 2023, were retrieved through the search strategy (Table 1). Therefore, keywords appropriate to the purpose of the research and keywords used in related studies were selected and searched in PubMed, Scopus, ISI Web of Science and ProQuest databases. Also, keywords followed the orientation of MeSH terms. Keywords and search string details in each database are listed in the Appendix Table SA1. Endnote version X9 software was used to manage resources.

2.2 | Inclusion criteria

The inclusion criteria in this study were articles with English abstracts, and keywords related to continuity of care and chronic disease.

2.3 | Exclusion criteria

Articles that dealt with reviews, letters to the editor, comments, and the under-18 population were excluded.

2.4 | Screening

After searching the databases, the titles of all the articles were examined. Articles that were related to the research topic were selected. Then the abstracts of the articles were examined. Then, the full text of the articles was reviewed and evaluated by the authors. Finally, the articles that were completely related to the purpose of the research were included. Two researchers (MAB and MGH-J) performed all research and selected articles independently. A third researcher (EKH) was used to reach an agreement when necessary.

2.5 | Quality assessment of articles

STROBE (Strengthening the Reporting of Observational studies in Epidemiology)²⁰ checklist was used for qualitative evaluation of observational articles and COREQ (COnsolidated criteria for REporting Qualitative research)²¹ checklist was used for qualitative studies. This step was done by two researchers separately and the articles were qualitatively evaluated. In case of disagreement, the opinions of the third researcher were used. The STROBE checklist includes 22 questions evaluating sampling methods, measuring variables, statistical analysis, adjustment of confounding factors, mentioning validity and reliability of used tools, and research objectives. Also, the COREQ checklist has 32 evaluation questions in the field of research team and reflexivity, study design, and analysis and findings. Based on the evaluations, 6 studies had an excellent quality score and 16 studies had a good score.

2.6 | Data collection

The data of each study was extracted using the data extraction form. Based on this, the first author's name, title, year, place, type of study, participants, and research results were recorded in the data extraction form in Microsoft Word 2016 software (Appendix Table SA2). The summary forms were completed for each article. After evaluating all the articles by two authors, the evaluations were placed in the table. If there was a disagreement about the evaluation, the opinions of the third author were used.

2.7 | Data analysis

Finally, the data obtained from the previous stage were classified using the thematic analysis method. Hence, the data collected in the previous stage were open-coded based on the research question. After rereading the codes as well as finalizing and reducing them, the process of categorizing and aggregating the codes continued until obtaining sub-components and main components that determined factors disrupting the continuity of care for patients with chronic disease during a pandemic. The results were then entered in Table 2.

3 | RESULTS

In this study, 1708 articles related to the purpose of the study were retrieved in databases. After removing duplicates, 719 articles were rejected in terms of titles, 132 articles in terms of abstracts, and 56 articles in terms of full text articles that did not meet the inclusion criteria. Finally, 22 articles were included in the study (Figure 1).

The findings from the descriptive analysis of 22 studies showed that seven studies (31.82%) by researchers in Asia, seven (31.82%) by Europe, four (18.18%) by Africa, three (13.64%) by America and one study was done by Australian authors (4.55%). Also, 16 cases (72.73%) of the studies were related to developed countries and six cases (27.27%) were related to developing countries.

Based on the thematic analysis of the findings, the researchers classified the factors disrupting the continuity of care for chronic patients during the epidemic into two main categories: patient-side factors and health system-side factors (Table 2). Three subcategories pertain to patient-side factors and four subcategories to health system-side factors.

3.1 | Patient-side factors

In this category, the most important factor disrupting the continuity of care for patients with chronic diseases during the epidemic was the psychological factor. There were three subcategories of patient-side factors, which included psychological factors (negative emotions, medical and family support), individual and social factors (age, comorbidity, insufficient knowledge), and disease-related factors

TABLE 2 Factors disrupting the continuity of care among chronic patients in pandemic.

Main categories	Subcategories	Sub-sub categories	References
Patient-side factors	Individual and social factors	Age	[22–25]
		Comorbidity	[10, 22]
		Insufficient knowledge	[26–28]
	Disease-related factors	Severity of chronic disease	[23, 29]
		The duration of the disease	[24, 30]
		Family history of the disease	[25]
	psychological factors	Negative emotions	[22, 23, 26, 28–35]
Medical and family support		[26, 29, 35]	
Health system-side factors	Provider access Problems	Reducing access to medical and para clinical care	[10, 27–31, 35–40]
	Infrastructural problems	Disruption of public transportation	[22, 23, 30, 31]
		Physical distancing	[22, 31, 39]
	health system Institutional problems	Lack of non-communicable disease management guidelines	[41]
		Changing the type of care	[41]
		Infodemics and the lack of reliable health information	[41]
	Financial problems	Lack of supply	[10, 26, 27, 31]
Decrease in income		[25, 42]	

(severity of chronic disease, duration of the disease, family history of the disease).

Additionally, 15 studies pointed to patient factors disrupting the continuity of care for chronic patients during the epidemic. In this category, 11 studies mentioned psychological factors (73.33%), eight studies referred to individual and social factors (53.33%), and five studies discussed disease-related factors (33.33%).

3.2 | Health system-side factors

In the health system side-factor, studies have focused on the subcategories of provider access problems (reducing access to medical and paraclinical care), health system Institutional problems (lack of supply, lack of non-communicable disease management guidelines, changing the type of care, infodemics and the lack of reliable health information), infrastructural problems (disruption of public transportation, physical distancing) and financial problems (decrease in income) as factors disrupting the continuity of care for patients with chronic diseases in the period of Covid-19. The sub-subcategories of reducing access to medical and para-clinical care were the most frequent factors in disrupting the continuity of care for patients with chronic diseases in this category. Also, 18 articles were related to health system factors. In this category, 12 studies pointed to provider access (67%), five studies to infrastructural (28%), five studies to health system institutional (28%), and two studies to financial problems (11.11%).

Table 2 shows additional information with subcomponents on factors disrupting continuity of care for patients with chronic disease during the pandemic.

4 | DISCUSSION

Due to the special conditions of patients with chronic diseases, continuity of care is important for them. With the outbreak of Covid-19, the continuity of care in patients with chronic disease was disturbed. Therefore, the present systematic review aimed to investigate the factors disrupting the continuity of care for patients with chronic diseases during the pandemic.

The results showed that in the main category of patient-side factors, negative emotions, age, the severity of chronic disease, the duration of the disease, and in the main category of health system-side factors, reducing access to medical and para-clinical care, Lack of supply, disruption of public transportation, and decrease in income were the most frequent subcategories that disrupted the continuity of care for patients with chronic diseases during the epidemic.

4.1 | Patient-side factors

Negative emotions in psychological factors were among the important issues disrupting the continuity of care for patient with chronic disease. According to the studies of Hiko et al.,²² Moges et al.,²³ and Bellini et al.,³⁶ fear, dissatisfaction, stigma, and anxiety were among

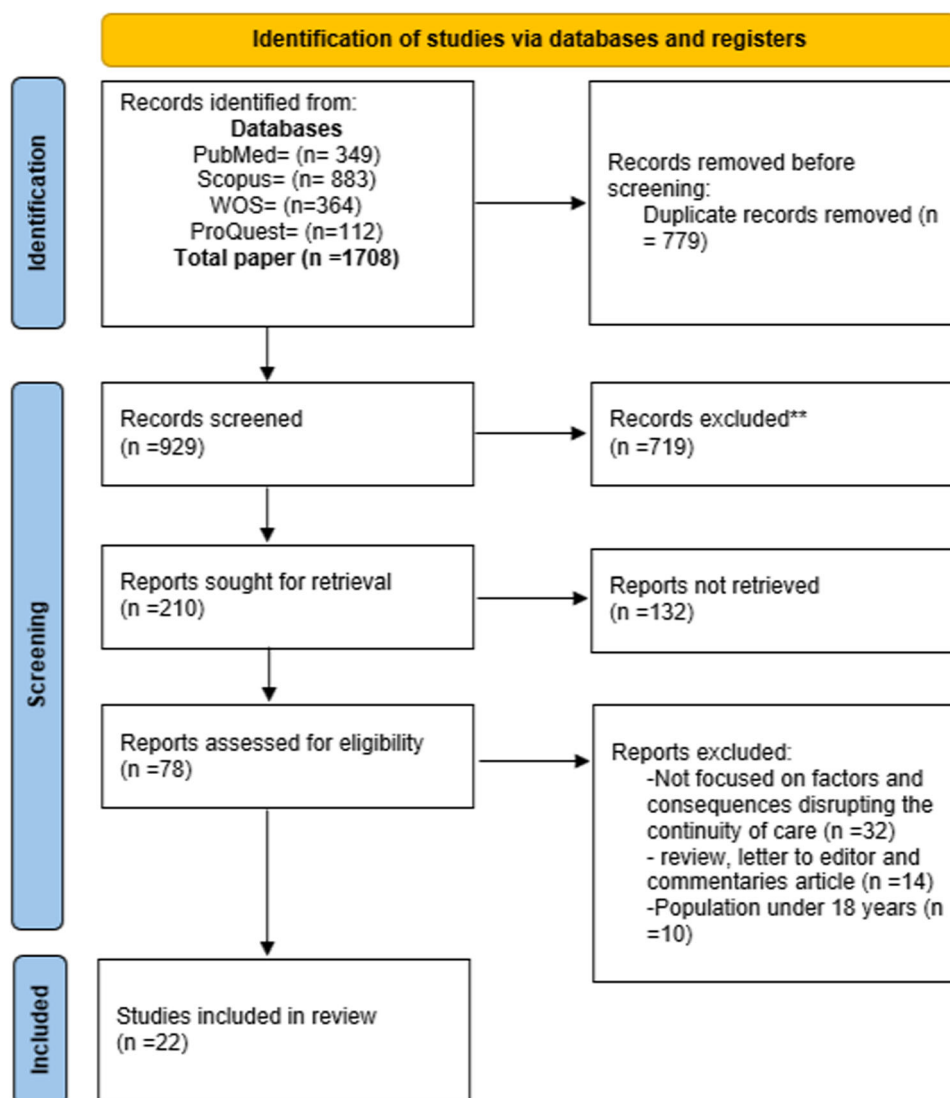


FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram for the systematic review.

the factors that had a negative impact on the management of patients with chronic disease during Covid-19.²⁶ A study showed quarantine caused depression and anxiety in the elderly.⁴³ Longer quarantines affect people's mental health.⁴⁴ Additionally, mental distress had a negative effect on medication adherence and chronic disease self-management.⁴⁵ Self-stigma also affected the management of type 2 patients with diabetes.⁴⁶ Since patients with chronic diseases are vulnerable, it is possible to improve the health literacy of patients. Through mass media and providing the necessary training by health centers, specialized clinics, and doctors' offices to manage chronic disease, continuous treatment should be adopted.

Age was another cause of disruption in the continuity of care in individual and social factors. Old age decreased continuity of care among patients with chronic disease.^{22-25,36} A study showed the elderly missed a follow-up appointment with a doctor.²³ Certain conditions such as illness forced the elderly not to go to the hospital during Covid-19.⁴⁷ Elderly patients have weaker follow-up conditions

due to their greater fear and severity of the disease. Therefore, special attention should be paid to the treatment of elderly patients during the crisis. The severity of chronic disease and the duration of disease were two most frequent components in the factors related to the disease. According to some studies, the severity of the disease had impact on reducing the continuity of care for patients.^{23,29} A study showed patients with more severe chronic diseases were three times more exposed to losing follow-up care.²³ A study showed that during the pandemic period, patients who had a strong need to follow up on their chronic disease, postponed their follow up.⁴⁸ Decreased referrals, access, and hospitalizations in the setting of COVID-19 resulted in inadequate ongoing care for chronic conditions among patients in need.^{9,12} Also, another study showed that quarantine conditions may have a negative effect on critically ill patients who require regular treatment and follow-up.⁴⁹ In other words, some patients delayed going to health care providers and continuing treatment due to concerns about services or fear of covid-19.⁵⁰

According to a study, patients with a duration of diabetes more than 5 years had more follow-up,²⁴ but according to a study by Ayele et al.,³⁰ patients with a history of more than 5 years were 36% more likely to lose care. It seems that individual and social differences are factors in the dispersion of the results.

4.2 | Health system-side factors

According to the studies of Bellini et al.,³⁶ Ismail et al.,¹⁰ and Gummidi et al.,²⁷ access to medical and paraclinical care for patients with chronic disease decreased during Covid-19. The study of Danhieux et al.¹² and Kendzerska et al.⁹ showed Covid-19 reduced patients' access to hospitals. This decreased the continuity of care among patients with chronic disease.^{9,12} Access to patients with chronic disease services decreased due to the COVID-19 quarantine and public health orders.^{12,51,52} Due to the rapid spread of this disease and the unpreparedness of the country's health system access to care was disrupted. Therefore, in these crises, improving access such as redesigning the care system (developing telemedicine and home care), investing, and strengthening primary care can be a solution.

The lack of supply in health system institutional problems was one of the other factors disrupting the continuity of care mentioned in the studies. Pitayarangsarit et al.³¹ showed that showed lack of healthcare personnel was among the problems of patients with noncommunicable diseases during Covid-19. The study by Shi et al.²⁶ showed during quarantine due to the lack of necessary facilities for self-management of blood sugar, diabetic diet, and blood sugar monitoring patients faced problems. Heart and blood pressure drugs were in shortage during Covid-19 since they were produced in China and India.⁵³ Another study showed antidiabetic drugs, antihypertensive drugs, HIV drugs, and malaria drugs (HCQ) were in short supply during the Covid-19 pandemic. There was a lack of drug supply, drug distribution, and drug delivery during this period. The lack of human resources caused an increase in the workload of employees.⁵⁴ In an interview conducted with pharmacists in 16 European countries, they showed local pharmacies faced a shortage of human resources.⁵⁵ In rural areas, lack of manpower in pharmacies caused a decrease in drug consultations for patients with chronic disease.⁵⁶ Also, the quarantine measures created problems for the sale of medicinal items.⁵⁷ Crises like Covid-19 can cause changes in the health system of countries. Therefore, the lack of resources can be reduced by monitoring pharmaceutical companies and drug-importing institutions as well as giving financial and spiritual incentives to health workers in critical situations.

The most important component in infrastructural problems was the subcomponent of disrupting public transportation. Studies showed that public transportation problems were one of the health risk factors for patients with chronic disease in the pandemic.^{23,30} Also, another study showed the probability of receiving care was lower in patients who faced transportation problems.²² In other words, limited transportation during public health crises is a major barrier to the continuity of care for patients.³¹ Providing suitable

conditions for treatment follow-up by patients with chronic disease, such as telemedicine and home care, can reduce transportation problems. Also, interdepartmental cooperation and the creation of participation of municipalities in public transportation systems can be helpful.

The decrease in income was one of the other sub-components in the component of economic factors studies discussed. A study showed during the pandemic, the decrease in income in patients with diabetes caused a decrease in regular follow-up in treatment.²⁵ The outbreak of Covid-19 was associated with the destruction of businesses and the reduction of people's income. This issue is important for patients with chronic diseases whose treatment costs are high. Therefore, it is necessary to define financial support for these groups through the government, charities, and non-governmental organizations in health crises.

4.3 | Strengths and limitation

This study extensively reviewed the articles related to the disruption in the continuity of care for patients with chronic diseases in the world from the outbreak of covid to June 28, 2023. According to the knowledge of the researchers, this article is the first systematic study about the factors disrupting the continuity of care for patients with chronic diseases during the pandemic. In this study, the factors disrupting the continuity of care in eight chronic diseases have been investigated. Also, as much as possible, it has been tried to report a comprehensive classification of factors that lead to disruption in the continuity of care for patients with chronic disease.

One of the limitations of this study is the search databases which were limited to peer-reviewed literature and excluding non-English publications. Consequently, factors disrupting the continuity of care for patients with chronic diseases, discussed in languages other than English sources, may have been overlooked.

5 | CONCLUSION

This study tried to identify all the factors affecting the continuity of care for patients with chronic disease during the pandemic. In general, the results showed that psychological factors, individual and social factors, disease-related factors, provider access, health system institutional, infrastructural, and financial problems disrupt the continuity of care for patients with chronic diseases during the pandemic. Psychological factors (negative emotions such as fear, dissatisfaction, stigma, anxiety, worry, and disappointment) and access to providers (reducing access to medical and paraclinical care) were among the most effective subgroups disrupting the continuity of care for patients with chronic disease in the pandemic. It seems that due to the importance of health crises, and the impact they have on the health system, and the daily life of the patients it is necessary for governments and health policymakers to design guidelines and detailed plans for similar crises.

5.1 | Implications for practice

To reduce the disruption of the continuity of care for patients with chronic disease during pandemics, we can follow these steps:

- Provide conditions for easy access to telemedicine for patients with chronic diseases
- Give necessary information to patients to reduce anxiety and continue care
- Carry out necessary planning by the health system of countries to reduce drug resources and hoard by profit-seeking people
- Give material incentives and spiritual to the health personnel to prevent them from withdrawing
- Regular follow-up of patients by doctors and treatment clinics
- Government support for low-income and vulnerable groups such as patients with chronic disease who have high treatment costs
- More use of experienced managers in the field of health and treatment to form health working groups in crisis situations

AUTHOR CONTRIBUTIONS

Mohadeseh Ghanbari-Jahromi: conceptualization; investigation; writing – original draft; writing – review & editing; methodology; project administration; formal analysis; supervision; resources. **Erfan Kharazmi:** conceptualization; investigation; writing – original draft; writing – review & editing; methodology; project administration; resources. **Peivand Bastani:** project administration; writing – review & editing; methodology; conceptualization; writing – original draft; investigation. **Mesbah Shams:** writing – review & editing; methodology; conceptualization; investigation; writing – original draft. **Milad Ahmadi Marzaleh:** writing – review & editing; methodology; conceptualization; investigation; writing – original draft. **Mohammad Amin Bahrami:** conceptualization; investigation; funding acquisition; writing – original draft; writing – review & editing; methodology; formal analysis; supervision; resources.

ACKNOWLEDGEMENTS

Authors would like to thank Shiraz University of Medical Sciences (SUMS) for financial support of the research. This article was a part of Mohadeseh Ghanbari-Jahromi's PhD thesis, approved and financially supported by the Research Vice-chancellor of Shiraz University of Medical Sciences (Grant No. 23745).

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data of this research is available and could be sent upon contact with the corresponding author.

ETHICS STATEMENT

The study has been approved by ethics committee of Shiraz University of Medical Sciences under the code of IR.SUMS.NUMIM-G.REC.1400.066. All methods were according to the Helsinki Declaration's ethical standards.

TRANSPARENCY STATEMENT

The lead author Mohammad Amin Bahrami affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

ORCID

Mohadeseh Ghanbari-Jahromi  <http://orcid.org/0009-0004-4253-8076>

Erfan Kharazmi  <http://orcid.org/0000-0002-2138-896X>

Milad Ahmadi Marzaleh  <http://orcid.org/0000-0003-1743-0093>

Mohammad Amin Bahrami  <http://orcid.org/0000-0003-2276-7440>

REFERENCES

1. Chen CC, Tseng CH, Cheng SH. Continuity of care, medication adherence, and health care outcomes among patients with newly diagnosed type 2 diabetes: a longitudinal analysis. *Med Care*. 2013;51(3):231-237.
2. Robles S, Anderson GF. Continuity of care and its effect on prescription drug use among Medicare beneficiaries with hypertension. *Med Care*. 2011;49(5):516-521.
3. Asche C, LaFleur J, Conner C. A review of diabetes treatment adherence and the association with clinical and economic outcomes. *Clin Ther*. 2011;33(1):74-109.
4. Schrag D, Xu F, Hanger M, Elkin E, Bickell NA, Bach PB. Fragmentation of care for frequently hospitalized urban residents. *Med Care*. 2006;44(6):560-567.
5. McWilliams JM, Chernew ME, Dalton JB, Landon BE. Outpatient care patterns and organizational accountability in Medicare. *JAMA Int Med*. 2014;174(6):938-945.
6. Baum A, Kaboli PJ, Schwartz MD. Reduced in-person and increased telehealth outpatient visits during the COVID-19 pandemic. *Ann Intern Med*. 2021;174(1):129-131.
7. Kouri A, Gupta S, Yadollahi A, et al. Addressing reduced laboratory-based pulmonary function testing during a pandemic. *Chest*. 2020;158(6):2502-2510.
8. Williams S, Tsiligianni I. COVID-19 poses novel challenges for global primary care. *NPJ Prim Care Respir Med*. 2020;30(1):30.
9. Kendzerska T, Zhu DT, Gershon AS, et al. The effects of the health system response to the COVID-19 pandemic on chronic disease management: a narrative review. *Risk Manag Healthc Policy*. 2021;14:575-584.
10. Ismail H, Marshall VD, Patel M, Tariq M, Mohammad RA. The impact of the COVID-19 pandemic on medical conditions and medication adherence in people with chronic diseases. *J Am Pharm Assoc*. 2022;62(3):834-839.
11. McQueenie R, Ellis DA, McConnachie A, Wilson P, Williamson AE. Morbidity, mortality and missed appointments in healthcare: a national retrospective data linkage study. *BMC Med*. 2019;17(1):2.
12. Danhieux K, Buffel V, Pairon A, et al. The impact of COVID-19 on chronic care according to providers: a qualitative study among primary care practices in Belgium. *BMC Fam Pract*. 2020;21(1):255.
13. Wicaksana AL, Hertanti NS, Ferdiana A, Pramono RB. Diabetes management and specific considerations for patients with diabetes during coronavirus diseases pandemic: a scoping review. *Diabetes Metab Syndr*. 2020;14(5):1109-1120.
14. Coma E, Mora N, Méndez L, et al. Primary care in the time of COVID-19: monitoring the effect of the pandemic and the lockdown measures on 34 quality of care indicators calculated for 288 primary

- care practices covering about 6 million people in Catalonia. *BMC Fam Pract.* 2020;21(1):208.
15. Pierce M, Hope H, Ford T, et al. Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *The Lancet Psychiatry.* 2020;7(10):883-892.
 16. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry.* 2020;66(4):317-320.
 17. Hajure M, Tariku M, Mohammedhusein M, Dule A. Depression, anxiety and associated factors among chronic medical patients amid COVID-19 pandemic in Mettu Karl Referral Hospital, Mettu, Ethiopia, 2020. *Neuropsychiatr Dis Treat.* 2020;16:2511-2518.
 18. PRISMA checklist. 2020. Available from: <http://www.prisma-statement.org/>
 19. Cochrane Library. Advanced Search. Noncommunicable Diseases. Available from: <https://www.cochranelibrary.com/advanced-search/mesh>
 20. STROBE Statement. Checklist of items that should be included in reports of cross-sectional studies. Available from: <https://www.strobe-statement.org>
 21. COREQ Checklist. CONSolidated criteria for REporting Qualitative research. Available from: https://cdn.elsevier.com/promis_misc/ISSM_COREQ_Checklist.pdf
 22. Hiko A, Assefa N, Ataro Z, et al. Follow-up conditions of care and associated factors among adult hypertensive patients during COVID-19 at West Arsi public health facilities, Southeastern Ethiopia: a multi-center cross-sectional study. *Front Public Health.* 2022;10:1018686.
 23. Moges T, Abebe W, Yalew AW, et al. Impact of COVID-19 on care seeking behavior of patients at tertiary care chronic follow-up clinics in Ethiopia: a cross-sectional telephone survey. *Ethiop J Health Dev.* 2021;35(3):200-207.
 24. Di Gangi S, Lüthi B, Diaz Hernandez L, Zeller A, Zechmann S, Fischer R. Quality outcome of diabetes care during COVID-19 pandemic: a primary care cohort study. *Acta Diabetol.* 2022;59(9):1189-1200.
 25. Silvanus V, Maharjan S, Jha A. Factors influencing health seeking behaviour among persons with diabetes attending urban health care settings. *J Nepal Health Res Counc.* 2022;20(2):347-353.
 26. Shi C, Zhu H, Liu J, Zhou J, Tang W. Barriers to self-management of type 2 diabetes during COVID-19 medical isolation: a qualitative study. *Diabetes Metab Syndr Obes.* 2020;13:3713-3725.
 27. Gummidi B, John O, Jha V. Continuum of care for non-communicable diseases during COVID-19 pandemic in rural India: A mixed methods study. *J Family Med Prim Care.* 2020;9(12):6012-6017.
 28. Gruiskens JRJH, van Hoef L, Theunissen M, et al. The psychosocial impact of the COVID-19 pandemic on chronic care patients. *J Am Med Dir Assoc.* 2023;24(4):426-433.
 29. Sloan M, Gordon C, Harwood R, et al. The impact of the COVID-19 pandemic on the medical care and health-care behaviour of patients with lupus and other systemic autoimmune diseases: a mixed methods longitudinal study. *Rheumatol Adv Pract.* 2021;5(1):rkaa072.
 30. Ayele TA, Alamneh TS, Shibru H, et al. Effect of COVID-19 pandemic on missed medical appointment among adults with chronic disease conditions in northwest Ethiopia. *PLoS One.* 2022;17(10):e0274190.
 31. Pitayangsarit S, Bhagaman N, Yodmai K, Thangsirikul N, Tipayamongkholgul M. The resiliency of noncommunicable diseases services during the public health crisis: a lesson from Bangkok, Thailand. *BMC Health Serv Res.* 2023;23(1):409.
 32. Karaca A, Kaya L, Beyazay S, Kaya Z. The effect of anxiety and fear experienced in individuals with chronic diseases on self-care management during the COVID-19 pandemic. *Arch Health Sci Res.* 2022;9(3):169-174.
 33. Samargandy S, Al Garni TA, Almoghairi A, et al. Effect of COVID-19 pandemic on the cardiac outpatients' perception of seeking medical advice. *J Saudi Heart Assoc.* 2020;32(3):377-382.
 34. Farrant L, Harding R, Nkhoma K, Mzimkulu O, Hunter J, Gwyther L. Impact of COVID-19 primary healthcare service restrictions on patients with chronic obstructive pulmonary disease in Cape Town, South Africa. *S Afr Med J.* 2022;112(9):760-764.
 35. Menting J, van Schelven F, Aussems C, Heijmans M, Boeije H. Routine healthcare disruptions: a longitudinal study on changes in self-management behavior during the COVID-19 pandemic. *BMC Health Serv Res.* 2023;23(1):196.
 36. Bellini B, Nreu B, Francesconi P, Mannucci E. Covid-19 pandemic, diabetes and glycemic control: results of a retrospective cohort study of 230.000 persons with diabetes in tuscany. *Nutr Metab Cardiovasc Dis.* 2022;32(11):2588-2593.
 37. Opinc A, Brzezińska O, Makowska J. The impact of COVID-19 and healthcare system changes on the well-being of rheumatic patients. *Rheumatology.* 2021;59(2):73-84.
 38. Javanparast S, Roeger L, Reed RL. Experiences of patients with chronic diseases of access to multidisciplinary care during COVID-19 in South Australia. *Aust Health Rev.* 2021;45:525-532.
 39. Gray C, Ambady L, Chao S, Smith W, Yoon J. Virtual management of chronic conditions during the COVID-19 pandemic: insights from primary care providers and clinical pharmacists. *Mil Med.* 2023;188(7-8):e2615-e2620.
 40. Muellers KA, Andreadis K, Ancker JS, Horowitz CR, Kaushal R, Lin JJ. Provider and patient experiences of delays in primary care during the early COVID-19 pandemic. *J Healthc Qual.* 2023;45(3):169-176.
 41. Monaco A, Casteig Blanco A, Cobain M, et al. The role of collaborative, multistakeholder partnerships in reshaping the health management of patients with noncommunicable diseases during and after the COVID-19 pandemic. *Aging Clin Exp Res.* 2021;33(10):2899-2907.
 42. Novi Sulistia Wati W, Pokkate Wongsasuluk W, Pradana Soewondo S. A cross-sectional study on the telemedicine usage and glycemic status of diabetic patients during the COVID-19 pandemic. *Med J Indones.* 2021;30(3):215-220.
 43. Armitage R, Nellums LB. COVID-19 and the consequences of isolating the elderly. *Lancet Public Health.* 2020;5(5):e256.
 44. Pancani L, Marinucci M, Aureli N, Riva P. Forced social isolation and mental health: a study on 1,006 Italians under COVID-19 lockdown. *Front Psychol.* 2021;12:663799.
 45. Gonzalez JS, Tanenbaum ML, Commissariat PV. Psychosocial factors in medication adherence and diabetes self-management: implications for research and practice. *Am Psychol.* 2016;71(7):539-551.
 46. Kato A, Fujimaki Y, Fujimori S, et al. Association between self-stigma and self-care behaviors in patients with type 2 diabetes: a cross-sectional study. *BMJ Open Diabetes Res Care.* 2016;4(1):000156.
 47. Romero Starke K, Petereit-Haack G, Schubert M, et al. The age-related risk of severe outcomes due to COVID-19 infection: a rapid review, meta-analysis, and meta-regression. *Int J Environ Res Public Health.* 2020;17(16):5974.
 48. Fekadu G, Bekele F, Tolossa T, et al. Impact of COVID-19 pandemic on chronic diseases care follow-up and current perspectives in low resource settings: a narrative review. *Int J Physiol Pathophysiol Pharmacol.* 2021;13(3):86-93.
 49. Verma A, Rajput R, Verma S, Balania VKB, Jangra B. Impact of lockdown in COVID 19 on glycemic control in patients with type 1 diabetes mellitus. *Diabetes Metab Syndr.* 2020;14(5):1213-1216.
 50. Colivicchi F, Di Fusco SA, Magnanti M, Cipriani M, Imperoli G. The impact of the coronavirus disease-2019 pandemic and Italian lockdown measures on clinical presentation and management of acute heart failure. *J Card Failure.* 2020;26(6):464-465.
 51. Williams R, Jenkins DA, Ashcroft DM, et al. Diagnosis of physical and mental health conditions in primary care during the COVID-19

- pandemic: a retrospective cohort study. *Lancet Public Health*. 2020;5(10):e543-e550.
52. Donohue D. A primary care answer to a pandemic: keeping a population of patients safe at home through chronic care management and remote patient monitoring. *Am J Lifestyle Med*. 2020;14(6): 595-601.
 53. Raddish M, Horn SD, Sharkey PD. Continuity of care: is it cost effective? *Am J Manag Care*. 1999;5(6):727-734.
 54. Ramakrishnan M, Poojari PG, Rashid M, Nair S, Pulikkal Chandran V, Thunga G. Impact of COVID-19 pandemic on medicine supply chain for patients with chronic diseases: experiences of the community pharmacists. *Clin Epidemiol Glob Health*. 2023;20:101243.
 55. Paudyal V, Cadogan C, Fialová D, et al. Provision of clinical pharmacy services during the COVID-19 pandemic: experiences of pharmacists from 16 European countries. *Res Social Adm Pharm*. 2021;17(8): 1507-1517.
 56. Dwyer G, Popoola A, Seiler N, et al. Chronic disease management service opportunities for community pharmacists during the COVID-19 pandemic. *Prev Chronic Dis*. 2022;19:210280.
 57. Tirivangani T, Alpo B, Kibuule D, Gaeseb J, Adenuga BA. Impact of COVID-19 pandemic on pharmaceutical systems and supply chain - a phenomenological study. *Explor Res Clin Soc Pharm*. 2021;2:100037.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Ghanbari-Jahromi M, Kharazmi E, Bastani P, Shams M, Marzaleh MA, Amin Bahrami M. Factors disrupting the continuity of care for patients with chronic disease during the pandemics: a systematic review. *Health Sci Rep*. 2024;7:e1881. doi:10.1002/hsr2.1881