

Perceived barriers of telehealth implementation in primary health care in Iran: A qualitative study

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Abstract

Background

Telehealth has the potential to improve access, continuity, and coordination of care in primary health care. However, implementing telehealth services within the Iranian health system may be constrained by multiple and interconnected challenges. This study aimed to identify perceived challenges and determinants relevant to the implementation of telehealth services in primary health care in Iran.

Methods

This qualitative study used semi-structured interviews with 16 stakeholders involved in health policy, management, service delivery, health information technology, and academia. Participants were purposively selected to capture variation in professional roles and organizational levels. Data were analyzed using directed content analysis guided by the Consolidated Framework for Implementation Research (CFIR). The main analytical domains were predefined according to CFIR, while inductive content coding was conducted within these domains to identify the specific content and subthemes emerging from participants' accounts. The analytical process and key decisions were systematically documented to enhance transparency and trustworthiness.

Results

A total of 77 codes were organized into 38 subthemes and 10 main themes across the five CFIR domains. The identified challenges included technical and infrastructure challenges, complexity of telehealth service design, weak governance coherence and capacity, ambiguity in regulatory and legal support, limited intersectoral collaboration, human resource challenges, organizational readiness and capacity, cultural and social factors, provider motivation, and weaknesses in strategic planning. The findings indicated that these challenges were not isolated; rather, they were interconnected and frequently overlapped across organizational and system levels.

Conclusions

Sustainable implementation of telehealth services in Iranian primary health care requires more than technological infrastructure and technical capacity. It requires simultaneous attention to governance, regulatory and legal arrangements, organizational readiness, human resources, intersectoral collaboration, provider-related factors, and cultural and social considerations. The findings highlight the need for an integrated, multilevel approach to planning, implementation, and institutionalization of telehealth services within primary health care in Iran.

Introduction

Primary health care (PHC), as the first point of contact between individuals, families, and communities and the health system, is a cornerstone of achieving universal health coverage and one of the most important settings for disease prevention, health promotion, chronic disease management, and continuity of care [1–4]. Despite the importance of PHC, many health systems continue to face challenges such as inequitable access, geographic dispersion of populations, limited human and financial resources, the growing burden of chronic diseases, and difficulties in providing continuous care [3, 4, 6, 7]. In Iran, an extensive PHC network, along with the family physician program and referral system, has been developed over several decades as the foundation of health service delivery. Nevertheless, challenges related to access, continuity of care, coordination across different levels and sectors of the health system, and effective use of resources remain [5, 8].

Digital transformation has created new opportunities to address some of these challenges. Telehealth can be used as a complement to in-person services in PHC by reducing the need for face-to-face visits, facilitating communication between patients and providers, supporting the follow-up and management of chronic diseases, improving access to specialist care, and enhancing continuity of care [9–13]. Evidence from studies conducted before the COVID-19 pandemic has also demonstrated the effectiveness of some interactive telehealth applications in improving service delivery processes and care outcomes [10, 13]. This pandemic further highlighted this potential and rapidly expanded the use of remote consultation and assessment in many health systems, particularly in primary care [11, 14–18]. However, the expansion of telehealth does not necessarily translate into successful implementation. Evidence indicates that barriers to telehealth are multidimensional and operate across multiple levels, ranging from infrastructure and technological limitations, interoperability, and data security to organizational readiness, staff skills and acceptance, users' literacy and trust, financing models, legal requirements, and policy-making [18, 23–27]. Moreover, if demographic, socioeconomic, and digital differences are not taken into account, the use of telehealth may also contribute to inequities in access to services [27].

In Iran, the development of electronic health records, health information systems, and other digital infrastructures in recent years has created opportunities for expanding telehealth services [19]. Nevertheless, studies conducted in the country have reported challenges including weak information and communication technology infrastructure, limited access to and quality of internet services, problems with system interoperability, concerns regarding information security and confidentiality, inadequate legal and financial frameworks, and limited organizational and workforce readiness [20–22, 28–31]. Although some Iranian studies have examined opportunities, barriers, and readiness for telehealth, a substantial proportion of this evidence has focused on broader applications of digital health, the COVID-19 pandemic, or technological readiness [20–22, 28–31].

Despite existing research, several important gaps remain. First, a substantial proportion of Iranian studies have focused on technological readiness, broader digital health applications, telemedicine, or

experiences during the COVID-19 pandemic, while evidence on the specific challenges of delivering telehealth at the PHC level remains limited [20–22, 28–31]. Second, existing studies have largely examined challenges separately, such as infrastructure problems, technology acceptance, or legal barriers, whereas telehealth implementation in PHC results from the simultaneous interaction of technological, organizational, human, cultural, economic, legal, and policy-related factors. Third, existing evidence has paid less attention to the experiences and perceptions of stakeholders directly involved in the delivery and management of PHC services, who can provide insight into how these barriers emerge and interact within the real-world health system context. Therefore, it remains unclear what the major challenges to telehealth implementation in Iranian PHC are from stakeholders' perspectives, at which levels of the implementation process these challenges arise, and how they influence one another. Addressing this gap can move beyond simply providing a list of barriers and contribute to a contextualized, multilevel understanding of the factors limiting the development of telehealth in Iranian PHC.

Accordingly, this study was conducted to identify and interpret perceived challenges and barriers related to the implementation of telehealth services in primary health care in Iran.

Methods

Study Design and Analytical Approach

This qualitative study was conducted to identify the requirements and infrastructure needed for implementing telehealth services in primary health care in Iran. Data were collected through semi-structured interviews and analyzed using directed content analysis. In this approach, the Consolidated Framework for Implementation Research (CFIR) was used as the initial framework for organizing and guiding the analysis. Relevant CFIR domains and constructs defined the overall direction of the analysis and the initial classification of the data, while the content of subcategories and specific requirements within each domain was extracted from the interview data. Thus, the analysis comprised two complementary levels: at the first level, CFIR provided the deductive framework needed to organize the data; at the second level, the content within the relevant domains and constructs was inductively extracted from participants' data and organized into related codes, subcategories, and themes. This approach enabled the simultaneous use of the theoretical structure of CFIR and the flexibility needed to identify requirements and infrastructure that might not have been explicitly defined within the initial framework.

Researcher Positionality and Reflexivity

The primary researcher was a male PhD candidate in Health Services Management, and the study was conducted as part of his doctoral dissertation. He had no direct professional experience in primary health care; however, prior to conducting the study, he had completed a research review on telehealth

services, which was also part of the objectives of his dissertation. Therefore, he was familiar with the scientific literature and issues related to telehealth. Before conducting the interviews, the researcher had no specific expectations or assumptions regarding the main implementation challenges and sought to explore the issues raised from the participants' perspectives without imposing a predetermined mental framework.

The researcher had no prior acquaintance with any of the participants and had no direct managerial relationship with them. The interview guide was developed based on previous studies and reviewed by the academic supervisor, academic advisor, and a primary health care specialist, and was subsequently assessed through two pilot interviews. During both the interviews and data analysis, efforts were made to minimize the influence of the researcher's assumptions on data generation and interpretation by using open-ended questions and repeatedly returning to the interview transcripts.

Research Setting

The study was conducted within the Iranian primary health care system. As the first level of health service delivery, this system is responsible for providing preventive, health promotion, diagnostic, treatment, and follow-up services through an extensive network of comprehensive health service centers, health posts, health houses, and health networks.

Sampling and Data Sufficiency

Participants were purposively sampled using a maximum variation approach based on their roles and experience to capture the perspectives of diverse stakeholders involved in telehealth implementation in primary health care. Participants were selected through purposive maximum variation sampling. The purpose of this approach was to obtain diverse perspectives on the challenges of implementing telehealth services in primary health care.

Maximum variation was operationalized across three main dimensions: organizational/analytical level, professional context and role, and the extent of relevant experience with primary health care or digital health. Accordingly, participants were selected from macro-level (policy and research), meso-level (management), and micro-level (direct service delivery) positions and included policymakers, managers, faculty members, digital health and health information technology specialists, physicians, and primary health care service providers. Eligibility criteria included at least five years of professional experience or direct experience in one of the areas of policy-making, planning, management, implementation, or evaluation of primary health care or digital health services. Participant selection continued until conceptual adequacy of the data was achieved, resulting in 16 interviews included in the final analysis.

The sampling and interviewing process continued until successive analyses identified no new meaningful code or concept that required the creation of a new theme. A total of 16 interviews were included in the final analysis, while the pilot interviews were excluded from the final analysis.

Given the heterogeneity of the participants, data sufficiency was assessed not on the basis of reaching a predetermined number, but according to information richness and the recurrence of conceptual patterns across the dataset. In the later stages of data collection, successive interviews primarily repeated, complemented, and enriched the themes already identified and did not result in the emergence of new major themes. Accordingly, saturation in this study referred to conceptual adequacy and the absence of new major themes in the analysis of the interview dataset, rather than claiming independent saturation for each stakeholder group.

Direct recipients of telehealth services and patients were not included in the study sample. Therefore, findings related to acceptance, preferences, trust, digital literacy, and the digital divide were interpreted from the perspectives of other health system stakeholders and do not represent direct reports of patients' experiences.

Development and Piloting of the Interview Guide

The semi-structured interview guide was developed specifically for the broader study, drawing on findings from previous studies on telehealth services, primary health care, and implementation research. The content of the guide was reviewed and revised by the academic supervisor, academic advisor, and a primary health care specialist who was a physician and manager of a comprehensive health service center. The guide covered three main areas: experiences of telehealth implementation in Iran, challenges and barriers to telehealth implementation, and the infrastructure and requirements for telehealth implementation. For the present study, the analysis focused specifically on participants' accounts of challenges and barriers to telehealth implementation. The relevant section of the English-language interview guide is provided as Supplementary File 1.

Two pilot interviews were conducted to assess the clarity, sequence, and comprehensibility of the questions. Based on the findings of these interviews, minor revisions were made to the wording and sequence of some questions. Because the interview guide was revised following the pilot interviews, data from these two interviews were not included in the final analysis.

Data Collection

Data were collected through semi-structured interviews conducted by the primary researcher. The interviews began with broad questions about participants' experiences with telehealth services and subsequently explored issues including implementation challenges, organizational factors, legal and ethical issues, financing, workforce readiness, user acceptance, intersectoral collaboration, and strategies for service development.

CFIR was not used in the initial design of the interview questions as a constraining tool for determining the content of the questions; the questions were designed as open-ended questions focusing on the requirements and infrastructure needed for implementing telehealth services. However, during the

analysis stage, CFIR was used as the initial framework for organizing and classifying the data, while the specific content of the subcategories and requirements was extracted from participants' responses.

Data collection continued until the final interviews yielded no new code or concept that added to the existing thematic structure, and newly collected data primarily repeated previously identified concepts.

The interviews were conducted in two forms—face-to-face and virtual—and, with the informed consent of the participants, were recorded and transcribed verbatim. The average duration of the interviews was 73 minutes. After each interview, field notes were prepared to record the interview conditions and the researcher's initial impressions.

Data Analysis

Data were analyzed using directed content analysis. CFIR was used as the initial analytical framework, and its domains and constructs served as the basis for the initial classification of implementation-related data. Following repeated reading of the interview transcripts, sections relevant to the research question were identified and assigned to the relevant CFIR domains and constructs. Subsequently, within each domain and construct, inductive content coding was performed. Initial codes were extracted from the explicit and semantic content of participants' statements, and codes with similar meanings were compared and organized into conceptual subcategories. Subcategories that were conceptually closely related were organized into categories and themes related to the requirements and infrastructure needed for implementation. Throughout the analysis, the raw data were continuously compared with the codes, subcategories, and emerging categories to ensure that the final classification remained consistent with the interview content. Cases that could not be classified within any of the initial CFIR domains or constructs were examined separately, without forcing them into the framework, to determine whether they represented a new concept, a contextual requirement, or a subcategory related to one of the existing domains.

To enhance the traceability of the analytical process, the link between the raw data and the final structure of the findings was maintained, such that selected quotations were linked to initial codes, subthemes, and main themes. To demonstrate this analytical chain and enhance the transparency and evaluability of the findings, an example of the raw data → initial code → subtheme → main theme → CFIR domain pathway is provided in Supplementary Table S1.

Role of CFIR in the Analysis

CFIR was used in this study as the initial analytical framework to guide and organize the analysis of the data. The use of CFIR did not mean restricting the data to predetermined constructs; rather, it provided a framework for the initial organization of implementation-related data. Within each domain and construct, codes and subcategories were inductively extracted based on the actual content of the interviews. Thus, the analysis simultaneously incorporated a deductive structure at the level of the main domains and an inductive process at the level of coding and subcategory development.

Data Trustworthiness and Rigor

To enhance the trustworthiness of the findings, the analytical process was conducted recursively and documented systematically. Following code extraction, the researcher returned to the full interview transcripts and examined the fit of each code with the underlying data. Similar codes were compared semantically and merged when overlap was identified, while codes representing distinct concepts were differentiated where appropriate. The development of subthemes and main themes was also conducted iteratively through continuous comparison between the raw data, codes, and thematic structure. In addition, variation in the professional characteristics and positions of participants was addressed through purposive maximum variation sampling, and the research process, participant characteristics, and analytical stages were documented transparently. Nevertheless, independent coding by a second researcher was not conducted; therefore, the possibility that the primary researcher's interpretation influenced the coding process and theme development cannot be completely excluded. This was considered a limitation of the study. Member checking was also not conducted. Interview transcripts and preliminary findings were not returned to participants for formal validation. Instead, the credibility of the findings was strengthened through systematic documentation of the analytical process, maintenance of an audit trail, use of field notes, iterative review of codes and themes, and purposive sampling aimed at capturing diversity in professional and organizational perspectives. This approach was selected in light of the study's objective of identifying and interpreting perceived barriers among diverse stakeholder groups.

Quality Assurance and Reporting Transparency

Initial coding and theme development were conducted by the primary researcher. As the study formed part of a doctoral dissertation, the analytical process was conducted under the academic supervision of the dissertation supervisor and advisor. To enhance the transparency and quality of reporting, the stages of study design, sampling, data collection, and data analysis were guided by the **Consolidated Criteria for Reporting Qualitative Research (COREQ)** [40]. The researcher's characteristics, interview context and process, participant selection, data collection procedures, analytical process, development of codes and categories, and presentation of evidence from the data were described in the study report. In addition, the analytical pathway from raw data to codes, subcategories, and final findings was documented to maintain traceability and transparency throughout the analytical process.

Ethical Considerations

This study was conducted after obtaining approval from the Ethics Committee in Research of Tehran University of Medical Sciences [Ethics code: **IR.TUMS.MEDICINE.REC.1404.482**]. Before the interviews, the study objectives were explained to the participants, and informed consent was obtained for participation in the study and audio-recording of the interviews. Participants were assured that their participation was voluntary, that they could withdraw from the study at any stage, and that identifying information would be removed during data analysis and reporting.

To maintain confidentiality and reduce the risk of re-identification, participants’ names, organizational names, and other identifying details were removed or aggregated from the final report, and participants were identified using codes P1 to P16. In the participant characteristics table, information was presented in aggregate form, and unique combinations of professional specialization, organizational position, and years of experience that could lead to identification were not reported.

Findings

Participant Characteristics

The study included 16 participants with diverse professional backgrounds and roles across the macro, meso, and micro levels of the health system. This diversity was intended to capture perspectives related to policymaking, management, and direct service delivery, as well as specialized perspectives in digital health and health information technology. The aggregated characteristics of the participants are presented in Table 1. To maintain a clear link between participants’ perspectives and the analytical findings, each main theme was supported by illustrative quotations selected based on explanatory richness and diversity of participant roles.

Table 1
Aggregate characteristics of participants

Participant code	Specialty and organizational position	Experience in the health field	Analytic level
P1	Health information technology specialist, university faculty member	> 15 years	Meso
P2	Physician, health network manager	> 15 years	Meso
P3	Physician, senior health manager and policymaker	> 20 years	Macro
P4	Physician, health network manager	> 25 years	Meso
P5	Information technology specialist	> 10 years	Meso
P6	Physician, health domain manager	> 10 years	Meso
P7	Physician, health domain manager	> 20 years	Meso
P8	Information technology specialist	> 15 years	Meso
P9	Physician, health domain manager	> 10 years	Meso
P10	Physician, network expansion manager	> 25 years	Meso
P11	Physician, health network director	> 10 years	Meso
P12	Public health specialist, senior Ministry of Health manager and policymaker	> 15 years	Macro
P13	Physician, director of comprehensive health service center	> 10 years	Micro
P14	Primary health care provider (community health worker / care provider in PHC centers)	> 20 years	Micro
P15	Health technology assessment specialist, university faculty member	> 5 years	Meso
P16	Public health specialist, university faculty member	> 25 years	Meso

Overview of the Findings

Overall, 77 codes related to challenges in the delivery and implementation of telehealth services were organized into 38 subthemes and 10 main themes. These challenges were mapped across the five CFIR domains of intervention characteristics, outer setting, inner setting, characteristics of individuals, and implementation process (Table 2), encompassing a range of technical, service design, governance, legal and ethical, intersectoral collaboration, human resource, organizational, cultural, motivational, and strategic factors.

Table 2

Thematic structure of challenges to telehealth service delivery in primary health care in Iran according to CFIR

CFIR domain	Main theme	Identified subthemes
Intervention Characteristics	1. Technical and infrastructural challenges	Weak integration of health information systems; communication and internet infrastructure problems; lack of standards for equipment and technologies used
Outer Setting	2. Challenges related to intervention design	Complexity of designing and implementing telehealth services; high implementation costs
Outer Setting	3. Weak coherence and capacity of governance	Absence of a single responsible authority; parallel work and inter-organizational misalignment; weak laws, regulations and legal support; financing and tariff-setting challenges
Outer Setting	4. Ambiguity in the regulatory and legal support framework	Professional liability and accountability; data protection and confidentiality; tariffs and payment mechanisms, insurance coverage and financial support, and ethical and operational standards
Outer Setting	6. Intersectoral collaboration challenges	Weak information integration across levels of the health system; misalignment among organizations and universities of medical sciences; interaction with insurers and the private sector; absence of effective mechanisms for information exchange
Inner Setting	5. Human resources and professional competency challenges	Resistance of service providers to change; lack of required knowledge and skills; lack of training and specialized skills for telehealth services; shortage of human resources and increased workload
Inner Setting	7. Organizational challenges	Lack of organizational readiness; absence of standard processes and guidelines; financial resource constraints; absence of incentive systems; resistance to organizational change
Characteristics of Individuals	8. Cultural and social challenges	Patient resistance and preference for in-person visits; low digital health literacy; distrust of telehealth services; inadequate public awareness-raising and education
Characteristics of Individuals	9. Motivational challenges	Absence of incentive systems; lack of financial incentives; concern about professional consequences
Process	10. Strategic challenges	Lack of a coherent strategic roadmap and planning; instability of programmes and failure to institutionalize successful experiences; weak monitoring, evaluation and feedback systems; gap between policy-making and frontline experience; project-based approach instead of a transformation-oriented perspective

The identified challenges were observed across all five CFIR domains, although their distribution varied across domains. The outer setting primarily encompassed challenges related to governance, regulation, intersectoral collaboration, and the policy environment, whereas challenges related to human resources,

organizational factors, and culture were more commonly situated within the inner setting and characteristics of individuals (Table 3).

Table 3
Distribution of identified challenges across CFIR domains

CFIR domain	Main themes	Number of main themes	Number of subthemes
Intervention Characteristics	Technical and infrastructural; Intervention design	2	5
Outer Setting	Governance, policy-making and regulation; Legal and ethical; Intersectoral collaboration	3	12
Inner Setting	Human resources and professional competencies; Organizational	2	9
Characteristics of Individuals	Cultural and social; Motivational	2	7
Process	Strategic	1	5
Total		10	38

1. Technical and Infrastructure Challenges

CFIR domain: Intervention Characteristics

One of the most frequently reported sets of challenges identified in the interviews concerned technical and infrastructure-related issues. Participants referred to limitations related to the integration of health information systems, instability of communication and internet infrastructure, and the absence of clearly defined standards for the equipment and technologies used.

1–1. Weak Integration of Health Information Systems

The fragmentation of health information systems and the lack of effective connectivity among them were among the most prominent issues raised. Participants referred to the incomplete connection of different systems with the electronic health record, information silos, and difficulties in exchanging data among systems used across different parts of the health system. From their perspective, the existence of multiple disconnected systems resulted in repeated data entry, incomplete access to patients' records, and difficulties in continuously monitoring patients' status.

One participant stated:

"It would be better if these things happened within the same system where the other services are provided." (P4)

Another participant stated:

“The patient’s information is scattered across five different systems... none of them are connected to each other.” (P10)

A health network manager also stated:

“We have one system for SIB, one system for insurance, and another system for prescribing; there is no connection between these systems.” (P15)

1–2. Communication and Internet Infrastructure Problems

Internet instability, frequent network disruptions, limited bandwidth, differences in access across geographical areas, and power outages were among the other technical challenges identified for the implementation of telehealth services in primary health care. Participants particularly emphasized the problems encountered in underserved and rural areas.

One participant stated:

“The main problem is the internet; we need to define the infrastructure for it.” (P2)

Another participant stated:

“Even now, comprehensive health centers lose electricity for two hours in the morning, and all their communications are cut off.” (P3)

One expert, referring to communication disruptions, stated:

“This is what happened to the internet in 1401; we were paralyzed... it drives you crazy.” (P7)

1–3. Lack of Standards for Equipment and Technologies Used

The absence of clearly defined standards for the hardware and software used to deliver telehealth services was also raised. Participants referred to the lack of clearly specified minimum technical requirements for audio and video equipment and differences in the quality of the equipment used.

One participant stated:

“We don’t even have anywhere that says a standard has been defined for it... Where is the physician? In his car, while driving.” (P5)

The participant further added:

“A system that is suitable for delivering the service... your microphone should be good, your camera should be good... standards should be defined.” (P5)

Overall, the technical and infrastructure challenges were primarily described in three areas: lack of integration among health information systems, instability of communication and internet infrastructure,

and the absence of clearly defined standards for the equipment and technologies used. These challenges were repeatedly reflected in the statements of participants at different levels of the primary health care system and were described as barriers to the stable and coordinated delivery of telehealth services.

2. Challenges Related to Intervention Design

CFIR domain: Intervention Characteristics

In addition to technical infrastructure, participants identified challenges related to the nature and design of telehealth services and the way in which these services should be delivered. These challenges primarily involved the complexity of determining the **scope** and mode of service delivery and the costs required for implementation.

2 – 1. Complexity of Telehealth Service Design and Delivery

Participants believed that not all primary health care services were suitable for remote delivery and that the level and type of remote interaction should be determined for different services. Uncertainty regarding which service should be provided to which patient and through what type of communication technology was among the issues raised.

One participant stated:

“It should be clear which services require video and for which services chat is sufficient.” (P1)

Another participant stated:

“Some physicians feel that they cannot make a reliable decision without directly observing the patient.” (P13)

2–2. High Implementation Costs

The need for initial investment in information technology infrastructure, equipment, development or upgrading of systems, and their maintenance was another challenge raised. Participants considered financial resource constraints and the initial costs of implementation to be barriers to the development of telehealth services.

One participant stated:

“You have to invest at the beginning... telehealth is not a software project.” (P10)

Another participant stated:

“Insufficient resources have meant that you have provided old infrastructure for this purpose.” (P3)

3. Weak Governance Coherence and Capacity

CFIR domain: Outer Setting

This main theme reflected participants' perceptions of weaknesses in the coherence, coordination, and capacity to steer telehealth services at the health-system level. Its subthemes included the absence of a clear responsible authority, organizational duplication, dependence of some programs on individuals, the policy–practice gap, and the absence of an integrated strategy. The common feature of these subthemes was not merely the existence of isolated barriers, but rather weaknesses in the coordinating and steering mechanisms governing the development and institutionalization of telehealth services.

3 – 1. Absence of a Single Responsible Authority

The absence of a clearly designated institution or authority responsible for governing telehealth services was one of the major challenges raised. Participants referred to ambiguity regarding responsibilities for policymaking, licensing, development of standards, and oversight.

One participant stated:

“Our country currently has this problem that there is no specific authority... Someone who wants to establish telemedicine, where should they get a license? There is no responsible authority.” (P1)

Another stated:

“Who is actually responsible for this? Whose area of expertise is this?” (P5)

3 – 2. Organizational Duplication

Parallel activities and independent decision-making among different organizations and units were identified as another governance challenge. Participants referred to the implementation of programs and development of multiple systems without sufficient coordination.

One participant stated:

“Three different parts of the Ministry of Health are working separately for themselves... the institutions operate in parallel and do not recognize each other.” (P1)

3–3. Person-Dependent Management

Some participants referred to the dependence of decisions and the continuity of programs on particular managers and individuals. Changes in managers or managerial priorities could affect the continuity of programs related to digital health and telehealth.

3–4. Policy–Practice Gap

Participants referred to the gap between existing policies and documents and their practical implementation. From their perspective, the existence of a policy or program at higher administrative

levels did not necessarily lead to its coordinated and sustained implementation at operational levels.

3–5. Absence of an Integrated Strategy

The lack of a coherent direction and strategy for the development of telehealth services was also raised. Participants described fragmented programs and the absence of a common pathway for guiding different activities.

4. Regulatory Framework Ambiguity and Lack of Legal Support

CFIR domain: Outer Setting

One important area of challenges involved ambiguity in legal frameworks, professional responsibilities, ethical issues and confidentiality, as well as payment and tariff-setting mechanisms.

4 – 1. Ambiguity in Professional Responsibility and Accountability

Participants expressed concerns about the lack of clarity regarding legal responsibility for potential errors in telehealth delivery, documentation procedures, informed consent, responsibility for diagnosis and prescribing, and the handling of complaints.

One participant stated:

“If something goes wrong, it is not clear who is responsible—the physician, the service center, or the system? Until these legal issues are clarified, many people are not willing to enter this field.” (P1)

4 – 2. Data Protection and Confidentiality

Concerns regarding the confidentiality of health information, unauthorized access, and the security of data exchange were also raised in the interviews. Participants referred to the increased number of points at which information is exchanged and stored in the digital environment and the potential consequences of inadequate security mechanisms.

One participant stated:

“Previously, information was exchanged only between the patient and the physician, but now this information is transferred in the digital environment, and if there is not sufficient security, people’s concerns are completely natural.” (P1)

4 – 3. Tariffs, Payment Mechanisms, Insurance Coverage, and Financial Support

Uncertainty regarding telehealth service tariffs, limited insurance coverage, and unclear payment mechanisms were also among the frequently reported challenges.

One participant stated:

“We had to set the tariff for virtual visits ourselves because previously it was not specified at all.” (P3)

Another participant stated:

“The physician needs to know how much payment they will receive if they provide the service virtually.” (P5)

4–4. Ethical and Operational Standards

Some participants emphasized the absence of clear frameworks governing service delivery, ethical requirements, information sharing, and other legal dimensions of telehealth services.

One participant stated:

“Ethical issues, ethical codes, licenses, information security... many of these things are still not clear.” (P3)

5. Intersectoral Collaboration Challenges

CFIR domain: Outer Setting

Participants referred to weak collaboration among the professional fields and organizations involved in the development of telehealth services. These challenges were expressed in terms of the gap between medicine and technology, the absence of intermediary roles, and weak collaboration with organizations such as insurers and telecommunications providers.

5 – 1. Gap Between Medicine and Technology

The structural separation and limited communication between the medical and engineering/technology fields were identified as barriers.

One participant stated:

“In Iran, we have separated technical universities from medical universities, and this is one of our biggest problems.” (P1)

5 – 2. Lack of Intermediary Roles Between Professional Domains

Participants referred to the limited presence of specialists who could bridge clinical, managerial, and technological needs.

5 – 3. Weak Collaboration with Insurers, Telecommunications Providers, and Other Stakeholders

Weak coordination with insurance organizations, telecommunications companies, and other stakeholders outside the service-providing unit was also identified as a challenge.

One participant stated:

“The only thing we expect from the intersectoral [organizations] is to provide us with a proper communication platform... insurance needs to have intersectoral coordination.” (P2)

6. Human Resource Challenges

CFIR domain: Inner Setting

At the organizational level, some of the challenges were related to human resources and service providers' acceptance. Some participants reported resistance or reluctance among certain physicians to use telehealth services.

6 – 1. Resistance Among Service Providers

Some participants reported that certain physicians had limited willingness to use telehealth services because of concerns about the quality of decision-making, professional responsibility, changes in work practices, or a preference for face-to-face care.

One participant stated:

“Many physicians still prefer to see the patient in person. They feel that without a direct examination, they may not make the right decision or may face responsibility later.” (P1)

6 – 2. Limited Digital Literacy and Skills Among Service Providers

Some participants referred to limitations in the ability of some staff members to use digital technologies and systems related to telehealth services.

One participant stated:

“The staff themselves also need to be familiar with these technologies. If they are not trained, even the best system cannot be successful.” (P1)

In contrast, some participants believed that staff did not have major difficulties using basic systems and that their primary need was familiarity with the specific processes involved in telehealth services.

6 – 3. Resistance to Change

Resistance to changes in the traditional model of service delivery was also evident in participants' statements. Some attributed this resistance to unfamiliarity with technology, concerns about changing roles, and habituation to conventional face-to-face service delivery.

☒. Organizational Challenges

CFIR Domain: Inner Setting

At the organizational level, participants referred to an organizational culture resistant to change, an imbalanced distribution of resources, and the inefficiency of some information systems.

☒-☒. Organizational Culture Resistant to Change

Some participants identified the presence of traditional and in-person-oriented practices, as well as administrative bureaucracy, as organizational barriers to the development of telehealth services.

☒-☒. Imbalanced Resources

The shortage or inappropriate distribution of human resources and other resources required in service-providing organizations was also raised as a challenge. Some participants referred to shortages of specialized and interdisciplinary personnel and the limited capacity of organizations to take on new responsibilities.

☒-☒. Inefficiency of Information Systems

This challenge differed from weak technical integration between systems and was more related to the organizational usability of available information. Participants referred to users' limited access to the information they needed, the one-way flow of information, and the inadequacy of the systems' managerial outputs.

One participant stated:

"The data are recorded, but there is no appropriate output for management. The information exists, but it is not usable." (P3)

☒. Cultural and Social Challenges

CFIR Domain: Characteristics of Individuals

Social acceptance and the characteristics of the service-receiving population were also identified by participants as one of the important sets of challenges. These challenges included resistance to or preference for in-person care, cultural and linguistic barriers, distrust of telehealth services, and the digital divide.

☒-☒. Patient Resistance

Many participants reported that some patients preferred face-to-face interaction with physicians or health workers and did not accept remote services as a complete substitute for in-person care.

One participant stated:

"A lot of the time, the patient wants to see the health personnel in person, to look them in the eye, and many of our people simply do not accept remote consultations." (P1)

§-§. Cultural and Linguistic Barriers

Cultural and linguistic differences among different populations may also limit communication and the use of telehealth services. Participants referred to cultural differences and communication difficulties in some population groups.

§-§. Distrust of Telehealth Services

Some participants perceived distrust among some service recipients as a potential barrier to the adoption of telehealth services.

One participant said:

“People’s own lack of trust and failure to use these services is itself an important barrier.” (P1)

§-§. Digital Divide

Limited access to or ability to use digital technologies, particularly among certain groups such as older adults and residents of underserved areas, was another challenge identified.

One participant stated:

“Not everyone is willing or capable. Therefore, these services cannot replace in-person visits for all people and all services.” (P4)

§. Motivational Challenges

CFIR Domain: Characteristics of Individuals

In this study, human resource challenges were primarily related to providers’ capacity, skills, acceptance, and readiness for change, whereas motivational challenges referred to the economic and professional benefits, workload, and incentive mechanisms associated with participation in the delivery of telehealth services.

Part of the participants’ statements concerned the economic and professional motivation of service providers to participate in the delivery of telehealth services. These challenges included reduced income, increased workload, and the absence of an appropriate incentive system.

§-§. Reduced Physicians’ Income

Some participants believed that the economic structure of remote services could reduce physicians’ income compared with some in-person services, particularly when ancillary revenues related to laboratory tests, medications, or other services were not available in the remote model.

One participant stated:

“The physician earns 20% from the consultation, 25% from laboratory tests, and 15% from medications. Telehealth has none of these.” (P5)

III-3. Increased Workload

Adding telehealth services to existing duties, without a corresponding adjustment in time or workload, was another motivational challenge identified.

One participant said:

“If virtual services are to be added to the current workload without considering new personnel or sufficient time, naturally the workload will increase.” (P13)

III-4. Absence of an Incentive System

The absence of specific mechanisms for recognizing and incentivizing providers of remote services was also identified as a barrier. Participants referred to the lack of appropriate incentives and the failure to incorporate these services into some evaluation and payment mechanisms.

III. Strategic Challenges

CFIR Domain: Implementation Process

In this study, governance challenges were related to decision-making structures, the assignment of responsibilities, policymaking, and coordination among institutions, whereas strategic challenges concerned the planning, stakeholder engagement, monitoring, evaluation, learning, and continuity of the implementation process.

At the implementation-process level, participants referred to the lack of coherent planning, insufficient stakeholder involvement, weak monitoring and evaluation, and the unsustainability of successful programs.

III-1. Lack of a Roadmap and Phased Planning

The absence of a clear pathway and coherent planning for the development of telehealth services was among the challenges identified. Participants referred to the lack of specific short- and long-term plans and the absence of clearly defined stages of development.

One participant stated:

“The country’s e-health roadmap needs to be developed. The responsibilities need to be specified.” (P8)

Another participant said:

“We do not have short-term and long-term planning.” (P9)

4.2.3. Insufficient Stakeholder Engagement

Some participants referred to the gap between decision-making and the experience of frontline workers and believed that the experiences and perspectives of those directly involved in service delivery were not adequately reflected in some decision-making processes and program-design activities.

One participant stated:

“Come and listen to those who are on the front line. The regulations that are written without our presence cannot be implemented.” (P15)

4.2.4. Weak Monitoring, Evaluation, and Feedback System

The absence of a coherent mechanism for evaluating the quality and outcomes of telehealth services, as well as the focus on quantitative indicators rather than outcome-oriented indicators, was also raised.

One participant said:

“The quality of services should be measured and controlled. We do not have analytical feedback.” (P6)

Another participant stated:

“The primary healthcare network is a master at producing numbers without outcomes.” (P2)

4.2.5. Unsustainability of Successful Programs

Some participants referred to the unsustainability of programs that had been implemented under particular circumstances, especially during the COVID-19 pandemic, but were not continued after the pressure of the crisis decreased.

One participant said:

“The experiences were successful, but they were not sustainable. When COVID ended, it was as if everything was forgotten.” (P15)

Another participant stated:

“Because its resources were not secured, that experience was not continued.” (P6)

Overall, the analysis of the interviews showed that the challenges of delivering telehealth services in Iranian primary health care were distributed across the five CFIR domains. Within the intervention characteristics domain, technical and infrastructural limitations and service-design challenges were

prominent. In the outer setting, issues related to governance and policymaking, legal and ethical uncertainties, and weak intersectoral collaboration were identified. Within the inner setting, organizational resistance, imbalanced resources, and the inefficiency of some information systems were among the main challenges. Within the characteristics of individuals domain, resistance and limited skills among some providers, distrust and preference for in-person care among some patients, as well as motivational challenges, were identified. Finally, within the implementation process domain, the lack of a roadmap, insufficient stakeholder engagement, weak monitoring and evaluation, and the unsustainability of successful programs were identified.

Discussion

Main Findings and Overall Interpretation

The findings of this study showed that perceived barriers related to the implementation of telehealth services in primary health care in Iran extend beyond technological limitations and arise from the interaction of health system, organizational, professional, and social factors. Participants raised challenges related to governance and strategic coordination, legal and financial regulation, intersectoral collaboration, organizational readiness, infrastructure and system interoperability, cultural and social factors, and provider motivation. This finding is consistent with international evidence that conceptualizes telehealth implementation as a sociotechnical process whose success depends on technological, organizational, policy, financial, and human factors [23–25].

More importantly, the interdependence of these barriers was evident. For example, fragmented governance may lead to the development of disconnected programs and systems; fragmentation of systems makes information exchange and collaboration between organizations more difficult; unclear work processes may increase staff workload and uncertainty; and ambiguity regarding payment and tariffs may reduce providers' motivation. Therefore, the identified barriers cannot be considered a set of independent factors; rather, they constitute part of an interconnected system of conditions affecting implementation. This feature is particularly important in PHC because telehealth services must be integrated into existing pathways of referral, follow-up, information exchange, and care delivery [3, 7, 9].

In this study, CFIR was used solely as a framework for organizing and interpreting the findings. This mapping showed that the boundaries between CFIR domains are not completely distinct in the real-world health system context; for example, tariffs are related to external policies, affect provider motivation, and also influence the feasibility of service implementation within organizations. Similarly, system interoperability has a technical dimension but also depends on governance, standards, and organizational collaboration. Therefore, the value of CFIR in this study lay more in revealing the **connections among different levels affecting implementation** than in independently classifying barriers.

Although the updated version of CFIR in 2022 introduced changes to the framework's domains and constructs [28], the use of the five-domain structure of the classic version in this study enabled comparison of the findings with a substantial body of previous studies based on the classic CFIR

structure. However, the findings were not assigned to a single domain merely to conform to the framework, and when a barrier had a cross-cutting nature, this overlap was retained in the interpretation.

Governance and Strategic Fragmentation: An Upstream Barrier

Governance and strategic coordination were among the most prominent perceived barriers in the present study. Participants referred to the lack of a coherent roadmap, fragmented decision-making, unclear responsibilities, weak coordination across different levels, and the gap between policymaking and implementation. The importance of this finding lies in the fact that telehealth is not a single technology but is linked to the organization of PHC, the referral system, financing, insurance coverage, health information management, and professional responsibility [8, 9, 19, 29].

From this perspective, the governance problem is not merely the absence of a national policy; the capacity to translate policy into coordinated implementation is also important. Weak vertical coordination among national, provincial, and local levels and horizontal coordination among the organizations involved can lead to siloed projects that are feasible on a limited scale but difficult to integrate and scale up at the health-system level. This finding is consistent with existing evidence in Iran regarding challenges in governance, health information systems, and digital transformation [19, 21, 29].

Consequently, governance can be considered an upstream factor that affects other implementation conditions. Without designation of an accountable entity, clear responsibilities, coordination mechanisms, and a defined pathway for translating policy into implementation, investment in infrastructure or development of new systems may result in greater fragmentation rather than the creation of an integrated system.

Regulation, Professional Responsibility, and Financing: Institutional Infrastructure for Implementation

Legal, ethical, and financial uncertainties were also among the important reported barriers. Participants expressed concerns regarding professional responsibility, data confidentiality and security, information exchange, payment, tariffs, and insurance coverage. These issues indicate that telehealth does not merely change the location where care is delivered; it also changes the conditions for recording and transferring information, professional responsibility, and payment mechanisms [9, 18, 23–25].

Concerns regarding privacy and data security are consistent with international evidence [9, 18, 23–25]. However, in the study context, these concerns were also intertwined with uncertainty regarding professional accountability and financial mechanisms. From the participants' perspective, when it is unclear how a remote service should be documented and reimbursed or who would be responsible in the event of an error, professional uncertainty may become a barrier to adoption.

Therefore, the legal and financial framework should not be regarded as an issue to be addressed after technology development; rather, it is part of the institutional infrastructure for implementation. Clear rules regarding responsibility, confidentiality, data exchange, tariffs, and insurance can simultaneously reduce professional uncertainty and facilitate organizational planning and provider participation.

Intersectoral Collaboration, Interoperability, and Continuity of Care

One of the important findings of the study was the dependence of telehealth implementation on collaboration among the Ministry of Health, universities of medical sciences, health networks, hospitals, information technology units, insurers, and other relevant organizations. In PHC, patients and information related to them move among organizations throughout the care pathway; therefore, a service that is established in one organization but cannot communicate with other components of the care pathway may become a disconnected service rather than strengthening continuity of care [9, 19, 21, 29].

In this context, system interoperability emerged as a cross-cutting factor. Participants referred to difficulties in information exchange and limited access to complete patient information. The value of telehealth is realized when relevant clinical information is available to the appropriate provider at the appropriate time [22, 31]. Therefore, interoperability cannot be limited merely to the technical connection of systems; data standards, access rules, organizational decisions, and information governance also play a role.

This finding also indicates that telehealth in PHC can function beyond a communication channel between patients and service providers and can serve as an infrastructure for coordination across different levels of care. Evidence regarding eConsultation also indicates that electronic communication between PHC providers and specialists can improve access to expertise when clear processes and accountability mechanisms are in place. Therefore, intersectoral collaboration and interoperability should be regarded as essential components of an integrated implementation system rather than as separate administrative or technical requirements.

Organizational Readiness and Operational Infrastructure

Organizational barriers included resistance to change, the absence of clearly defined work processes, resource limitations, inadequate readiness, and weak change management. This finding is consistent with previous studies identifying organizational support, resources, staff readiness, and the fit between technology and existing processes as important factors in the adoption of digital services [23, 24].

One notable point in this study was the distinction between the availability of technology and operational readiness to use it. Participants raised problems such as unstable internet connectivity, power outages, insufficient network capacity, inadequate technical support, and poor system connectivity. Therefore, having hardware and software available does not necessarily mean that an organization is ready to deliver services; technology must be usable under real-world conditions, with sufficient reliability and support.

This distinction is particularly important for PHC because infrastructure disruptions can directly interfere with continuity of service delivery. Therefore, readiness assessment prior to implementation should

encompass not only the availability of equipment but also stability, usability, technical support, and compatibility of the infrastructure with actual service-delivery processes.

Cultural and Social Factors and Digital Equity

Participants also identified factors such as preferences for in-person visits, perceived trust in virtual services, digital literacy, and inequalities in access to technology as potential barriers. This finding is consistent with evidence indicating that the development of digital services, if access, digital literacy, and the ability to use technology are neglected, may reproduce or exacerbate existing gaps [25–27].

Given that patients and direct service recipients were not included in the sample of this study, these findings should be interpreted as participants' perceptions of the social and cultural factors affecting adoption, rather than as direct reports of patients' experiences. Nevertheless, this issue is highly relevant to PHC because delivering services to a population that is heterogeneous in terms of access, resources, and digital capabilities requires service design that does not assume equal access to technology among users.

From this perspective, the findings support an approach that views telehealth as a complement to in-person care rather than a universal and mandatory replacement for it. Some services, such as follow-up, education, self-care support, and consultation, may have greater potential for remote delivery, whereas some services continue to require face-to-face interaction [13, 16–18, 25, 26]. Therefore, the decision to provide a service remotely should be based on the type of service, patient characteristics, the need for physical examination, access, and technological capacity.

Provider Motivation and Perceived Value of the Service

Provider reluctance or resistance also emerged in the findings; however, this resistance cannot be attributed solely to resistance to technology. Concerns regarding increased workload, professional responsibility, unclear processes, inadequate tariffs, changes in the patient–provider relationship, and the perceived value of the service may affect provider participation. This interpretation is consistent with international evidence regarding the role of workload, usability, organizational support, training, payment, and perceived usefulness in telehealth adoption. Thus, training alone is unlikely to be sufficient to address this barrier. A provider who has learned how to use the technology may still not accept its continued use if telehealth is perceived as “additional work” without professional or financial support. Therefore, increasing provider participation requires a combination of clearly defined roles, manageable work processes, appropriate payment and incentives, legal and managerial support, and recognition of telehealth as part of routine care [23–25].

Policy and Implementation Implications

The overall findings indicate that implementing telehealth in PHC in Iran does not require a single intervention but rather the alignment of multiple levels of implementation conditions. At the health-system level, governance, regulation, financing, and interoperability should be addressed in a

coordinated manner. At the organizational level, readiness, work processes, infrastructure, and change management are important; and at the provider and population levels, workload, motivation, trust, digital literacy, and access should be incorporated into intervention design.

From a practical perspective, the findings support an approach that, instead of “digitizing all services,” focuses on providing the right service, to the right person, under the right conditions, through the appropriate pathway. Within such an approach, telehealth is integrated into existing PHC, referral, and follow-up pathways and is used according to service suitability, patient status, and infrastructural capacity. Such a model can prevent the development of disconnected digital services and enhance the capacity of telehealth to strengthen continuity of care, access, and coordination across different levels of the health system [3, 9, 13, 16–18].

Overall, the contribution of the present study lies not merely in identifying a new set of barriers, but in demonstrating the multilevel and interconnected nature of perceived barriers related to telehealth implementation in PHC in Iran. The findings show that governance, regulatory, collaborative, organizational, technological, and human factors cannot be managed independently because each can influence the others and shape implementation success or failure.

Contribution of the Present Study to the Literature

Compared with previous evidence, the findings of this study highlight several distinctive points. First, the study specifically focused on primary health care, a context in which telehealth services must be integrated alongside the referral system, continuity of care, and communication across different levels of service delivery. Second, the findings were developed based on the perspectives of stakeholders with different roles at different levels of the health system, thereby revealing the relationships among technological, organizational, governance, and human barriers. Third, the retrospective mapping of inductively derived findings onto CFIR enabled these barriers to be interpreted in terms of different levels and domains affecting implementation. Therefore, the added value of the present study lies not merely in identifying new barriers, but in providing a contextualized and multilevel picture of perceived barriers related to telehealth implementation in PHC in Iran.

Strengths and Limitations of the Study

This study has several strengths. First, its specific focus on the implementation of telehealth services in primary health care and the participation of stakeholders with different roles and positions across the health system enabled a contextualized picture of implementation challenges to be developed. In addition, the use of inductive analysis followed by mapping onto CFIR made it possible to preserve the empirical content of the data while providing a systematic interpretation of challenges across different implementation levels.

One limitation of the study is that patients and direct service recipients were not included in the study sample. Therefore, challenges related to trust, preference for in-person care, digital literacy, and access

were reported from the perspective of health-system stakeholders and do not necessarily reflect users' direct experiences. Future studies should directly examine the perspectives of patients and groups exposed to the digital divide.

At the same time, several limitations should be considered when interpreting the findings. First, the data primarily reflect the perspectives of health-system stakeholders and experts; therefore, the experiences of patients and the community, particularly groups more vulnerable to digital exclusion, may be underrepresented. Second, although sampling was conducted with the aim of achieving diversity in participants' backgrounds and experiences, the transferability of the findings should be judged in light of the organizational and policy structure of Iran's primary health care system. Third, CFIR was used as an interpretive framework rather than as a hypothesis-testing model; therefore, the findings should not be considered an empirical validation of CFIR. Finally, qualitative findings identify perceived and experienced factors affecting implementation but cannot determine the relative importance or causal effect of each factor. Future studies could involve patients and communities and use mixed-methods or implementation-effectiveness designs to prioritize the identified factors and evaluate them in different PHC settings.

Conclusion

The implementation of telehealth services in primary health care in Iran faces an interconnected set of technological, governance, legal and financial, organizational, professional, and social challenges. The findings showed that these challenges exist at multiple levels of the health system and that interactions among them may limit the adoption and institutionalization of telehealth services. Therefore, the development of these services requires a multilevel and context-sensitive approach in which telehealth services are integrated into existing PHC processes and the referral system while simultaneously addressing organizational, professional, policy, and social factors.

Declarations

Ethics Approval and Consent to Participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by the Ethics Committee of Tehran University of Medical Sciences [Ethics Code: IR.TUMS.MEDICINE.REC.1404.482]. All participants provided informed consent to participate in the interviews and for their recording prior to entering the study. Participants were assured that their participation was voluntary, that they could withdraw from the study at any stage, and that identifying information would be removed during data analysis and reporting.

Conflict of Interest

The authors declare that they have no conflicts of interest in connection with this study or its publication.

Consent for publication

Not applicable.

Author Contribution

J. S-KH contributed to the study design, data collection, transcription of the interviews, data analysis, interpretation of the findings, and preparation of the initial manuscript. M.A contributed to the study design, methodological supervision, interpretation of the findings, and critical review of the manuscript. E.J-P contributed to the study design, supervision, thematic analysis and development, interpretation of the findings, and critical review of the manuscript. A.O contributed to the study design, supervision, thematic analysis and development, interpretation of the findings, and critical review of the manuscript. All authors contributed to the review and approval of the final version of the manuscript and accepted responsibility for its final content.

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Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to the confidential nature of the interview data, which may contain identifiable information, including names and references to individuals and officials. The data are therefore not available for public sharing to protect the confidentiality and privacy of the participants and other individuals mentioned in the interviews.

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