Identifying the challenges of a telecare system establishment for older adults and providing a solution: a qualitative study

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Abstract

Background New approaches to health care delivery, including telecare, provide an opportunity to address the challenges in an aging population. Thus, this study aims to identify the challenges of the telecare system establishment for older adults in Iran and provide a solution.

Methods The present research is qualitative and inductive study. Accordingly, 19 semi-structured interviews are conducted with experts in the fields of geriatrics, information technology management, informatics, and health services management. The data are analyzed by Braun & Clarke's thematic approach using MAXQDA.

Results According to the study results, the challenges of a telecare system establishment for older adults in Iran are classified into three categories: socio-cultural, structural-organizational, and legal. Within the socio-cultural domain, educational and behavior-communicational challenges are particularly noteworthy. The structural-organizational domain encompasses challenges related to workforce, policy, technical and infrastructure, standardization, and financial challenges. The legal domain also includes legal and security challenges.

Conclusions The present study results indicated that a telecare system establishment for older adults faces numerous obstacles. EHealth initiatives in Iran are in their early stages, but it seems that the prerequisite for establishing telemedicine and telecare is the creation of electronic health records.

Keywords Telecare, Older adults, Telemedicine, Healthcare innovation, E-Health

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Background

Today, health is considered one of the basic development components in any society [1]. Health systems in different periods have always faced numerous challenges, including significant changes and development of information and communication technology, as well as increased expectations of people from health systems, costs of health care systems, and burdens of non-communicable diseases and the aging population. Indeed, the growing population of older adults is one of the main challenges of the 21st century in social, economic, and health dimensions [2–5]. One of the most critical stages in human life is aging. According to the definition provided

by the World Health Organization (WHO), the age group of 60 years and older is considered older adults. In addition, According to the United Nations definition, if the percentage of the population aged 65 and over in a country is between 4 and 7%, that country is moving towards an aging population. If the percentage is between 11 and 21%, it is considered an aged society. The growth rate of older adults globally is so high; it is estimated to reach 1.4 billion by 2030 and more than 2 billion by 2050 [6–8]. In Iran, statistics indicate the growth of older adults' population, too. In the last census conducted in Iran (2016), the number of people aged 60 and over was reported to be about 7.4 million (9.3% of the total population). It is also estimated that in 2041, older adults will have made up almost 20% of the total population of Iran [9, 10]. Different studies have indicated that increasing the population age leads to a growing demand for health services [11, 12], as well as an increased burden of chronic diseases, hospitalization rates, duration of hospitalization, and ultimately costs for older adults and the health system [13, 14]. Thus, on the one hand, increased costs in the health system and, on the other hand, increased burden of chronic diseases requiring a follow-up system [15] have persuaded health organizations to adopt new approaches and technologies in providing services. One of such approaches is using information and communication technology in healthcare. In other words, information and communication technology combined with the health sector is manifested through a concept called "electronic health" [16]. According to the World Health Organization, eHealth refers to "the safe and cost-effective use of information and communication technologies to support health and related areas, such as health care services, health monitoring, health and treatment studies, medical education, health knowledge, and research" [17]. E-Health activities include electronic health records, telemedicine, e-counseling, and telecare [18–20]. Telecare is defined as "Providing telecare services to the elderly and less physically abled and providing the necessary care and reassurance for living in their own homes. The use of sensors is possibly a part of a package that can support people with diseases such as dementia or those at risk of falling" [21]. Johannessen et al. have also concluded that telecare plays an effective role in preventing injury and creating a sense of security in older persons [22]. In Iran, due to the rising population of older adults, the health system will face challenges such as increasing demand for health services and rising costs, thus consequently necessitating the review of the approaches to provide health services. In addition, factors such as population distribution over a large geographical area, low-income & disadvantaged areas, and the lack of specialized personnel have overshadowed fair access to health care. All these factors considered, an efficient telecare system is required more than ever. A system that can address these challenges and take steps to improve the health status of individuals in the community [23–25]. In this regard, the study conducted by Cheloungar and Ajami is one of the convincing pieces of evidence indicating the positive effects of telecare systems for older persons [26]. Thus, given the importance of utilizing modern technologies, including telecare, in providing services to older adults, the present study is conducted to identify the challenges of a telecare system establishment for older adults in Iran and provide a solution.

Methods

This study is qualitative and inductive with a thematic analysis method to identify the challenges of a telecare system establishment for older adults in Iran and provide a solution in 2021. The research environment includes universities of medical sciences, including Tehran, Isfahan, Kerman, Shahroud, Mashhad, Golestan, and their affiliated units, State Welfare Organization and its subsidiary units.

The research population of this study includes staff and managers in the field of information technology and informatics, staff and managers of geriatric service providers, researchers and experts aware of the problem, and generally, all people partially experts in geriatrics, information technology & informatics, and healthcare service management.

For sampling from the research population, at first, using purposive sampling, three people were selected to participate in the study. They were selected from the community of experts and managers of the telemedicine network in large areas and Welfare Organization's Rehabilitation and Care Centers Affairs Office. After conducting the interview and implementing and analyzing the data, the study questions were reviewed. The other participants were selected based on the snowball sampling method, and the study population was interviewed until the data was saturated. After conducting 19 interviews, the data was saturated.

In this study, an interview guide including detailed questions on the objectives was provided based on the previous studies. After writing the questions, the interview guide was approved by the elite (experts) and refined through pilot testing to ensure they were clear, relevant, and able to elicit meaningful responses from the participants. The interview guide consisted of 10 questions. Indeed, the interview questions were designed around two main areas: identifying the challenges and providing solutions for the implementation of a telecare system for older adults. Some of these questions include the following: What are the cultural and social challenges in the implementation of a telecare system for older adults? What are the financial (economic) challenges in

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the deployment of a telecare system for older persons? What solutions would you propose for the successful implementation of a telecare system for older persons in Iran? Additionally, the guide contains demographic information such as gender, the study field, and educational level.

The method of collecting qualitative data was semi-structured interviews with the research samples. The researcher's ultimate effort in the interview was to observe honesty and trustworthiness and protect the interviewees' personal information. Prior to the interview, the interviewees were fully informed about the research aims and topic and were provided with the necessary explanations. Also, in all stages of the interview, a respectful and ethical approach was adopted.

The interviews were conducted in a calm environment, without any bias. The interview process was conducted with prior notice to the interviewees. Due to the circumstances in the country caused by the COVID-19 pandemic during the period of conducting the study, some interviews were conducted electronically via applications such as Skype. Like face-to-face interviews, permission was obtained to record the interviews. The duration of the interviews ranged from 17 to 53 min; in other words, the average duration was about 32 min. The period of data collection was from June 2020 to September 2020.

Braun & Clarke's thematic approach (2006), set in 6 steps, was used to analyze the data [27]. Actually, after each interview, the researcher (FS) transcribed the interviews verbatim. Then, in order to create a general understanding of the content of the interviews, the interview transcripts were studied and reviewed several times. The initial concepts and codes were obtained after repeated readings of the interview transcripts. Thus, the data encoded were categorized as sub-themes and main themes by removing irrelevant and duplicate items (codes) and putting together similar concepts. Indeed, the thematic analysis of the transcripts was conducted by four researchers: FS, MA, AA, and ANS. Three researchers independently coded the data, while the fourth researcher oversaw the process as well as the evaluation and analysis of the outputs. Any discrepancies in the coding were resolved through discussion and mutual agreement under the supervision of the fourth researcher. All four researchers were trained in qualitative data analysis and worked closely together throughout the coding and theme identification stages. It is worth noting that qualitative data analysis was conducted using MAXQDA-18. The MAXQDA-18 program was used extensively for data management and analysis. It was employed to assist in the coding process, to identify and organize themes, and to ensure consistency across the coding of transcripts.

According to Lincoln and Guba, trustworthiness was considered instead of validity and reliability in qualitative studies; it includes four criteria: credibility, dependability, confirmability, and transferability [28].

To achieve the criterion of transferability, sufficient explanations were provided to participants regarding the research aim and problem. For the credibility criterion, maximum variation sampling was conducted, and pilot interviews were performed. To ensure dependability, the study process was made available to professors with experience in qualitative research for review, and the research findings were validated by them. For the confirmability criterion, prolonged engagement with the data, as well as the preservation of records and documents throughout the study, were ensured.

Table 1 Demographic information of research participants by gender, education, and study field

Information		Frequency (percentage)
Gender	Woman	10 (53%)
	Man	9 (47%)
Educational level	Bachelor	0
	Master	1 (5%)
	General practitioner, dentist, pharmacist	1 (5%)
	Doctoral degree (Ph.D.)	13 (69%)
	Post-doctoral degree	1 (5%)
	Medical specialty	3 (16%)
Field of study	Health services management	1 (5%)
	Information technology management	2 (10%)
	Software	1 (5%)
	Medical informatics	5 (26%)
	Global health	1 (5%)
	Gerontology	1 (5%)
	Elderly health	1 (5%)
	Geriatrics	3 (15%)
	Nursing for the elderly	1 (5%)
	Nutrition	1 (5%)
	Exceptional children	1 (5%)
	General medicine	1 (5%)

Results

In this study, 19 people were interviewed, of whom 47% were men and 53% were women. Furthermore, most of the participants in the study (69%) had a doctoral degree. Table 1 shows the demographic information of the participants in terms of gender, education and field of study. It should be noted that this information is based on the individuals' latest field of study; the interviewees in fields of study not related to the subject of the research have experiences and jobs associated with the present study. Additionally, the study's findings, along with participant quotes relevant to these findings, are mentioned in this section and are denoted as (Pn). In this regard, Table 2 presents Information of research participants in terms of Codes, educational level, and gender.

Table 2 Information of research participants by codes, educational level, and gender

Research Participants Codes	Educational level	Gender
P1	Doctoral degree (Ph.D.)	Man
P2	Doctoral degree (Ph.D.)	Woman
P3	Master	Woman
P4	Doctoral degree (Ph.D.)	Man
P5	Doctoral degree (Ph.D.)	Woman
P6	Doctoral degree (Ph.D.)	Woman
P7	Post-doctoral degree	Man
P8	Doctoral degree (Ph.D.)	Man
P9	Doctoral degree (Ph.D.)	Man
P10	Doctoral degree (Ph.D.)	Man
P11	Medical specialty	Woman
P12	Doctoral degree (Ph.D.)	Woman
P13	Doctoral degree (Ph.D.)	Man
P14	Medical specialty	Woman
P15	Doctoral degree (Ph.D.)	Woman
P16	Doctoral degree (Ph.D.)	Man
P17	Medical specialty	Woman
P18	Doctoral degree (Ph.D.)	Woman
P19	General practitioner	Man

The challenges of a telecare system establishment for older adults in Iran were classified into socio-cultural, structural-organizational, and legal.

Socio-cultural challenges

One factor that prevents a telecare system establishment for older adults in Iran is socio-cultural issues. Major barriers in this area are educational and behavioral-communicational.

One interviewee pointed out: "As individuals' learning ability slows down over time. It is not that they do not learn, they learn, but they indeed need longer training. It can, thus, be a long and tedious process, and it's boring not only for the older person but also for the trainer." (P15).

Another interviewee commented on behavioral-communication barriers: "Another problem we have for older adults is actually cognitive and motor problems; they must be actually able to use the systems that are created for them and interact with these electronic devices." (P5).

Moreover, in terms of behavioral barriers, the resistance of individuals, including physicians and patients, to the telecare system was recognized. In this respect, there were concepts with different words, such as distrust of service providers and recipients of this technology, poor willingness to use the Internet among older persons, service providers' preference to use old service delivery systems, and lack of culture for using telecare services, which are almost the same. Regarding the resistance of individuals, one of the interviewees noted: "The biggest barriers we have in the world, it is not specific to Iran,

for both doctors and ordinary people whom can later be called patients is resistance." (P3).

Concerning barriers related to level of literacy of service recipients, one of the interviewees mentioned: "older adults may have difficulty working with so-called technology, with computers, the Internet, mobile phones, and all the so-called tools that connect them to their doctor."(P8).

Structural-organizational challenges

Implementing a telecare system for older adults in Iran also faces structural and organizational challenges. These barriers include workforce barriers, policy barriers, technical and infrastructure barriers, standard barriers, and financial barriers.

Regarding the lack of a human resources database, one of the interviewees mentioned: ".... Another problem is the lack of a database of medical and care staff involved in this so that the patient can identify them and verify their credentials(when he/she wants to interfere, his/her level of literacy, his/her degree, his/her skill must be determined so that the family can choose), providing a certificate for no bad record..." (P19).

The lack of telecare system establishment in Iran is related to the conflict of interest in the structure of health system. In other words, decision-makers in the field of health care believe that by implementing telecare projects, their interests, including income from the service delivery process, are reduced. A participant in the study puts it this way: "... Conflict of interest means that there is indeed an attitude that this telecare can reduce physicians' incomes and the provision of health services..." (P7).

Regarding the lack of a clear strategy in the field of telecare in the programs of the related organizations, one of the interviewees stated: ".... Another issue is that in their short-term and long-term strategy, they must define a section for such programs and provide regulations and rules. It is challenging now; it is not seen that way." (P12).

The communication infrastructure in Iran is also facing numerous weaknesses. The barriers in this regard include poor quality and instability of the Internet, poor Internet bandwidth, problems with mobile phone antennas, lack of specific software in telemedicine, and lack of special equipment for telecare at homes and healthcare centers. One of the interviewees stated that: "... In order to be able to actually strengthen telecare in the future, we need to have a series of tools and equipment for older persons, such as a series of wearable tools. These wearable items include gloves, watches..." (P10).

Lack of support from policymakers is also discussed in economic and financial barriers. This issue has three aspects: lack of government support and attention to telecare programs, lack of budget allocation for older

adults, and lack of insurance coverage for telemedicine services. An interviewee pointed out: "… The biggest problem we have is payments and, more importantly, insurance payments. Payments can be solved in some way. For example, when the counseling session is over, the patient is connected to a portal, and online payment is conducted. However, the percentage of insurance coverage is a big challenge. We have had many meetings with insurance companies, and most insurers still do not cover telemedicine." (P8).

The lack of necessary standards in telecare services is another barrier to providing such services. This issue includes several dimensions such as technical standards (including data standards, communication standards, and security standards), organizational standards, and care standards. Various aspects of data standards have been mentioned, including data retention standards, data entry forms, and standards related to geriatric records. One of the interviewees described the weakness in setting care standards: "In the standard issues, we still have weaknesses, not just in providing telecare for older persons, but in all forms of care; telecare in all age and sex groups facing problems. For example, one can think of the medical errors, the events in this field, and the existing standards. For example, how long is a telecare visit? How much is it? Unfortunately, these are things that are still in question, or at least I haven't seen any certain standards in this regard. For almost all countries like our own country, a specific time has been defined for examining and prescribing the required drugs for a regular visit to a general practitioner or a specialist. The insurance companies have set some standards. Some standards have also been defined for the type of care. But I haven't seen any such standards. This is one of the challenges that is required to be addressed. Some measures are required to be taken in this regard." (P9).

Legal challenges
Another barrier to a telecare system establishment for older adults in Iran is the legal challenges in this area, including legal and security barriers.

Regarding the legal barriers, one interviewee said: "Legal issues mean that if something happens to an older adult in a counseling session, who is in charge? The doctor who provides the counseling service? The older person himself/herself? The doctor who is with the older person and receives counseling, for example, In cases where there is consultation between physicians, a specialist, and a general practitioner advises the older person, if something happens to the older person, a misdiagnosis occurs because you know telemedicine is associated with mistakes compared to a face-to-face visit. The rate of making mistakes is lower in some types of telemedicine. However, in some other types of telemedicine, such as

tele-cardiology, the rate of making mistakes is up to 30%. Who should be blamed if the older person die of misdiagnosis?" (P8).

Moreover, an interviewee stated about security barriers: "… For example, your data is recorded into an application, website, or sensor. The data is then sent to your provider. Then, you have no idea who can access your data. Therefore, the security infrastructure should be strengthened" (P12).

Table 3 summarizes all the challenges of a telecare system establishment for older adults in Iran in the form of main themes, sub themes, and codes extracted from interviews.

The next purpose of the present study is to provide solutions for the optimal telecare system establishment for older adults in Iran. The results of the present study in delivering solutions based on the suggestions of the interviewees were divided into 16 themes:

An economic analysis of telecare programs: Before using the telecare system, economic studies such as cost-benefit and cost-effectiveness analysis can provide sufficient confidence in its various dimensions. In this regard, one of the interviewees said: "… Secondly, it is required to be investigated whether such a system is necessary for our country or not, that its cost-effectiveness, its… analysis, and all related assessments and analyses are required to be conducted, and a written document is then required to be provided." (P5).

The pilot implementation of a telecare program: In order to implement the telecare system, it is recommended to primarily implement it as a pilot so that its various dimensions will become clear, thus gradually more comprehensive. One of the participants stated: "Logically speaking, it should be piloted at a level, meaning that we should investigate a group of patients, for example, if we are going to examine older adults…" (P1).

Assessment and prioritization of telemedicine needs of older persons: One of the interviewees stated: "The most important point is assessment and prioritization of needs. We must first find out what specialization our older adults need in telemedicine…" (P8).

Defining a custodian organization(trustee body): "I think perhaps the starting point of this story is that there should be a national consensus on who is in charge, meaning that either everyone should say there is no need for a custodian, i.e., everyone should do their job, or it needs to have a specific custodian…" (P1).

Preparing a national document for e-health: The existence of a national document for e-health is of high significance since, in this way, the concepts and definitions, such as the definition of remote services and information security, will be unified and similar. "First, let's define and compile a national document in which our definitions are the same and unified," said one participant. (P1)

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Table 3 A summary of the challenges of a Telecare system establishment for older adults in Iran

Main themes	Secondary themes(sub themes)	Codes
Socio-cultural challenges	Educational challenges	Inadequate knowledge and awareness of the recipient and service provider about informatics systems and tools
		Barriers related to the level of literacy of service recipients
		Challenges related to teaching older people(e.g. Slowing of people's learning ability with aging)
		Poor training related to the nature of telecare services for older adults and their families
	Behavior-communica-tional challenges	Lack of attention to disciplines related to aging
		Lack of understanding of aging importance
		People's resistance to the telecare system
		Barriers related to communication with different ethnic groups
		The negative impact of diseases of older adults on their use of technology
		The need for older adults to be accompanied so that they can use technology
Structural-organiza-tional challenges	Challenges related to the workforce	Lack or shortage of geriatricians in various fields of medical sciences
		Lack of database of human resources in this field
	Policy Challenges	Poor prevention policy of insurance organizations
		Lack of a place to validate and rank people, centers, and applications related to these services
		Poor inter-sectoral communication and coordination
		Failure to encourage the private sector to provide these services
		Existence of conflict of interests
		Lack of a comprehensive electronic health system
		Lack of referral system
		Lack of a clear strategy for telecare
		Lack of a telecare service package
		Lack of a specific trustee in this regard
	Technical and infra-structure challenges	Lack of access to the necessary tools for older adults
		Poor user-friendliness of tools and software
		Poor communication infrastructure
		Problems related to maintaining and managing data obtained from telecare services
	Standardization challenges	Lack of technical standards
		Lack of organizational standards
		Lack of care standards
		Lack of localization of standards
		Lack of attention to the existing standards and failing to use them
	Financial challenges	Cost of workforce training
		Uncertainty of payment mechanism for service recipients
		Lack of support from policymakers
		The high cost of providing the infrastructure for this technology
		Poor pricing(tariffing) of this type of service
		Unknown nature of payment mechanism to providers of this type of service
Legal challenges	Legal challenges	Uncertainty about the legal responsibility of providing telecare services
		Lack of definition of electronic signature
		Insufficient attention to the laws protecting the rights of older adults
		Uncertainty about the workflow of complaints in this area and the mechanism for dealing with them
		Poor legislation in cyberspace
		Lack of definition of the rights of service recipients and providers in telemedicine services
		Poor process of qualification for providers of telecare services
	Security challenges	Unknown nature of the mechanism of storage and transmission of patient information
		Unknown nature of the mechanism of clinical team's access to individual information
		Access of non-clinical people (technical admin) and interference with privacy
		Lack of mechanisms for authentication of physicians and patients

Table 4 A summary of the other strategies provided by the interviewees

Strategy	Interviewee's viewpoint
Providing telecare services to older adults with a focus on multidisciplinary teams	"In the telecare system, the most important thing, in my opinion, is that we should not consider the older person as a piece of the puzzle. What do I mean? I mean, should I, as a nurse, just come to cover the person's nursing part or not…" (P15)
Applying incentive and compulsory policies	When the issue of e-learning came up 4, 5 years ago, for example, when a professor started sitting at a desk instead of teaching at the board; Everybody started saying it was impossible. No way. Tehran University of Medical Sciences came and said that every professor who teaches 25% of his/her courses online, for example, he would be given a certain amount to be encouraged" (P3)
Supporting service providers and recipients	"I think we need to prepare the required background by removing the barriers that are on the way of these start-ups working in this field. They are all young. They have no support and…" (P2)
Education and culture-building	"The most important solution is education, meaning there should be culture building and information dissemination. It's very important. The first thing to be taught is what telemedicine is…" (P3).
Creating a comprehensive information system for older adults	"For example, from an organizational point of view, If the main organization, being the Ministry of Health, has a registration system, it should first identify, screen and know the older person and determine the exact age of older adult care…" (P12)
Providing feedback to patients and their companions	"… and the next thing is to provide feedback to the patient's family about how much improvement has been achieved since they started using it. This is the main gap that needs to be bridged in our care systems." (P5)
Creating a competitive environment for the activities of private institutions in this field	"… If there is a competitive environment for all the private sector's institutions and everyone follow a unified standard yet they can provide their own solutions, it will be very good." (P6)
Forming a suitable national committee in this field	"… I think the solution is to create a national committee, a national committee that primarily considers the different dimensions of the package. This committee should define specific services for its telecare system. It should gather experts from related fields and reach a truly comprehensive package based on such services. Such a package is a subset of the country's older adult health package. Yet, it is known as a telecare service package for older adults…" (P16)

A performance monitoring system establishment: In providing remote services, it is possible to prevent the reduction of the quality of such services by creating a monitoring system and using a system of encouragement and punishment. One of the participants pointed out this: "Those who buy services, which in most cases are insurance companies, are required to monitor this issue, and this monitoring should be accompanied by encouragement and punishment. The encouragement and punishment should be financial…" (P7).

Using the experiences of developed countries in smart services: In this regard, by conducting comparative studies and reviewing applications, the most desirable model can be created, a model consistent with the cultural and religious structures and infrastructure of our country. One of the participants stated: "We need to conduct a comparative study to investigate interactive systems, applications that provide smart services in developed countries; in this way, a model will be extracted that is most compatible with our infrastructure and national and religious culture." (P19).

Table 4 indicates a summary of the other identified strategies of this study based on interviewees' opinions.

Discussion
Based on the present study results, the challenges of a telecare system establishment for older adults in Iran were classified into three categories: socio-cultural, structural-organizational, and legal challenges.

Concerning socio-cultural challenges, the present study has indicated that providing telecare services to older adults faces resistance from both the older adults and physicians. Fatehi and Debnath have also reported resistance to change as an obstacle to telemedicine services [29, 30]. In addition, in the present study, it has been pointed out that both service providers and recipients lacked the required trust in this technology. An empirical investigation revealed that there is a direct relationship between older adults' use of telemedicine tools and their trust in the safety of these tools, as well as their trust in the service provider [31].

According to the results of our study, barriers related to the literacy levels of service recipients include weaknesses in electronic literacy, media literacy, health literacy, and illiteracy or low literacy among the older adults. Similar to the present study, the research by Pahlevany Nejad et al. also identified the lack of electronic literacy as one of the major challenges in the use of mobile health among the older adults [15].

The findings of the current study indicate that the acceptance of the Internet and its related technologies or the desire to use it is also low among the older persons. However, the study conducted by Mohagheghi Kamal et al. indicates that the level of technology acceptance among the older persons in Tehran has been assessed to be more than average, and the intention to use information and communication technology tools among

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the older adults has been reported to be significant [32]. These findings contrasts with the results of our study.

One of the strategies to address cultural and social challenges is Education and culture-building. Providing information about telecare services plays a significant role in their adoption. The findings of this study indicate that the issue of non-acceptance of these services can be addressed through education and culture-building. Additionally, the potential of social media, such as radio, television, and the virtual platforms, can be leveraged to enhance public awareness and increase media and health literacy. The World Health Organization's report on the Global Digital Health Strategy 2020–2025 emphasizes the importance of raising public awareness about digital health [33]. Furthermore, considering that telehealth services involve physical distance between the recipient and the service provider, with the potential for someone from a remote city to interact with a provider from a metropolitan area, one of the cultural barriers to the establishment of a telecare system is the lack of familiarity and awareness of the cultural principles and frameworks of the service recipient. In order to address this issue, in line with the findings of the current research, it is possible to consider facilities for the service recipient. For example, the option of choosing between local and non-local providers could be made available to them.

We have identified challenges in the financial domain such as poor tariffing system for this type of service, and unknown nature of the mechanism of payment to providers of this type of service. The study by Ghazi Saeidi and Tanhapour also pointed out barriers, including issues related to reimbursement for costs of telemedicine services by health insurers, and legal tariffs for these services [34]; the present study has confirmed this. In another study, Mashouf et al. have referred to problems of telemedicine, including insufficient budget al.location; this was in line with the results of the present study [35]. The implementation of a telecare system involves costs in the areas of training human resources and providing the infrastructure for this technology. By infrastructure, we mean equipment and hardware, software, and internet access. The high cost of relevant hardware and software, along with the difficulty of securing internet costs for certain segments of society, creates challenges.

In response to the financial challenges mentioned, one of the solutions is the insurance pricing (tariff) for these services, identifying, and supporting older persons who require more care through insurance systems. Another solution is avoiding the use of highly specialized human resources at all levels of these services. In fact, pricing electronic health services could be effective in reducing costs and improving access to services. Additionally, by identifying older persons who have a greater need for these services or who belong to lower income deciles,

these high-cost services could be prioritized or offered with greater insurance support for them. Therefore, another solution is the creation of a comprehensive older adults' information system.

In their study, Salehnia and Salehnia stated that the standard of care is one of the issues faced by users in utilizing e-health services [36]. Sethi et al. have indicated that the lack of technical and service standards is among the legal issues of telecare [37]. The Global Digital Health Strategy emphasizes that health data require high standards of safety and security [33]. In this domain, the results of all these studies are in line with those of the present study.

Leveraging the experiences of leading countries in providing smart services can be a valuable solution for addressing standard challenges. In this regard, through conducting comparative studies and reviewing applications, the creation of the most optimal model that aligns with our country's cultural, religious structures, and infrastructure can be pursued. In a study, Molaei et al. suggested that, in order to reduce excess costs and increase the knowledge of users, the telemedicine networks implemented in healthcare centers of developed countries should first be studied and examined [38].

Despite the benefits associated with the field of electronic health, it must be acknowledged that this technology carries the risk of patient data exposure [39]. Hadara and Stabi, in their study, highlighted challenges related to security, privacy, and data management [40].

Therefore, In light of the results from our study, establishing levels of access to data, along with legal consequences for errors and breaches of ethical and security issues, as well as an appropriate system of rewards and penalties in this regard, is a suitable solution to address security challenges.

Another challenge in deploying a telecare system for older adults in Iran is structural and organizational challenges. Lack of facilities and equipment is one of the challenges mentioned in the study conducted by Fathi et al. [41]; this is in line with the results of the present study. The study conducted by Kaplan et al. has also suggested to adopt "a whole-system strategy" to integrate telehealth into regular services and other functions of information systems [42]. This is consistent with the findings of the present study as well.

Based on the insights gained from our research, one of the appropriate solutions to address structural and organizational challenges is to designate a single trustee body for this field. Additionally, supporting service providers and recipients, or in other words, ensuring that knowledge-based companies providing telecare services receive financial support such as grants and loans, as well as non-financial support, is another solution. Furthermore, telecare services for older adults should be provided

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with a focus on multidisciplinary teams. Teams of service providers for older adults, consisting of specialists from various fields of medical sciences, play a significant role in improving the quality of services offered to this demohraphic group. Therefore, programs and policies should be implemented to train specialized human resources in the field of aging.

The existence of barriers in the legal infrastructure of telemedicine was highlighted in the study by Qazi Saidi and Tanhapour [34], similar to the present research. In this regard, Kabiri et al. considered the lack of a digital signature as one of the legal challenges of telemedicine technology in the health system [43]; this is consistent with the present study. In another study conducted by Nittari et al., it was mentioned that medical errors can occur in both face-to-face and remote interactions, but the mechanism for addressing patient complaints is more precise in the face-to-face process [44]. We also reached the same result in our research.

A solution to the legal challenges is the development of a national document in the field of electronic health. Having a national document in electronic health is crucial for ensuring consistency in concepts and definitions, such as the definition of tele health services and data security.

Limitations of the research: While our study provides valuable insights into the challenges and potential solutions for implementing a telecare system for older adults, it is not without its limitations. It should be noted that several people introduced by the interviewees did not attend the interview for reasons such as unwillingness, business, and illness. This research was only conducted in one county in Iran, so future research should be conducted across different counties to facilitate comparison. Finally, since this research employed a qualitative approach, its findings may not be generalizable beyond the study area, which can be considered a limitation of this method.

Conclusions

The present study results indicated that a telecare system establishment for older adults in the mentioned domains faces numerous obstacles. EHealth initiatives in Iran are in their early stages, but it seems that the prerequisite for establishing telemedicine and telecare is the creation of electronic health records. It is suggested that more investigations be carried out on the cost-effectiveness of telecare services, and that comparative studies be conducted to benefit from the experiences of other countries. Moreover, empowering the current human resources in the field of e-health and providing services to the older adult community, as well as attracting students to specialized areas of older adult health, is also advisable. The other recommended measures include making the required changes in the curriculum of various medical sciences according to demographic and technological changes, considering insurance support for telecare services, and providing the possibility of implementing electronic health records to access the complete health information of older adults. All of the abovementioned measures call for more attention by policymakers.

Declarations

Ethics approval and consent to participate

All interviewees had provided an informed consent for participating in the study before the interview. Indeed, informed consent was obtained from all the participants. All stages of the current study were ethically reviewed and approved by the ethics board of Tehran University of Medical Sciences. The ethical code is IR.TUMS.SPH.REC.1400.119. The study was conducted in accordance with the Declaration of Helsinki (2013).

Consent for publication

No applicable.

Competing interests

The authors declare no competing interests.

Clinical trial number

Not applicable.

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