Vol. 19, Issue 1

Telehealth in Primary Health Care: A Scoping Review of the Literature

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Abstract

Background: The use of telehealth as a viable mobility to deliver quality services steadily increases in various levels of the health system. Despite the increasing use of telemedicine in secondary and tertiary health care services, there is a long way to go in the use of this technology in public health and primary health care (PHC). This study aimed to explore the features, approaches, and various dimensions of telehealth in PHC.

Methods: A scoping review was conducted using the Arksey and O'Malley framework. A search was conducted in three bibliographic databases including PubMed, Web of Sciences, and Scopus and in Google Scholar to collect papers published in November 2018 to 2000. Data were extracted according to a predefined form and check for completeness and accuracy by a second reviewer.

Results: Through reviewing papers, the authors extracted information on the general characteristics and features of telehealth services, kinds of PHC services delivered via telehealth, hardware and software facilities used for providing health care through telehealth services packages, as well as their benefits, outcomes and obstacles.

Conclusion: Telehealth can be used for different purposes of PHC through deploying a full range of communication channels available to the public. Due to the opportunistic use of existing devices and platforms, telehealth can provide scalable PHC services nationwide and worldwide. However, implementing telehealth in PHC faces challenges from technical, organizational, and human perspectives. Digital equity (in terms of technology access and e-health literacy) is required to expand telehealth services to the populations in underserved areas.

Keywords: telemedicine, telehealth, primary care, general practice, family doctor, services, guideline, package

Introduction

Advancement and accessibility of healthcare services are among the measures of a society's development. Recent progress in telecommunication technologies has further emphasized the global importance of access to healthcare. It has impacted the methods of medical care and healthcare delivery and, as a result, remote access to health-related services known as telehealth has emerged as one of the most effective paradigms to improve the accessibility of health services.[1-5]

National healthcare systems are under pressure to provide prompt, accessible, and high-quality healthcare in cost-efficient ways.[6,7] By bridging the distance between care providers and receivers, telehealth can provide healthcare to hard-to-reach areas and help solve some of the issues patients face within the healthcare system. Telehealth is a new approach to delivering remote health services via real-time communication between the patient and the healthcare provider, using electronic audio and visual means.[7,9-11] With telehealth, information is exchanged over communication networks to monitor the health status of patients and to offer clinical recommendations, consultations, treatment, education, and administrative services.[1, 2, 5,12-14]

Telehealth has various benefits in primary health care (PHC), ranging from seamless access to health services for people in remote places to self-management promotion, patient empowerment, cost reduction of unnecessary referrals, and decreasing the need for commuting to seek medical care. Physicians can share information via telehealth channels for better clinical education, faster diagnosis, disease prevention and quicker therapeutic interventions.[1,2,5,11-13,15-18] Telehealth services also open up a new way of communication among patients and family caregivers and improve the sharing of critical information and experiences.[14] Use of this technology can also incentivize physicians to recruit and retain in remote and rural areas by allowing them to remotely communicate with their colleagues and take advantage of long-distance education.[19] The health system can also overcome the issue of limited resources and facilities by utilizing telehealth.[20]

In PHC, telehealth can usually be offered when a patient is seeking the doctor's advice about a non-emergency medical problem. It does not replace face-to-face consultation, but complements it by offering timely PHC services in areas facing logistical hurdles to receiving secondary health care.[1-3] PHC as the first contact point of population with health system aims to achieve the equity in population access to the health services.[21,22] Telehealth can contribute to this aim and overcome the challenges.[23-25]

In this paper, we aim to determine the characteristics and components of telehealth packages through a scoping systematic review by answering the following questions:

1. What are the general characteristics of telehealth in PHC?

2. What kinds of PHC services can be offered in the form of telehealth?

3. What facilities are used for providing PHC through telehealth?

Methods

This study is a scoping systematic review, and the methodology for this review was based on the framework outlined by Arksey and O'Malley.[26] The researchers carried out a preliminary scoping search to determine a terminology for establishing the search terms of the study.

Data Sources and Search Strategy

We searched three electronic databases including PubMed, Web of Science, and Scopus. Google Scholar was also searched for relevant articles published in November 2018 to 2000. The combination of the following keywords, including Telemedicine, Telehealth, Primary Care, General Practice, Family Doctor, Services, Guideline, Package, Primary Health Care, Primary Healthcare, were used to find the studies.

Figure 1 shows the process of articles' selection.

Inclusion criteria:

- The focus of the study is on the telehealth in PHC
- All types of the study

Exclusion criteria:

- Non-English studies
- Papers where the full text was not available

Data Extraction

Two of the researchers (LB and LRK) examined the full text of all the included studies independently. They extracted data from fully eligible studies into a predefined form. The data extraction form was used including information on: title of the study, author(s)' name, study type, stud year, study population age, tools/equipment used to provide telehealth, telehealth mode (synchronous or asynchronous), providers involved in telehealth, period of the telehealth delivery, intervention group, control group/s if applicable, the reason for telehealth, intervention type, telehealth outcome, target group of telehealth, and clinical and non-clinical equipment parameters used in telehealth. Any disagreement about the extracted data was resolved by the third researcher (LD).

Results

Out of the 3,823 articles identified from the electronic literature search, 115 were duplicates and were therefore eliminated. After screening the title, abstract, and full text of the papers, a total number of 43 were included for the final review (**Figure 1**).

Table 1 presents the characteristics of all 43 included studies.[27-69] Fourteen out of all the studies were the randomized controlled trial.[33,36,37,40,41,44,47,49-50,52,54,57,62,69] The focus of the studies was the population with over the age of 18, except for one study that focused on children.[43]

The studies included in this review originated from 15 countries around the world. The majority of the studies originated from the United States (n=15)[34,36,39,41,42,44,46,48-51, 54,59-60,67,] and the United Kingdom (n=12).[28,35,37,43,52,55,57,58,61,65,66,68] Only three studies were from Asian and African countries.[27,30,45] Diabetes and hypertension were the most frequently targeted diseases[27,36,39,45,46,47,48,49,51,52,61,62,69] by the telehealth PHC services.[28,44,49,68]

In 26 studies, general practitioners were the primary providers of telehealth services.[28-31,34-38,44,46,51-53,57-59,60,61,63-69]A total number of 19 studies used the real-time (synchronous) approach for providing telehealth services.[27,28,30,32,34,35,37,39-42,52,53,57,61-63,65,66] Patients were found to be the primary receivers of telehealth services (n=32).[27-29,31-39,41-42,44, 46-54,57-63,68]

The aim of providing telehealth services was various. In some studies, the aim of telehealth was to follow up with patients[29,30] and monitor disease,[27,29,37,44,52,62] empower people,[43,44] train patients,[27,47] and provide quick and easy access to meet medical needs.[30,31,43,53,61] However, some telehealth services aimed to train and supervise healthcare providers and give a second opinion or consultation. The studies included in this review originated from 15 countries across the world.[45,53,56,64,65]

Equipment and devices used for delivering telehealth services included television,[27] telephone,[34,35,39,41,44,46,48,50,54,57,59,66] glucometer,[52,59,62] camera,[27,35,36,45,46,60,63] mobile phone, [40,43,48,52,61,68] spirometer,[29,64] pulse-oximeter,[29] heart rate monitor,[29] computer,[30,33,39,41,45,69] digital otoscope,[60] and telephonic stethoscope.[60]

Disease management,[28,36,62,69] healthcare support in rural areas,[30,41] self-management,[27,33,39,42,48,51,58,59,61] and cost reduction[35,38,46] were the most critical achievements of telemedicine services in the reviewed studies.

The critical challenges reported for implementing telemedicine services include lack of resources,[27,69] lack of awareness,[27,30,48] staff resistance,[38,50] lack of privacy criteria,[27,33,43] and lack of access to technology.[57,58,64] (**Table 2**)

Discussion

This study aimed to investigate telehealth at the PHC level. Our findings revealed that the adults (18-60 years old) were the target of telehealth services in most of the studies. It shows that people of these ages are more willing to use this method, have the necessary technological know-how, and can easily use the tools involved in telehealth.[17] The target group of telehealth services in some of the included studies were elderly adults. There is evidence that the telehealth applicability to the seniors has not been a barrier to receiving telehealth services, and older adults have an interest in using telehealth services. People in this age range are more likely to utilize telehealth services if they do not have an additional cognitive load.[70] The majority of the telehealth services provided in PHC originated from European and American countries. A possible explanation for this may be the leading position of this country in technical infrastructures and the equipment required for implementing such services.[71]

The results of our study revealed that the majority of telehealth services used various communication channels such as video conferencing, cellphones, telephones, the web, email, and Skype, considering the situation of the service receiver and the available tools. The variety of communication channels reveals the full range of options for delivering telehealth services. According to the findings of the study done by Dhillon et al., Skype and email were the most popular tools for receiving telehealth services among the participants.[70]

Most of the participants in the included studies suffered from chronic and non-communicable diseases such as hypertension and Type II diabetes. Patients suffering from chronic conditions usually place substantial financial burdens on the health care system so that the utilization of telehealth services can reduce these pressures.[72] Turning to the telehealth approach can act as a solution to the problem of managing care for chronic conditions among aging of the population in different communities. The investigation by Esperance et al. (2016) has concluded that self-management via telehealth services can improve patients' access to physicians and the quality of care among diabetic patients. Despite being overall pleased with using the telehealth system, the patients in the mentioned study raised concerns on technical issues and the need to learn new information to use the system.[73]

Xu et al. (2018) conducted a study on the efficacy of telemedicine in providing care to diabetic patients in rural areas. The patients who had used the telemedicine system experienced lower blood sugar levels, better access to health care, less waste of time, and a high degree of satisfaction with the method.[74] The higher success rate of telehealth services in this domain can be attributed to the broader adoption of telehealth for managing diabetes compared to other diseases.

Our findings implied that the healthcare providers who made the most use of telehealth services were family doctors. Telehealth can undoubtedly improve the quality of PHC offered by general practitioners through increasing access to physicians. General practitioners can use telehealth to perform examinations and provide consultations to their patients in any place and at any time without even having to go to their offices. This approach can reduce waiting times in doctors' offices, deliver healthcare services to people living in remote areas, and allow physicians to increase their income through reimbursement systems intended for telehealth services.[75]

The results revealed the most dominant approach to telehealth services was the synchronous form.[27,28,30,32,34,35,37,39-42,52,53,57,61,62,63,65,66] Real-time communication is considered an effective way of delivering telehealth services in PHC. In the synchronous mode of telehealth, there is a stronger sense of communication between patients and providers. What determines the suitable mode of delivering telehealth services are the patients and the type of disease they have. Moreover, telehealth is a technological phenomenon[76] and a directed approach for meeting individuals' needs.[75]Therefore, choosing between one-way or two-way as well as synchronous or asynchronous methods must be made accordingly.

Most of the included studies in this review have focused on investigating the effects of these services on rural and underserved areas since those are the areas facing problems with access to healthcare.[7] Increasing accessibility and improving patient health can happen by establishing telehealth services in rural areas. However, the rollout of the technology in rural regions is usually slower due to the lack of technical support and lower budgets. Lack of adequate resources can be another barrier to deploying telehealth in underserved areas since they do not have dedicated technical support teams of experts like the large urban areas. Moreover, it should be noted that even though innovation is considered a competitive advantage, rural systems are usually resistant to change.[77]

According to the findings of our review, it seems the clients mostly received the telehealth services directly by themselves. However, the study by Dhillon et al. found that the elderly preferred to receive telehealth services through the help and support of their families.[70] There is evidence that patients whom a supervisor supported were more successful in using this technology.[77]

Reviewing the main obstacles to the implementation of telehealth revealed that lack of coverage by healthcare insurances and payment plans are among the primary problems holding back the adoption of telehealth networks.[11,78] Barriers also ranged from difficulty in acquiring permits to concerns about privacy[3,11,13] and the lack of enough information, user perception, skill, education, initial costs, and the providers' reluctance toward new approaches of health care delivery.[9,79] The study by Souza et al. identified additional factors such as low bandwidth, unsuitable networks, low signal quality, picture quality, and organizational issues as barriers to the implementation of telehealth services.[80] Furthermore, a study conducted by Fatehi reported technical, organizational, cultural, sociological, economic, and ethical obstacles.[81] The barriers reported by Nesbitt et al. also are similar to the ones identified in our study.[78] Regardless of the disadvantages, there were a variety of advantages reported for telehealth services in primary healthcare. They range from self-care promotion to patient empowerment, decreased patient visits, cost reduction, and access improvement to the services. Additional benefits include patients' time savings, higher commitment to showing up for appointments,[75] better clinical results, better access to specialist services, less need for travel, and better screening rates.[82]

Conclusion

Telehealth can be used for different purposes of primary health care through deploying a full range of communication channels available to the public. Due to the opportunistic use of existing devices

and platforms, telehealth can provide scalable primary health care services nationwide and worldwide. However, the implementation of telehealth in PHC faces challenges from technical, organizational, and human perspectives. It seems inevitable to transform the policy context and regulation if telehealth approach is a part of health system agenda. Respect for privacy and confidentiality principles is also crucial. Moreover, digital equity is required to expand telehealth services to the populations in underserved areas. Digital equity can be achieved through addressing existing disparities in internet and technology access and improving e-health literacy among low-income and underserved communities. Under such conditions, telehealth can strengthen primary health care system toward universal health coverage. Since no guideline was reported for implementing telehealth services in primary health care, future research may utilize the findings of this study as a basis for developing the guideline. Analysis of telehealth policies for primary healthcare in different countries could shed light on a deeper understanding of our findings. The current study is limited in this regard and future research may explore this to complement the findings of this study.

Declarations

Ethics approval

Ethical approval for conducting this study has been obtained from the Research Ethics Board at Tabriz University of medical science, Tabriz, Iran (No: IR. TBZMED.REC.1396.1251).

Competing Interests

The authors declare that there is no competing of interest.

Funding

This study was part of MSc thesis and funded by Tabriz University of Medical Sciences

Authors' Contributions

LB: Data extraction, data organization, treatment of data, and drafting a manuscript. LRK: Data analysis, and manuscript writing, scientific revision and approval. LD: Data examination, writing of manuscript and scientific criticism as well as approval. MF: Data examination, scientific review and approval. All authors have read and approved the final manuscript.

Acknowledgements

The authors would like to thank Dr Faramarz Pourasghar, MD, PhD, for his valuable help.

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