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Advantages and disadvantages of teleworking in healthcare institutions during COVID-19: A systematic review

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ABSTRACT

Introduction: The prevalence of COVID-19 as pandemic disease and efforts to control it have caused extensive changes in work methods and the global growth of teleworking, especially in health. This study aimed to investigate the advantages and disadvantages of teleworking in healthcare institutions during the Covid-19 era.
Methods: This systematic review was conducted up to January 1, 2022, by searching the relevant keywords in PubMed, Scopus, Web of Science, and ProQuest databases. Study selection has been conducted based on inclusion and exclusion criteria. Data extraction was done using the data extraction form based on the study objectives.
Results: From all 276 articles retrieved, 14 studies were included in the study. The results show that England had the highest number of articles (6 articles). The advantages of teleworking have ten categories, and the disadvantages have nine categories. The most important benefits of teleworking include facilitating service delivery, increasing satisfaction, supporting healthcare providers, and reducing costs. The most important disadvantages of using teleworking have been the lack of facilities and support, the lack of technology acceptance, and reduced interactions between healthcare providers.
Conclusion: Although teleworking was a suitable solution for some problems in healthcare institutions during COVID-19, it is also associated with obstacles. It is recommended that managers make policies and guidelines to use appropriate technologies, provide facilities, and have continuous support and increased interactions between healthcare providers and patients.

1. Introduction

The World Health Organization (WHO) reported the COVID-19 disease on March 11, 2020, as a pandemic. This disease became a global pandemic due to its high prevalence and spread [1]. Governments adopted policies such as quarantining urban centers that are sources of pollution, social distancing, banning public gatherings, and closing schools and offices to manage COVID-19 [2]. With the implementation of the social distancing plan, working methods in institutions also changed, so teleworking grew rapidly and led to significant changes in working methods [3].

Teleworking was proposed in the 1970s to reduce traffic and air pollution for the first time [4]. teleworking is practical works that members of an organization do them during their normal working hours away from the main workplace and usually at home [5]. In teleworking, Information and Communication Technology (ICT), such as computer communication services (extranet, intranet, internet), e-mail, mobile, instant messages, fax are used to interact with others to perform tasks [6]. Teleworking is not limited to time, place, and type of communication technology. The successful implementation of this requires technological, social, and organizational support, especially in e-leadership practices, and the emergence of digital technology and Internet services has facilitated the advancement of teleworking [7].

Teleworking has evolved due to the new conditions of the work environment, such as intense competition, new social structures, and the increasing development of ICT. During the COVID-19 era, teleworking

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was an important measure proposed by the WHO in 2020 and successfully implemented by many organizations worldwide [8]. Among the different areas, the public service has the most use of teleworking (17%). After that, the healthcare services (12%), financial and insurance (10%), manufacturing sector (8.5%), and education (7.5%) have the most teleworking use [9].

Statistics about teleworking before COVID-19 show that in 2018, only 4.3% of Spanish employees and 5.2% of European Union (EU) employees worked at home. During COVID-19, these statistics increased greatly, so nearly 40% of staff in the EU started teleworking during COVID-19, and many employees worldwide are used to teleworking during this pandemic [10]. The results of the studies conducted in this field have shown that teleworking positively affects the quality of life, increasing vitality and satisfaction and job performance of employees. Also, teleworking provides access to the employees' expertise regardless of location [11–14].

However, some studies have shown that teleworking leads to social and occupational isolation, and employees do not actively participate in sharing information. This feeling of professional isolation has a negative effect on job performance [15,16]. Some other studies considered the role of e-leadership in resolving this problem and developing the distinctive abilities of these people to improve organizational performance in virtual and remote work environments [17,18].

Performing high-quality, correct, and on-time work duties is one of the most critical factors in a healthcare organization's performance. Considering the pivotal role of teleworking during COVID-19, its use is inevitable worldwide. During this pandemic, many Employees have been forced to introduce different degrees of teleworking, which has changed the psychological and social work environment. Also, in today's advanced world, teleworking is one of the modern ways of working. The development of ICT is rapidly developing and expanding and can be a suitable option to overcome unexpected events, so this issue should be further analyzed. Carrying out all or part of the employees' activities through teleworking can bring advantages and disadvantages for the employees and the organization. Explaining this issue through the trustees of this matter can lead to better decisions in this field. Therefore, the researchers examined the advantages and disadvantages of teleworking in healthcare organizations during COVID-19. The results of this research can provide helpful information regarding the role and impact of teleworking in the performance of healthcare organizations, and managers, Organizational planners, and other officials will help.

In some conditions, healthcare services methods have changed because of healthcare centers' roles, the importance of performing work tasks correctly, timely, and high quality, and the necessity of using teleworking during COVID-19. On the other hand, in today's advanced world, teleworking is one of the modern ways of working, and with the development of information and communication technology, it is developing and expanding rapidly, and it can be a suitable option to overcome unexpected events [19], so this issue should be be further analyzed. Carrying out all or part of the employees' activities through teleworking can bring advantages and disadvantages for the employees and the organization. Explaining this issue can lead to better decisions in this field.

Therefore, the researchers tried to examine the advantages and disadvantages of teleworking in healthcare organizations during the COVID-19 era. The results of this study can provide useful information regarding the role and impact of teleworking in the performance of health care organizations.

2. Methods

2.1. Study selection

This study has been conducted based on the PRISMA statement, which includes the initial search, screening of the studies, assessment of the eligibility, preventing risk of bias, and study selection [20]. Therefore, the scientific databases, including PubMed, Scopus, Web of Sciences, and Proquest, were searched using the appropriate combination of keywords start from March 2020 until Jan 2022(Table 1).

To retrieve other related studies, a hand search was made in the list of references of the included articles and Google scholar search engine with different combinations of keywords.

2.2. Inclusion criteria

Original articles published on the use of teleworking during the outbreak of COVID-19 in healthcare organizations that were related to the advantages and disadvantages of teleworking and their full version was available in English were included in the study.

2.3. Exclusion criteria

Articles that referred to teleworking except in healthcare organizations were excluded from the study. The articles were entered into the Endnote software and duplicate articles were deleted. Then, titles and abstracts (screening stage) and the full text of articles (Eligibility stage) were assessed. Irrelevant articles and articles without inclusion criteria were excluded from further reviews.

2.4. Data extraction and data analyses

Data extraction was done independently by two researchers using a data extraction form. The data extraction form includes a) the bibliographic information of the articles, such as the author's name and year. b) information related to the study objectives, the country where the study is conducted, the type of information technology used for teleworking, the participants in the study, the c) advantages and d) disadvantages of using teleworking during the COVID-19 (Including the investigation of aspects of quality of life, productivity, personnel satisfaction, organizational satisfaction, affordability, and impact on costs). The content of studies was then analyzed considering the aim of the study.

2.5. Quality assessment

Quality assessment of studies has been done by Newcastle-Ottawa Scale [21] with some modifications for health information technology studies [22]. Based on the assessment that the authors did; the selected studies have the quality for inclusion in the study.

3. Results

A total of 276 articles were found in the initial search. After removing duplicates, unrelated articles were removed based on the evaluation of the title, abstract and full text, and finally, 14 articles were selected. The strategy of article selection is shown in Fig. 1.

According to Table 2, hospitals and educational centers are the most frequent places to implement teleworking programs. Other places included cancer and mental and behavioral health centers. Also, most studies on teleworking during COVID-19 have been conducted in

Table 1
Search strategy.

Time limitation	From 1 March 2020 up to 1, Jan 2022
Language limitation	Only full text in English
#1	"Teleworking" OR "Remote working" OR "Distance working" OR "Telework" OR "Working from home" OR "Remote job"
#2	"Healthcare institutions" OR "Hospital" OR "Healthcare centers" OR "Health" OR "Clinic"
#3	"COVID-19" OR "SARS-COV-2" OR "Corona virus" OR "COVID"
Search strategy	#1 AND #2 AND #3

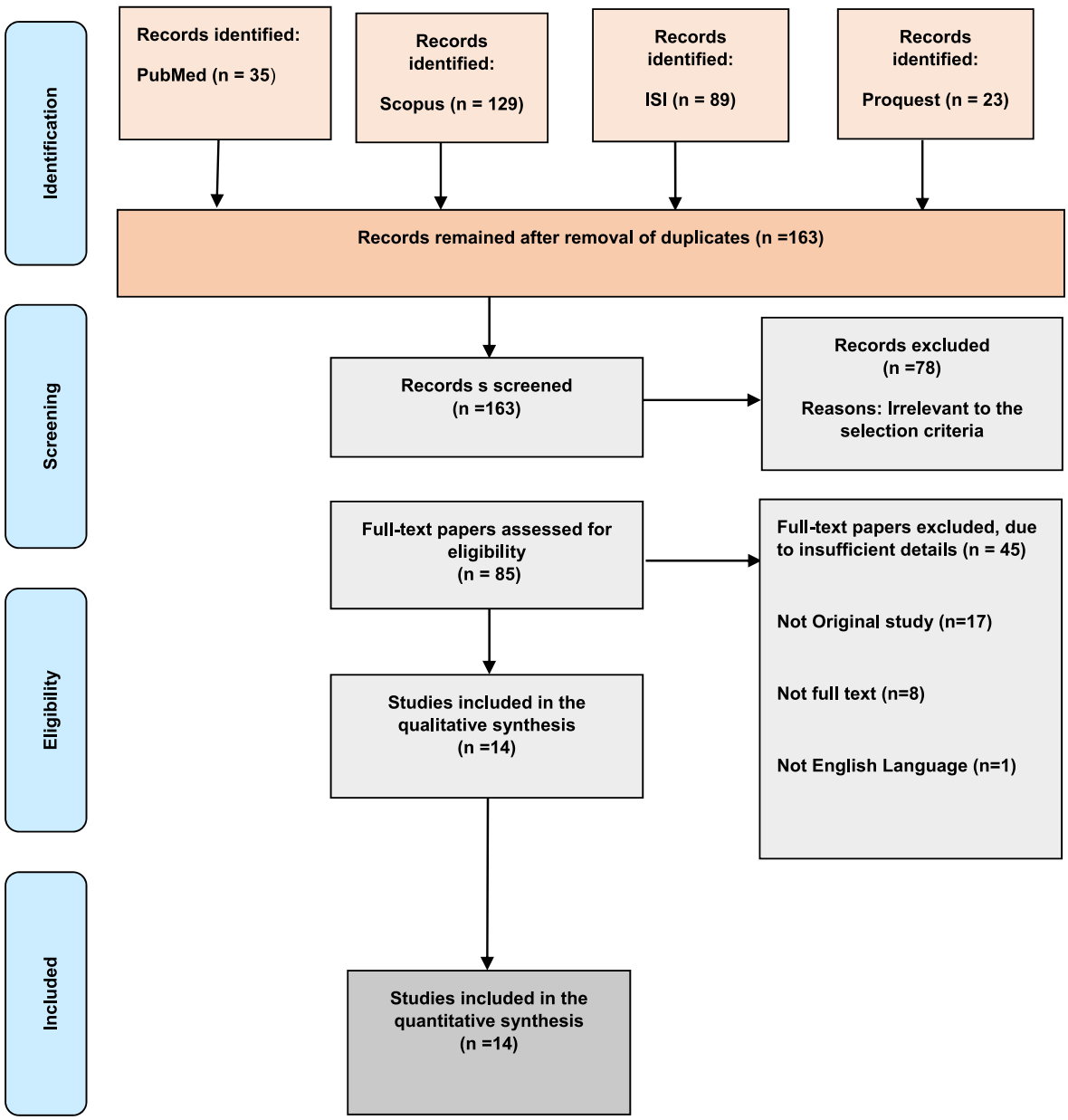

Fig. 1. Study selection process.

healthcare centers in England (43%), Australia (22%), the USA (14%), Iran, Italy, and Spain (7%), respectively.

In Table 3, the benefits of using teleworking during the COVID-19 in healthcare centers are presented. Based on Table 3, 10 themes and 55 sub-themes were identified.

Based on the results of Table 3, the advantages of using teleworking are extensive, and it has had positive effects from various aspects on the performance of the health system employees during the Covid-19 era. In addition to facilitating the performance of health system employees, this technology has also supported patients during the Covid-19 period.

Table 4 presents the disadvantages of using remote work during COVID-19 in healthcare centers. Nine themes and 62 subthemes were identified based on Table 4.

According to Table 4, the disadvantages of using teleworking during COVID-19 or similar conditions should not be underestimated. The number of reported disadvantages of using it is emphasized as much as their advantages. Not paying attention to these disadvantages can affect the delivery of healthcare services to patients.

4. Discussion

The wide spread of COVID-19 worldwide and nationwide shutdowns in service centers to manage and control this disease and cut off its transmission chain caused politicians to use the capacities of ICT to change the way services are provided. One of the most important types of service centers that switched to teleworking during the COVID-19 and used ICT tools were healthcare centers. Teleworking in healthcare centers during the COVID-19 had advantages and disadvantages explained in this study and can be used in similar conditions.

4.1. Advantages of using teleworking in healthcare centers during COVID-19

4.1.1. Support of healthcare providers

Healthcare providers were one of the main parts of society exposed to the severe damage caused by Covid-19 [37]. In addition to the risk of disease and physical injuries, they are exposed to all mental injuries [38], and policymakers must use all available capacities to support this

Table 2
The features of the included studies.

ID	Author, country, year	Type of health center	Applied technology	Main results
1	Liberati [23] England 2021	NHS Mental health care providers	Video Conferencing Platforms – Online digital health platforms such as SilverCloud	Mental health workers faced multiple adversities during the pandemic that were highly consequential for their well-being. These findings can help in identifying targets for support.
2	Pannullo [24] USA 2021	The operating room of the Weill Cornell Medical Department of Neurosurgery in New York	Video Conference, telemedicine	Shifting to teleworking can help overcome barriers and changes resulting from COVID-19. Increasing the use of telemedicine can play an important role in patient triage and neurology clinic visits after the pandemic by increasing productivity.
3	Sheehan [25] England 2021	NHS	Telecare	It is possible and desirable to provide remote services for people with mental disabilities and/or autism.
4	Wiener [26] USA 2021	practice models for pediatric oncology social workers		Social workers can use video and electronic tools to help create meaningful interactions and meet the needs of patients and families during the pandemic.
5	Dulohery [27] United Kingdom (UK) and Republic of Ireland (ROI) 2021	United Kingdom (UK) and Republic of Ireland (ROI) medical schools	Anatomical education software/online conference/use of 3D virtual corpses	Despite the concerns of anatomists about adaptation to education, assessment and work environment during the pandemic, the use of information technology tools led to the identification of important opportunities for the benefit of students and professors.
6	Foye [28] United Kingdom (UK) 2021	The private sector, community user-led organizations, the voluntary sector and local government)	Phone and new and online video platforms, Attend Anywhere, Zoom, Microsoft Teams	Remote visits (e-visit) are almost impossible for people with dementia and many patients do not have the ability to use this technology.
7	Hopkins [29] Australia 2021	Child and Adolescent Mental Health Services Clinic	Phone, laptop or tablet [Service] for remote connection to [Service] systems/ telehealth	Telehealth has become an essential new component for clinicians, either alone or as a supplement to some of interventions.
8	Callaway [30] Britannia 2021	Radiology departments in NHS hospitals across the UK	Laptop, desktop reporting station, and use of virtual private network (VPN) to transfer photos,	The use of home reporting increases the provision of elective and emergency imaging reporting in the era of covid-19 and helps radiologists to provide support and services.
9	Guarino [31] Italy 2020	Liver Unit of Naples Federico II University Hospital	Helpline/Safe email and fax services/ Telephone consultation/ Video consultation (via Skype or WhatsApp)/	Telemedicine was a useful tool to follow up patients with chronic liver disease (CLD) and mitigate the impact of the COVID-19 pandemic.
10	Rostami [32] Iran 2020	Roshana Cancer Institute (RCI), Tehran	Remote PCTm is a cloud-based remote access software platform for users that allows individuals or teams to access one or more devices remotely.	The use of telework can reduce unnecessary attendance in the radiotherapy department. This may finally reduce the risk of staff contamination and indirectly the risk of patient contamination.
11	Dick [33] Britannia 2020	A pilot of an in-hospital Trust radiologist reporting on in-hospital Trust patients via a remote login was undertaken	Virtual desktop system/RIS messaging service/Dell UP2716D monitors/ telephone/RIS; Soliton Radiology 2.2.2.1808 and PACS; Carestream 12.1.6.1005	Remote reporting is equivalent to in-hospital reporting in terms of standards, and it leads to better productivity and reduced consultation time.
12	Bhome [34] United Kingdom (UK) 2021	Geriatric mental health care workers	Video calls - phone calls	Teleworking has been positively received by employees working in mental health centers for the elderly. Teleworking has provided greater flexibility in work patterns, improved efficiency, and the possibility of involving a wider range of professionals in multidisciplinary team (MDT) meetings.
13	Evans [35] Australia 2021	Through campus forums, social media sites (such as Facebook) and email to members of women's gyms	Telehealth services are provided to women with or without video.	Reducing the need for in-person visits by improving patients' self-care through exercise, nutrition and reducing their stress
14				

(continued on next page)

Table 2 (*continued*)

ID	Author, country, year	Type of health center	Applied technology	Main results
	Hoffman [36] Spain 2020	Faculty of Radiation Oncology and Faculty of Medical Physics		The shift to home work was a positive change for the majority of the radiation oncologist workforce and had a potentially beneficial effect on burnout for many staff groups.

group [39]. The results show that the use of teleworking during COVID-19 is a supportive tool for healthcare providers by reducing physical presence in the workplace [32], reducing working hours [26], providing more support to medical students [33], and increasing the availability of psychological management of COVID-19 for employees [34] could reduce the harm caused by COVID-19.

4.1.2. Increasing healthcare quality

In healthcare quality, the study's findings are divided into two parts: increasing service quality and decreasing service quality; certainly, more investigations should be done to achieve reliable results. The results of this study showed that the use of remote work through reducing the transmission of infection [24], ensuring the continuity of service provision [28,32], increasing flexibility and reporting capacity [30], and the possibility of self-calibrating some remote monitors [30], is effective in increasing the quality of services. Some of these results obtained during Covid-19 can be used the post-COVID-19. Also, ICT can increase the quality of services as a support tool in some healthcare regions.

4.1.3. Increasing employee and patient satisfaction

With the wide spread of Covid-19 and the unprecedented number of infections and referrals to healthcare centers, healthcare workers' workload and working hours increased, and the workers had to spend much more time than usual in healthcare centers.

The study showed that using teleworking for providers has improved their work-life balance [24]. The use of ICT can increase employee satisfaction through increased flexibility and balance between work and life [26] during COVID-19, and increasing employee satisfaction can affect the quality of healthcare delivery and cause patient satisfaction. Also, by facilitating communication between patients and care centers, teleworking can expand the provision of services, prevent unnecessary patient visits during the outbreak of COVID-19, and increase patient satisfaction.

In general, to increase satisfaction, the effects of teleworking in the organization should be perceived, and the inappropriate expectations of the organization's employees, especially the managers of the departments, should be transformed into realistic expectations.

4.1.4. Facilitate health services delivery

The results have shown that teleworking has significantly impacted attracting and employing the best specialists at any point because teleworking helps attract specialized human resources and facilitate the provision of services by removing time and place limitations [13]. Since the workload and activities of healthcare organizations have increased during COVID-19, and because teleworking is not limited to office hours, healthcare organizations will have more power to respond to the emergency needs of patients and accelerate and facilitate the provision of services [40].

Three types of resources are necessary to provide fast and optimal services in teleworking, including human resources, technological resources, essential ICT infrastructure, and organizational resources that

Table 3
Benefits of teleworking in health care centers during the Covid-19.

Row	Themes	Sub themes
1	Support of health care providers	Protecting employees from contracting COVID-19 [31,32] Reducing the physical presence of personnel [32] Reducing working hours [26] Providing more support to trainees [33] Increasing the availability of ways of psychological management of employees [34]
2	Increasing healthcare quality	Reducing the possibility of infection transmission [24] Guaranteeing the continuity of providing services under any conditions [28,32] Increasing healthcare quality through the ability of remote monitoring self-calibrating [30]
3	Increasing employee and patient satisfaction	Improving the work-life balance [24,26] More interaction between trainers and medical students [24] Increasing student satisfaction [27] Reduction of administrative burden [29] Feeling happier [29] The satisfaction of remote communication for patients [31]
4	Facilitate health services delivery	Providing health services more quickly and efficiently [25] Reducing waiting time for patients [25] More access for the patient [24] Limiting direct contact with the patient [26] Increasing virtual access to patients [26] Saving training time [27] Increasing the flexibility and capacity of reporting [30] Helping to keep the care center safe [31] Facilitating and improving coordination in complex care [31] Reducing the time of conducting and receiving medical consultations [33] Accelerate care management in many cases [33] More flexibility in work patterns [34]
5	Reduce costs	Reducing the number of unnecessary employees in the hospital [24] Saving the cost of medical education [27] Saving on travel costs [27,29] Reducing transportation logistics in childcare [29] Saving time due to reduced transportation [34]
6	improving the family relationships	Increasing the time spent with family [26,36] Providing the ability for family visits online [29]
7	Reduce stress	Reducing the stress of receiving the required services through telehealth [25] Reducing the anxiety of disabled people by preventing unnecessary traffic [29] Reducing the anxiety of healthcare providers [34]
8	Increasing the productivity of specialists	The possibility of participating in more online conferences [27] Increasing personal and research collaborations or attending meetings to share best experiences [27] Possibility of prioritizing clinical interventions in the clinic [29] Possibility of writing reports at home [29] Reducing the need for hygiene measures such as hand washing and home disinfection [29] Ability to focus on work away from workplace noise [29] The possibility of participation more specialists in multidisciplinary team meetings [34]
9	Patient support	Helping patients in the management of chronic liver diseases [31] Increasing access to healthcare services [31] Quick response to patients' questions [31]

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Table 3 (*continued*)

Row	Themes	Sub themes
10	Other	Nutritional recommendations and early interventions to ensure drug compliance (especially for immunosuppressive drugs in liver transplant patients) [31] Reducing physical attendance of patients [32] Providing telephone calls to reduce the loneliness of patients [34] Supporting the physical and mental health of patients [35] Improving patients' self-care skills, including exercise, nutrition, and stress reduction [35] Environmental benefits [24,29] Screening patients for COVID-19 before admission [31] Reducing the risk of transmission of COVID-19 [34]

use flexible and diverse methods of working and providing services [41].

4.1.5. Reduce costs

Doing work by the employees within the organization during COVID-19 involves spending the costs of providing facilities, equipment, space, welfare services, communication, etc. With the help of teleworking, some of these costs can be saved [42]. Organizations reduce the costs of providing services by implementing teleworking with the optimal combination of various influential factors. Teleworking has reduced the costs related to the provision of daily services by reducing the costs of moving personnel and hiring human resources. Some studies have shown that using ICT, such as telemedicine, can save unintentional costs in the long run by improving the skills of doctors [43,44].

4.1.6. Improving the family relationships

For employees, teleworking offers more flexibility to deal with family issues because they can perform their job duties anywhere and anytime and have enough time to communicate with family members, thus improving the family atmosphere [45]. Also, autonomy in time management allows employees to coordinate their personal and work duties. Therefore, it also increases job opportunities for women and disabled employees [46].

One of the most important reasons employees tend to telework is flexibility. Of course, teleworking affects the degree of flexibility it creates. With the ability to control the workload and specify realistic expectations, employees can reach a balance to organize their time and tasks with proper planning [13]. Flexible work became an opportunity for employees to improve their work, family, and social life by reducing work limitations and achieving independence. A study related to the present study showed that teleworking makes a better balance between home and work life and ultimately leads to more significant employee satisfaction [47].

4.1.7. Reduce stress

Telehealth for people with anxiety, people who may have difficulty with transportation or live far from clinic locations, children and adolescents with autism spectrum disorder, attention deficit hyperactivity disorder, intellectual disability Mild, sensory processing problems, people who are socially isolated (COVID-related or other) and parents are very beneficial [29]. Using these technologies could be able to reduce the stress of the patients and healthcare providers.

The study by Blount et al. showed that telecommuting reduces commuting stress among employees by reducing driving time.

4.1.8. Increasing the productivity of specialists

Having a proper teleworking structure increases individual and organizational morale, ultimately increasing productivity and performance and helps to achieve goals. The studies' results have shown that

Table 4
Disadvantages of teleworking in health care centers during the COVID-19.

Row	Themes	Sub Themes
1	Disruption in the process of providing healthcare services	Unfamiliar and new roles for employees [23] It is difficult to perform specialized examinations [24] Excessive delay in visit time due to limited technological literacy of patients [24] Disruption in providing services due to the possibility of losing some communication information such as people's email [24] The difficulty of remote communication with special patients such as dementia, autism, psychosis or paranoia [28] Difficulty in setting up an appointment [29] Increasing the time of remote conformal three-dimensional radiotherapy (3DCRT) [32]
2	Reduced interactions of health service providers, patients, etc.	Reducing the interaction of physicians with colleagues and patients [23] The widespread use of technologies in education may prevent effective student-student and student-teacher interactions [27] Reducing the possibility of tracking non-verbal communication [29] Hard interaction of parents in some cases in telehealth services [29] Reduced interactions among radiologists and reduced discussion of difficult cases with referring specialists [30] Absence of physical interactions (eg, eye contact, handshake), which may have a calming role for patients [31] It is difficult to communicate, interact and discuss with other doctors [33]
3	Lack of facilities and supports	Lack of necessary tools and equipment [25] insufficient training and support [25] Lack of access to adequate equipment to provide remote care [26] Lack of adequate mechanisms to support teleworkers [27] Technical issues and procurement management in the field of medical education [27] Poor internet connection [28,29] Unavailability of some hardware facilities [28] Lack of privacy [28] Requires laptop, stable Wi-Fi connections [28,29] Lack of access of some people to operation systems to use telehealth [29] Low bandwidth [29] Lack of appropriate IT support and technology infrastructure [29,30,36] Limiting the performance of VPN connections and image transfer [30] Possible vulnerability of the system [30] Interference, interruption, error or delay due to service connection problems [31]
4	Decreasing the quality of service delivery	Impaired work quality due to trying to provide care in difficult conditions [23] Decreasing the quality of telehealth care compared to face-to-face [26] Reduction of expected productivity in teleworking [33]
5	Negative impact on medical education	Increasing the workload of students [27] Disruption in the teaching of the anatomy lesson [27] Increasing the amount of fraud and collusion in non-attendance training [27]

(*continued on next page*)

Table 4 (*continued*)

Row	Themes	Sub Themes
		It is more difficult to provide content online compared to face-to-face training [27]
		Preference of face-to-face practical classes over online practical classes among academics [27]
		Compromise of training, especially in ultrasound and interventional radiology due to reduced face-to-face interaction [30]
6	Financial disadvantages for healthcare providers	Wage reduction [26]
		forced to stop working (fired or on leave) [26]
		Lack of funding for telecommunications equipment [30]
		Concerns about job security [36]
7	Negative impact on providing healthcare services to patients	Telehealth is not suitable for people with mental disorders such as anxious and personality disorders [29]
		The difficulty of providing services to children and disabled people [29]
8	Occupational injuries	Moral damage related to the failure to provide quality care services [23]
		More responsibilities and longer shifts [23]
		emotional exhaustion [23]
		Feeling pessimistic about job duties due to separation from work [23]
		Burnout [23]
		Work imbalance [25]
		Disruption in personal life due to interference between job duties and household affairs and [25]
		The tediousness of working with telehealth systems [28]
		Increasing work pressures and job burnout among employees [28]
		Increasing workload at home (especially at the beginning of use) [29]
		Decreased sense of personal success among physicians [36]
		Negative experiences of working at home [36]
9	Failure to accept technology	Forced to quickly adapt to teleworking and providing services via telephone, video and other new online platforms [28]
		Lack of knowledge about how to use the system [29]
		Lack of knowledge of most staffs on how to compress data for downloading on their remote workstation [30]
		Problems related to conveying bad news [31]
		Not being able to use technology among some groups of users such as the elderly [34]
		The negative attitude of some people towards receiving health services from a telehealth service system [35]

using ICT caused positive benefits for the patients and the organization, including productivity improvements. In teleworking, organizations are influential in choosing the optimal workforce. By teleworking, they can entrust the work to experts with more ability and capability, improving productivity to some extent [44].

Policymakers can promote the dissemination of best management practices, self-management skills and ICT, investment in home offices, and fast and reliable broadband across the country, to improve teleworking gains [48]. The results of Alfaleh et al.'s study [49] showed that doctors working in medical centers are primarily satisfied with teleworking in terms of job nature and productivity.

Ozimek et al., in their study, show how to increase the productivity and welfare inherent to employees using general teleworking tools. They referred that the managers and policy-makers should increase investments in telework and address potential concerns for worker well-being and longer-term innovation.

4.1.9. Patient support

The spread of COVID-19 caused public health concerns but also caused many psychological diseases, including anxiety, fear, depression, irritability, sleep disorders, and post-traumatic stress disorder (PTSD) [50]. In this condition, it is necessary to maintain a state of mental health of people. Teleworking was one of the effective tools used to support patients by providing remote consultations and monitors, recommendations and improving self-management and self-care skills. Teleworking technologies have supported both infectious and non-communicable chronic diseases during COVID-19 [51].

4.2. Disadvantages of teleworking in healthcare centers during the COVID-19

4.2.1. Disruption in the process of providing healthcare services

The use of information technology in health care organizations and providing remote services is facing challenges. During COVID-19, due to reasons such as the creation of new tasks for employees [23], the difficulty of conducting specialized examinations using teleworking [24], and the difficulty of coordinating visits [29], these challenges became more prevalent. Providing common mechanisms for the use of information technologies in a written form in healthcare centers during crises and pandemic conditions and considering all needs and issues can help in the successful implementation of teleworking. The suggestion is that the model of using information technology in providing services in an era similar to Covid-19 in healthcare organizations should be presented.

4.2.2. Reduced interactions of health service providers, patients etc.

Establishing telecommunication has always encountered challenges in interactivity and complete transfer of concepts between the two sides of the communication. This problem has caused that, in addition to the many advantages of long-distance communication, this type of communication has not been able to replace face-to-face communication [52]. The study results have also emphasized that telecommunication has faced challenges in interactions between different groups such as healthcare providers, patients and their families, and students of different fields of medicine. Although using ICT tools is essentially aimed at improving communication among people, during COVID-19, some people with special characteristics of using information technology and receiving remote services caused problems. For example, in some situations, parents can't place their child in front of the telemedicine system screen. Also, healthcare service providers could not allocate excessive time to this connection [29].

Because telecommunication could not bring 100% effectiveness in health care centers in the era of Covid-19, it is suggested to use a combination of communication methods (face-to-face-virtual). And to prevent the spread of the disease, the published recommendations and guidelines by healthcare organizations should be emphasized, and their implementation should be monitored. In the combined methods, both for providing medical education services and for providing healthcare services, essential services that require the presence of patients and other services that do not require the presence of people will be provided virtually based on information technology platforms.

4.2.3. Lack of facilities and supports

The fact is that the implementation of remote work programs and the provision of remote health services widely in the era of Covid-19 required the use of different facilities and infrastructures [53], and providing these facilities to health care officials in different regions is facing increasing challenges. Other issues are the lack of sufficient mechanisms to support teleworkers [27], insufficient training and support [25], and technical issues and logistics management in the field of medical education [27], which uses teleworking in healthcare

organizations during the COVID-19 has faced many challenges.

The study by Wang et al. in Japan showed that teleworkers' greatest discomfort during the COVID-19 pandemic was related to insufficient technology, desktop space, and slow internet speed.The study by Ganster et al. showed that teleworkers need support and training to adapt to the conditions of teleworking.4-2-4 Decreasing the quality of service delivery.

There are many differences of opinion about the quality of service delivery during COVID-19 based on telehealth, so more studies should be conducted concerning the quality of telehealth services during the period of COVID-19 so that a more accurate judgment can be made. Decreasing the quality of telehealth compared to face-to-face care [26] during COVID-19 was one of the main challenges of using teleworking. These efforts seem to require instructions, training, and careful attention to technological barriers and interpersonal relationships [54].

4.2.4. Negative impact on medical education

Undoubtedly, one of the main parts of human life that suffered severe damage after the spread of Covid-19 was the field of education in various areas and levels [55]. Medical education was one of the educational fields that faced many challenges following the wide spread of Covid-19. Due to medical education's impact on society's health, educational officials thought of using non-attendance methods based on health information technology to reduce students' attendance. For this reason, the model of regular education in various fields, especially medical education, has moved towards education based on information technology based on Fig. 2.

Based on Fig. 2, a general model of regular education and information technology-based education from the perspective of researchers, the use of information technology and remote education should be carefully put on the agenda and never did not give used as a substitute for regular education methods in medical education.

4.2.5. Financial disadvantages for healthcare providers

In terms of financial disadvantages, it can be mentioned in two categories, one related to the providers and the other related to the provision of equipment for the providers. The prevalence of COVID-19 in the world affected the employment situation in different parts, and in some cases, healthcare providing centers also took forced leave or fired their employees [26]. Their wages also decreased with teleworking programs and reduced personnel shifts in some health care centers [26]. This created serious challenges and jeopardized their job security. It is suggested to use rational financial incentives and sustainable financial resources to provide services in the case of teleworking programs, and do not retrench as much as possible.

4.2.6. Negative impact on providing healthcare services to patients

Based on the results, the negative effects of teleworking include cases such as inappropriate use of telehealth for patients with mental disorders [29] and the difficulty of providing services to children and disabled people [29]. But it seems that these effects are more, and so far, few studies have been done in this field. This issue is very important in performing tasks in health care centers; teleworking can never replace the provision of direct services and should only be used as a support tool.

4.2.7. Occupational injuries

Occupational injuries were one of the broadest dimensions of the harms and disadvantages of using teleworking in health care centers during the Covid-19 era. These injuries are divided into two categories: behavioral injuries and physical injuries. One of the inherent disadvantages of teleworking, the use of information technology services to perform work tasks remotely, is the loss of the boundary between home and work when working from home [25]. This problem can lead to negative experiences from working at home [36], such as not it brought work balance [25], emotional fatigue [23], and sometimes increased work pressures and job burnout among employees [28]. In this regard, the results of study Megan et al. showed that teleworking has a negative effect on people's physical health of university faculty and staff. The review study by Julia et al. showed that professional ergonomic assessments should be performed that consider healthy design workspaces to reduce physical injuries during teleworking [19].

4.2.8. Failure to accept technology

The use of information technology tools among the organization's employees has always faced resistance and has created challenges in their successful implementation [56]. Of course, implementing remote

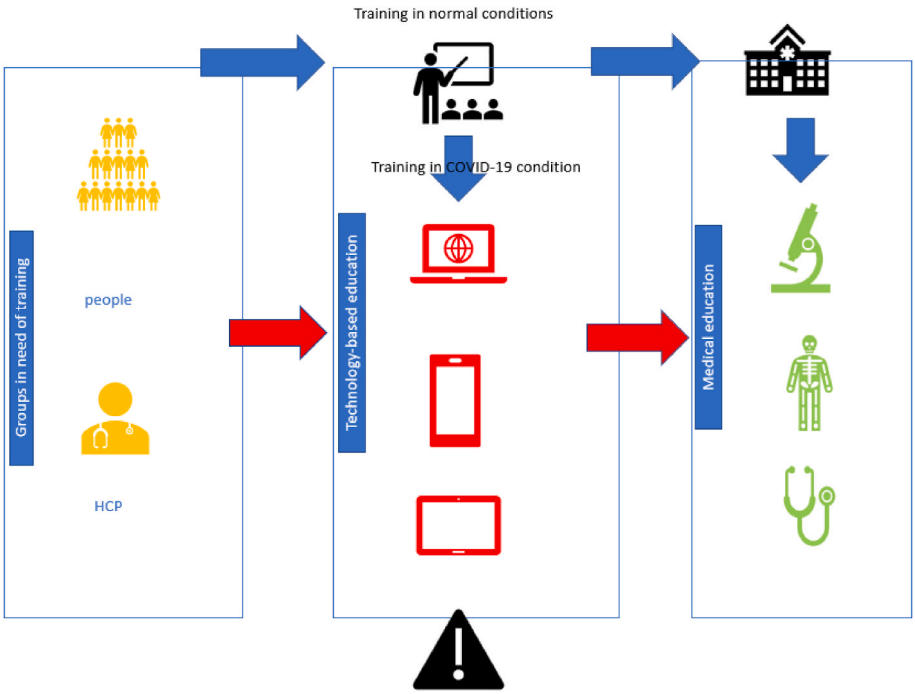

Fig. 2. Regular medical education and IT based medical education.

work programs for service recipients, especially groups with low ability to use information technology, such as the elderly, is also associated with many challenges, which have faced difficulties in accepting them. Due to the sudden and unplanned use of teleworking programs, the personnel were forced to use them, which can significantly affect the quality of providing healthcare services based on this approach.

In this regard, the results of the study Arvola et al. [57] showed that older people are less inclined to teleworking due to their low computer skills.

4.2.8.1. Limitations of the study. Unfortunately, the full text of some papers was not available and this was considered as a limitation of this study, which might have influenced the findings of the study.

5. Conclusion

In this study, we have thoroughly reviewed and categorized the advantages and disadvantages of teleworking during the COVID-19 period, which can be considered a road map. In order to make proper decisions on the use of teleworking in situations such as COVID-19, solutions were presented for each of the categories in the study so that officials and decision-makers can take the necessary decision by examining the existing situation and considering the mission of the organization.

Although teleworking in the era of COVID-19 is a powerful solution to many problems in healthcare institutions, it is also associated with obstacles, the identification of which leads to better planning for its use. Managers must have policies and guidelines to use appropriate technologies, provide facilities and continuous support, and increase interactions between healthcare providers and patients to resolve these problems.

Based on the study results, to achieve more accurate results on the effects of teleworking in healthcare organizations during COVID-19, to predict and make the right decisions in similar critical conditions, it is suggested to conduct more studies about these technologies implemented. Also, it recommended using phenomenology studies to examine the experiences of organizations, healthcare providers, and patients. It also suggested studying the advantages and disadvantages of teleworking and the key effective factors in its successful establishment and development by carrying out teleworking projects for different departments of the organization in different time frames.

CRediT authorship contribution statement

Ali Garavand: Conceptualization, Supervision, Methodology, Investigation, Writing – original draft, Writing – review & editing, Data collection, Formal analysis. **Samaneh Jalali:** Methodology, Investigation, Writing – original draft, Writing – review & editing, Data collection, Formal analysis. **Ali Hajipour Talebi:** Investigation, Writing – original draft, Writing – review & editing, Data collection, Formal analysis. **Azam Sabahi:** Conceptualization, Supervision, Methodology, Investigation, Writing – original draft, Writing – review & editing, Data collection, Formal analysis.

Declaration of competing interest

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

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