COVID-19 and Care for the Elderly in Long-Term Care Facilities: The Role of Information Communication Technology

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Abstract

Objective. To review the changes in communication in long-term care facilities (LTCF) during the COVID-19 pandemic. **Methods.** A systematic literature review was conducted through a keyword search of the PubMed and Ovid Embase databases. In accordance with the inclusion and exclusion criteria, 11 articles were selected and analysed qualitatively. **Results.** The use of information communication technology was heterogeneous, and it was used to bring together several different groups of users: LCTF residents' families, hospitals, specialists, and general practitioners. The modes of communication and preferred ways to reduce the social isolation of LTCF residents from their family members were described. Various smartphone applications have been designed for both socializing and the use of telemedical solutions. Opportunities for peer-to-peer social interaction between the elderly through information communication technologies have been neglected. **Conclusion.** Video calls may bring greater satisfaction to residents and their families. Telemedicine and interdisciplinary cooperation between healthcare professionals have increased the quality of medical care in long-term care institutions during the COVID-19 pandemic.

Introduction

The COVID-19 pandemic has changed the way work is done at LTCFs and revealed many shortcomings. On the one hand, staff have worked to protect institutionalized elders, whereas on the other hand there has been an outbreak of ageism within society and the media (1, 2). Regions of Italy in which families are more fragmented and inclusion in LTCFs is more accessible were affected more severely in the first wave. At the same time, the official statistics underestimated the number of deaths directly or indirectly related to COVID-19 (3, 4). A high percentage of deaths took place among the elderly in LTCFs. This was also the reason why numerous recommendations and guidelines were accepted to prepare LTCFs for potential further COVID-19 outbreaks (5-7). With the intention of preventing the spread of the virus, many chose a strategy of partially or completely banning physical contact between LTCF residents and their loved ones. Due to concerns that inadequate physical contact and social isolation would cause a deterioration in their physical and psychological health, calls were made to enable residents to maintain active contact with their families, and communication shifted to the virtual domain (8-11).

COVID-19 also brought about some welcome changes, such as stronger communication between different levels of health care, and better connections between different medical disciplines and LTCF staff to provide better quality care for residents in LTCFs (6). The development of communication information technology in recent decades has enabled the rapid development of communication channels. Communication between healthcare workers has moved to smartphones and the

internet, both within and outside institutions. Healthcare workers and LTCF staff have remained in touch through regular phone calls, e-mail, and video conferences, using various platforms (6, 12). Telemedicine has experienced a breakthrough. In France there was a 15-fold increase in the number of teleconsultations in March 2020 compared to February 2020 that were probably made in primary care. A hospital in France, that had already been using teleconsultations in LTCFs since January 2018, did not see any increase in the number of teleconsultation in the same time period (13). However, the truth is that there are very few institutions that have the option of telemedicine. In Switzerland, only 3.9% of 466 LTCFs used teleconsultations (14). Inadequate basic infrastructure and technical equipment remain a problem for LTCFs. A question worth asking is whether internet accessibility will become an essential human right (15).

The aim of this research was to systematically review the changes in long-term care facilities (LTCF) during the COVID-19 pandemic.

Methods

This review article investigates the role of information communication technology in LTCFs for the elderly in different countries around the world during the COVID-19 pandemic. The methods and times of searching PubMed and Ovid Embase are shown (16, 17). The keywords used for searching — long-term care facility, COVID-19, and information communication technology — were expanded using their synonyms. Boxes 1 and 2 present the search strings in full, synonyms included.

A qualitative methodology of analysis and synthesis was employed to evaluate article quality. The articles were defined on the basis of their research design, and the research patterns, goals and results were reviewed. After this qualitative analysis, a quantitative description of the research designs was also carried out.

The PubMed search yielded 34 documents. Ovid Embase returned 198 documents; after applying the additional filters "aged" and "article" this was reduced to 44 articles, which were included in the step-by-step review using the PRISMA 2009 Checklist. After removing duplicates, 70 articles were examined. After examining the titles and abstracts of the articles, inclusion and exclusion criteria were used to further analyse 32 articles:

- Inclusion criteria: elders, elders in institutional care, information technology (IT), social isolation.

Nursing Homes [Mesh] OR Residential Facility OR Assisted Living Facility OR Extended Care Facility OR Skilled Nursing Facility OR Old Age Home OR Home for the Aged OR Long Term Facility OR Long Term Care Facility OR Care Home OR Long Term Care Home) AND (Covid-19 OR coronavirus OR SARS-CoV-2 OR severe acute respiratory syndrome coronavirus 2 OR COVID-19) AND (Cell Phone[Mesh] OR cell phone OR cellular phone OR mobile phone OR computer OR smartphone OR ipad OR gadget OR Apps OR communication OR Information Technology [Mesh] OR IT OR Telemedicine OR device OR iphone.

Box 1. List of keywords used to search PubMed (November 28th, 2020) (16).

Nursing home OR long term care Facility OR long term Facility OR Residential Facility OR Assisted Living Facility OR Extended Care Facility OR Old Age Home OR Skilled Nursing Facility OR Home for the Aged OR Homes for the Aged OR Care Home OR Long Term Care Home) AND (covid-19 OR coronavirus OR Sars-Co-2 OR severe acute respiratory syndrome coronavirus) AND (telemedicine OR information technology OR Cell phone OR cellular phone OR mobile phone OR computer OR smartphone OR ipad OR gadget OR Apps OR communication OR IT OR device OR iphone.

Box 2. List of keywords used to search Ovid Embase (December 1st, 2020) (17).
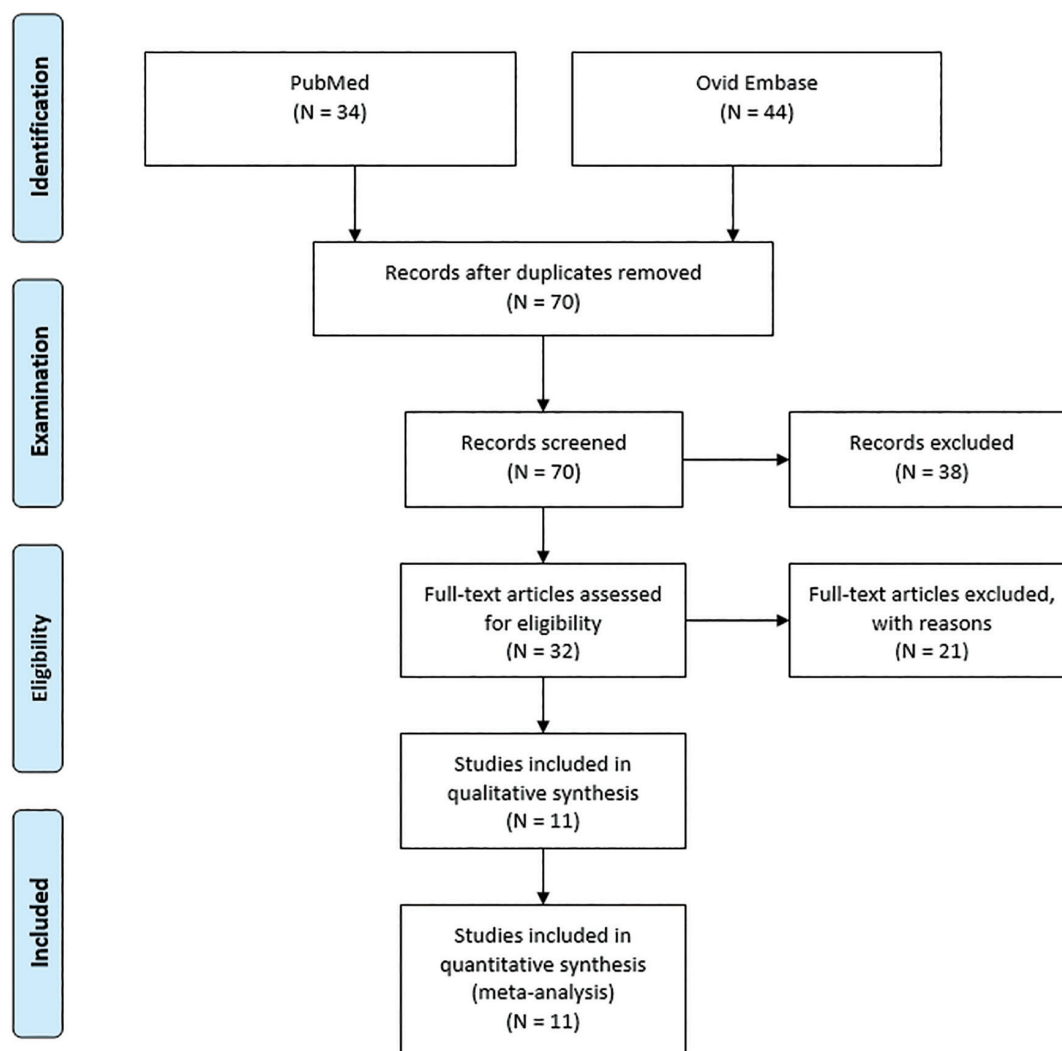
Figure 3. Step-by-step article examination based on PRISMA 2009.

- Exclusion criteria: use of IT for diagnostic purposes, use of IT for data analysis

Thirty-two articles were examined in all. After this step, 11 articles were reviewed in more detail (18-28). Figure 3 shows the decision process.

Results

This systematic review encompassed five population-scale case studies (50%), four cross-sectional studies (40%), one review article (10%), and one qualitative ethnographic study (10%), listed in Table 1. Due to the heterogenous study designs, quantitative analysis was not undertaken.

Table 1. Articles Reviewed

Author	Title, study design, description, place	Sample, goal, result
Archbald-Pannone LR (18)	"COVID-19 collaborative model for an academic hospital and long-term care facilities".	Sample: US region
		Goal: Central support for optimal geriatric and palliative care in LTCFs during the COVID-19 pandemic.
	Population-scale case study: telemedicine consultations played a vital role in connecting hospitals (geriatric-palliative team) with local LTCFs, United States, 2020.	Result: Telemedicine consultations: 12 institutions contacted, five taking part (5/12), outbreak at two institutions, 12% and 19% mortality from COVID-19, respectively.
Harris DA (19)	"Rapid telehealth-centered response to COVID-19 outbreaks in postacute and long-term care facilities".	Sample: One LTCF with 48 residents, 41 of them positive for COVID-19.
		Goal: Managing/overcoming the outbreak of COVID-19 in LTCF with the help of teleconsultations.
	Population-scale case study: the influence of daily teleconsultations on the rate of hospitalization and mortality from COVID-19	Result: Quick implementation of teleconsultations and daily videoconferences between LTCF staff and a multidisciplinary team from the university health center. Hospitalization rate 37.5% (18/41), mortality 12.5% (6/41); in 1 month after the outbreak 13 teleconsultations were made, after which nine residents remained in LTCF care.
Koeberle S (20)	"COVID-19 outbreak: organisation of a geriatric assessment and coordination unit. A French example".	Sample: Region in France.
		Goal: Reorganization and centralization of health care, connecting hospitals, gps and LTCFs through a call center and a centralized data center at a university hospital.
	Population-scale case study: setting up a call center intended for healthcare workers at different levels, evolution of appropriate software, centralization of data, France, 2020.	Results: 235 calls in 16 days, of which 189 calls were for determining level of care, 99 referred to LTCF residents, 18 referred to residents in assisted living facilities, and 72 calls were from the home environment. Rate of hospitalization: 11/99 in the LTCF, 2/18 in assisted living facilities, 38/72 in the home environment.
Shrader CD (21)	"Responding to a COVID-19 outbreak at a long-term care facility".	Sample: LTCF, US.
		Goal: Mastering the COVID-19 outbreak in LTCFs at three levels: containing the spread of the disease, therapy, communication.
	Population-scale case study: Zoom for communication between management and staff with family members, introducing video calls for communication between residents and their family members, United States, 2020.	Result (only communication described): Communication of management with staff and family members of residents, phone calls by loved ones were replaced with Zoom meetings. Weekly calls were set up between a group of loved ones and management/staff. Use of video calls between residents and loved ones with the help of staff.
Ohligs M (22)	"Employment of telemedicine in nursing homes: clinical requirement analysis, system development and first test results".	Sample: One rural LTCF in Germany and one GP, physician–patient relationship already established.
		Goal: Setting up teleconsultations by the GP with the LTCF, lowering the rate of emergency service use.
	Population-scale case study: implementing telemedicine in one rural LTCF with a connection between the LTCF and the GP. To implement telemedicine into the GP's office, regulation changes were necessary.	Result: In 7 months 56 routine and urgent consultations were made, and there was one hospitalization.

Table 1 (continued)

Author	Title, study design, description, place	Sample, goal, result
Sacco G (23)	"Communication modality preferences by frail hospitalized and institutionalized older adults during COVID-19 confinement: a cross-sectional survey".	Sample: 163 elders in isolation on a geriatric ward or in a LTCF.
		Goal: Determining the mode of communication preferred by the elderly (phone call vs. Video call) using a survey. Determining the percentage of elderly that can communicate independently, satisfaction after completed mode of communication, differences in relation to age and place of care.
	Cross-sectional study: Phone call vs. video call in a geriatric ward and a LTCF. Elders in geriatric wards were more independent, it was more likely that a phone call would suffice, in the LTCF there was higher satisfaction with a video call with the assistance of staff, France, 2020.	Result: Elders preferred a phone call (55.3%) to a video call (44.7%), satisfaction after completed communication was similar (87% vs. 89%), age and gender did not influence their preference. Elders on the geriatric ward found it easier to establish communication (22.8%) than LTCF residents (3.8%), phone calls made them more independent than video calls (30.1% vs. 5.1%), hospitalized patients were more satisfied with communication than LTCF residents (92% vs. 74%), and LTCF residents were more satisfied after a video call.
Gallo Marin B (24)	"Experiences of Rhode Island assisted living facilities in connecting residents with families through technology during the COVID-19 dandemic".	Sample: 46 institutions that received 254 tablet computers.
		Goal: Reducing the social isolation of the residents.
	Cross-sectional study: survey, donation of 254 tablet computers to LTCFs from nonprofit organizations, wi-fi is a requirement, Rhode Island, US.	Result: 11 of 46 LTCFs participated (24% response), 63.6% of institutions used tablets for more than one purpose: video calls 90.9%, communication of staff with loved ones 36.4%, telemedicine 36.4%, social care 27.3%, free time 27.3%, other 18.2%, administration 9.1%.
Monin JK (25)	"Family communication in long-term care during a pandemic: lessons for enhancing emotional experiences".	Sample: 168 family members/friends, LTCF residents.
		Goal: To evaluate nine modes of communication (window + phone, Facebook, mail, SMS, letter via staff, videoconference, letter via postal service, sent objects, phone) using the Positive and Negative Affect Scale.
	Cross-sectional study: mode of communication (without personal visits) related to higher positive and lower negative experience of LTCF residents and their loved ones, on-line survey, US, 2020.	Result: Family members assessed their own satisfaction as greater than the residents', the most-used mode of communication was a phone, a higher frequency of phone calls was related to fewer negative emotions, a higher frequency of electronic mail use was related with more positive emotions, letters were related to more negative emotions with family members as well as residents, speed of communication or synchronous communication was related to more positive emotions. Video conferences were not related to either more positive or less negative emotions. Shortcoming: The study was carried out on family members, who assessed their own feelings and the feelings of the resident.
Siu HYH (26)	"A cross-sectional survey assessing the preparedness of the long-term care sector to respond to the COVID-19 pandemic in Ontario, Canada."	Sample: 240 physicians, 54 nurses; those invited were members of expert organizations involved with care at LTCFs.
		Goal: Using a survey to determine how physicians and nurses assess LTCF preparedness for a COVID-19 outbreak.
	Cross-sectional study: physicians at LTCFs assessed how institutions are ready for an epidemic, implementation of guidelines, cooperation between management and LTCF physicians, Ontario, Canada.	Result: 160 out of 294 invited (54% response) took part in the study, none of the returned surveys was excluded. The survey was completed mainly by physicians (80%) from an urban area (87.3%). Five most common measures: 1) isolation protocol for respiratory infections (92.5%), 2) active testing of new admissions (90%), 3) staff education (83.1%), 4) active coordination with local public health service representatives (83.1%), 5) encouraging ill staff to stay home (83.1%). 38 of the participants mentioned the established virtual health solution (5/160, 3.1%).

Table 1 (continued)

Author	Title, study design, description, place	Sample, goal, result
Banskota S (27)	"15 smartphone apps for older adults to use while in isolation during the COVID-19 pandemic".	Sample: 15 top-ranking apps in the field of 1) social networks, 2) medicine, visual and hearing aids, 3) health and fitness, 4) food and drinks.
		Goal: To find cheap and accessible apps that would help elders during a pandemic with lowering social isolation as well as with food supply, maintaining health, and health care.
	Review article: 15 selected Apps on iOS or Android devices most suited for use by the elderly, study made using the PRISMA principle, USA, 2020.	Result: Selected 15 apps, elders can use smartphones with adequate training. Shortcoming: The article refers to the elderly in general, but such apps could be used by elderly people in LTCFS.
Zamir S (28)	"Intergroup 'Skype' quiz sessions in care homes to reduce loneliness and social isolation in older people".	Sample: Three LTCFs, total of 87 residents with dementia and eight staff members.
		Goal: Connecting elders, peer-to-peer communication, socialization inside and outside LTCFs.
	Ethnographic design: Informal feedback, diary and semi-structured interview with resident and staff, researchers used video quiz via Skype in which several LTCF residents participated. Great Britain.	Result: Staff inclusion was mandatory for preparation and technical support, and staff also participated. After three meetings, residents became competitive and each LTCF had a top star that knew the answers to many of the questions. Residents memorized the top star resident. Residents from different LTCFs that had things like place of residence or professions in common reached out to each other. They remembered the answers, not the technology (they did not recognize the equipment after retaking the quiz). Eventually the number of residents participating grew. Residents expressed positive emotions. Cohesion within LTCFs and between them increased. The only negative emotion was uneasiness regarding its outlook. Shortcoming: Equipment difficulties, time strain on the staff.

US=United States; LTCF=Long-Term Care Facility: GP=General practitioner.

To sum up the first five population-scale case studies, three of them used information communication technology to connect hospitals with LTCFs, two used telemedicine solutions (18, 19), and in one case a call centre was set up with centralized data support (20) At one LTCF, information communication technology was used for communication at the LTCF and at home with family members (21). In Germany, a rural GP's office was similarly connected because of prior familiarity

Table 2. Use of Information Communication Technology during the COVID-19 Pandemic

Mode of use	Participants				References
	Healthcare staff	LTCF staff	Residents	Family members	
Professional use					
Interpersonal cooperation among healthcare workers	+	+	−	−	18, 19, 20, 26
Telemedicine services	+	+	+	−	18, 19, 21, 24, 26, 27
Communication between staff and family members	+	+	−	+	21, 24
Reducing social isolation					
Communication between residents and family members	−	-	+*	+*	20, 21, 23, 25, 26
Peer-to-peer social contact	−	+	+*	+	27, 28

LTCF=Long-Term Care Facility; *Communication took place in most cases with the help of staff.

with the residents (22). Three cross-sectional studies describe communication and preferential uses of various communication modes for connecting residents with their loved ones and reducing social isolation in two cases (23-25). One cross-sectional study focuses on LTCF staff assessment of their level of preparedness for the COVID-19 outbreak. This study indirectly reveals that only a small percentage of staff (3.1%) used telemedicine to prepare for the COVID-19 pandemic better (26). The selected articles also include a review article, which lists 15 appropriate apps for use on smartphones intended for elders. Apps are intended to help with socializing as well as telemedicine, everyday needs, or as an aid for visually impaired and hearing impaired elders (27). The ethnographic study was intended for peer social contact among the elderly using a video quiz, which required substantial help from staff (28).

Discussion

All the articles in this review, which explores the impact of information communication technology in LTCFs during the COVID-19 pandemic, can be divided into two parts by intention of use: professional use and reduction of social isolation. Most articles focus on using information communication technology as a tool to improve communication among healthcare workers from various backgrounds and between healthcare workers and non-healthcare workers. Information communication technology enables interpersonal cooperation between professionals from different professions, either by using video conferences, setting up a call centre, or using telemedicine (18-20, 22, 24, 26, 27). Interpersonal cooperation and the use of telemedicine greatly reduced both the hospitalization rate and the mortality of LTCF residents during the first wave of the pandemic. The authors report the mortality numbers as 12%, 12.5%, and 19% respectively (18-20).

The second part of the article concerns social contact, mainly describing communication between residents and their family members, an elder's communication with the environment, or between staff and family members (20, 21, 23, 26,

27). Information communication technology was used to reduce social isolation. Conclusions regarding the various modes of communication are inconsistent. Whereas Cochrane's meta-analysis in Noone et al. concluded that video calls do not reduce elders' feelings of loneliness, Sacco et al. discovered that most elders preferred a regular phone call (55.3%) to a video call (44.7%) (23, 29). The elderly also found it easier to make a phone call independently. Satisfaction after communicating was similar (87% vs. 89%). An important data point is that the elderly on geriatric wards find it easier to establish communication on their own (22.8%), in contrast to LTCF residents (3.8%), who expressed greater satisfaction after a video call (23). In practice, residents suffering from dementia may also decline video calls, and in solitary cases a phone call has proven to be a better solution.

From the viewpoint of care and research, too little emphasis is placed on ways to connect the elderly with one another within LTCFs or other types of institutions. Undoubtedly, the way people chat with someone who shares memories regarding the same profession or living environment is different. This is how various apps either entertain us or offer us a chance to broaden our social circle (27, 28). This article offers a review of various ways to use information communication technology in long-term institutionalized care. The communication solutions most frequently used were detected. The COVID-19 pandemic has set new practices in motion in many different areas, many of which are still being studied. It is possible that some relevant articles or other ways to use information communication technology have been overlooked.

LTCFs are an ideal environment in which to evolve telemedicine. It would make sense to develop telemedical support for LTCFs based on the regional areas and hospitals with which they most commonly cooperate. At the same time, telemedical support could be provided by GP offices due to a shortage of LTCF physicians in some areas. Coordinated action between regional hospitals, LTCF physicians, LTCF staff, and emergency services would enable better quality of care, and reduce hospitalization rates (30, 31).

In recent years, care for elderly individuals with accompanying chronic illnesses has become complex, and LTCF physicians have had to learn more about geriatric care, rehabilitation, and palliative care. The Netherlands saw the development of education in the area of institutionalized medicine, mostly among European physicians that work in LTCFs and who are GPs or family medicine physicians (32). LTCF physicians in Slovenia are mostly family medicine specialists. Slovenia needs to prepare a training program for LTCF physicians, and push to change regulations to enable the development of telemedicine and interdisciplinary cooperation (22, 33). Many training programs should also be prepared for nursing staff. It is known that nurses are often sceptical of vaccinations by medical staff (34). The Hesitancy in the COVID-19 vaccination programme could affects communication strategy in LCTFs.

Conclusion

Video calls at LTCFs performed with the help of staff bring greater satisfaction to residents and family members, but in a hospital environment this connection was not found. The COVID-19 pandemic has accelerated the process of bringing LTCFs into contact with hospitals and cooperation among healthcare workers with the aid of information communication technology. Telemedicine services were used frequently. Institutional lockdown in the COVID-19 pandemic has shaken established procedures in LCTFs. It has indicated the impoverished use of software and audio-visual modes of communication. On the part of users, social isolation stood out. Tensions arose on the part of employees due to differences in professional instructions and doubts posted on social media. We believe that it is therefore necessary to initiate education. Elderly residents should be educated about the use of mobile and electronic applications that could reduce social exclusion. Evidence-based decision-making should be promoted between employees, which can be carried out through video and teleconferences between different experts or webinars. Future quantitative and qualitative studies of quality eldercare in long-term care facilities is needed.

Conflict of Interest: The authors declare that they have no conflict of interest.

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