

# Experiences of health and social professionals using care technologies with older adults during the COVID-19 pandemic: A qualitative study

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## Abstract

**Objective:** To investigate the perceptions and experiences of health and social care professionals concerning the use of technology for the care of older adults during the COVID-19 pandemic.

**Design and measures:** A phenomenological qualitative, exploratory, and descriptive design using semi-structured interviews.

**Sample:** Twenty Spanish health and social care workers in six Spanish cities between February and July 2021, during the COVID-19 pandemic.

**Results:** During the COVID-19 pandemic care workers have become more familiar with technology devices, but they also recognize certain barriers for the implementation of technology, mainly in nursing homes and homecare, related to concerns of lack of humanization and difficulties in accessing and using these devices.

**Conclusion:** Politicians and social and healthcare managers should be aware of the benefits of techno-care, reducing the difficulties in implementing it and making more funding and further training available to care providers.

## KEYWORDS

care technology, elderly, health technology, information technology, nursing care

## 1 | BACKGROUND

The use of technology has been on the rise in care practices over the last few decades, driven by the advent of the internet and mobile devices, and in particular by the development of artificial intelligence. As a result, healthcare has undergone profound changes that have resulted in better care and more favorable outcomes (Nurock, 2020).

Healthcare has long been supported by technology: for example, wheelchairs, gait aids, prostheses, implants, and hearing aids were developed to help individuals to develop their abilities and attend to their diverse needs (García & Martín-Palomo, 2021; Mol et al., 2010), while ventilators, catheters, non-invasive surgeries, and medical apps were designed to assist medical and health professionals (Neuman et al., 2012).

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More recently, modern trends like big data, 5-G, wireless sensor network, human-robot collaboration, and artificial intelligence (Wang & Wang, 2021), have brought sweeping changes, for example, empowering people with dementia by enhancing their capacity to live longer and more independently (Löbe & AboJabel, 2022).

The current SARS-CoV-2 pandemic has increased our awareness of the vulnerability of human beings (García-Selgas & Martín-Palomo, 2021). In this new scenario, the interaction between human beings and artificial intelligence has proved fundamental in maintaining life in different fields of care giving (León, 2020).

During the periods of lockdown, while the use of ventilators, tomography, and cardiac monitors proved essential for saving lives, mobile devices played a key role in promoting communication (Badanta et al., 2021; Jutai & Tuazon, 2022; Juvonen et al., 2021). Indeed, previous studies have already documented the use of technologies by health professionals during the pandemic to manage appointments, diagnose infections, or follow up contacts (Agencia Española Protección Datos, 2020; Williams et al., 2020).

Several authors have also pointed out how the implementation of care technologies with older people and dependents during the pandemic played a central role in promoting support and solidarity under social distancing (Blades et al., 2020) and in providing material and emotional care (Bodoque et al., 2022), such as the mobile-based cognitive interventions aimed at improving older adults' executive function and memory (Ha & Park, 2022). This is known as techno-care: those benefits offered by the new information and communication technologies and that are beginning to replace personal attention or traditional technical aids, in dependent people or with limitations to carry out the daily life activities (Méndez et al., 2014).

Despite the positive use of care technologies during the COVID-19 pandemic, it is important to highlight that some negative aspects exist, such as difficulties with access and inequalities of use, physical barriers (Fernández-Prados et al., 2021), loss of humanization in the treatment, lack of privacy, and low internet speed (Abuhammad et al., 2020; Garfin, 2020; Haase et al., 2021; León, 2020).

In addition to these challenges, there is a certain degree of reluctance from health and social care workers to accept the use of technology, which may hinder its correct utilization for health care. In this context, taking into account the opinions and perspectives of health and social care professionals on the use of technology could help administrators to provide modern, comprehensive care currently and in the future.

To bridge this gap, the present study aims to investigate the perceptions and experiences of health and social care workers concerning the use of care technologies with older adults during the COVID-19 pandemic.

## 2 | METHODS

### 2.1 | Design

This study is part of a larger mixed-methods project entitled "Sustainability of care for people in a situation of dependency: experiences and dilemmas in designing techno-care (P18-TP-2624)", which has been conducted between January 2020 and June 2023.

In the present study, we opted to use a qualitative, exploratory, and descriptive design using a phenomenological approach (Hernández et al., 2014), as this allows us to explore a particular topic of interest in a specific context, and to perform an analysis focusing on subgroups rather than involving entire societies.

Data collection consisted of semi-structured interviews, conducted by six multidisciplinary researchers who were experts in sociology, social work, social education, nursing, anthropology, and philosophy. The interviews were conducted in six Spanish cities between February and July 2021, during the COVID-19 pandemic.

This research followed the Consolidated Criteria for Reporting Qualitative Studies (COREQ) (Tong et al., 2007) (see the [Supplementary Material](#) "Annex I").

### 2.2 | Population and setting

The sample consisted of professionals working with the older population at public and private institutions, such as hospitals, nursing homes, and home care. The inclusion criteria required interviewees to be health and social care workers, over 18 years old, and who were working during the COVID-19 pandemic. Unemployed professionals or informal caregivers (family members) were excluded.

The participants were then selected to include both males and females, from different backgrounds (licensed practical nurses (LPN), registered nurses (RN), homecare assistants, and psychologists) and levels (managers and micro-level workers), and those working in different cities in Spain (Almería, Granada, and Málaga in Southern Spain; Madrid, the Spanish capital; Murcia (Eastern Spain), and Bilbao (in the North). The intention was to increase the relevance of our findings and their generalizability to other areas in Spain.

### 2.3 | Procedure

The main researcher contacted several Spanish health and social institutions with which she had previously worked on care projects for the elderly. Purposive and snowball sampling were used to select the participants, and it was carried out using saturation criteria, whereby the number of statements was considered to be sufficient when provided no further new information (Faulkner & Trotter, 2017). This resulted in a total of 20 participants (80% females), with a mean age of 47.4 years old, representing a broad range of knowledge, relationships, and roles

in the field of geriatric, social and health care (Table 1). Specifically, most of the professionals work in the home care sector (40%) and in nursing homes (40%), mainly as health staff (65%). Their average work experience is approximately 15 years, with work experience in direct care for the elderly ranging from three to more than 30 years.

All the interviews were carried out face-to-face (one participant-one interviewer) and lasted approximately 60 min. Patients cared by these professionals were older adults from different settings (i.e., acute care services, emergency rooms, home care, nursing homes, outpatients) and having different chronic conditions. The focus was on the participants' shared behaviors and experiences, and for this reason, we worked under the assumption that they would have certain perspectives in common while providing care, even if they did not know each other (Roper & Shapira, 2000). The goal of the semi-structured interviews was to create the framework for the interviewees in which they felt comfortable to talk about sensitive issues, while also giving the researcher the opportunity to ask them to expand on certain topics and clarify any ambiguities. Finally, the interviews were audiotaped and transcribed verbatim.

## 2.4 | Instrument

The areas to be explored in the interviews were established by the researchers through a prior review of the literature within the overall project. International databases (i.e., CINAHL, Pubmed, Web of Science, SCOPUS) and research papers on technocare conducted in Spain were consulted (Arroyo et al., 2014; Criado, 2019). The interview script was made up of two parts, including information on sociodemographic characteristics and details about the use of care technologies by users and health professionals when caring for older adults, as well as assessing their use and their relationship with them. Details of the interview script are given in Figure 1.

All the questions were discussed and agreed on among the authors, based on the theoretical work of Lahera (2019) and Rivard and Lehoux (2021). A consensus among researchers was reached on the open questions. After this first stage and before interviewing the participants, two researchers from the project provided feedback on the interview script. Grammatical errors were detected and corrected, and the final version was accepted as appropriate and understandable. When the first two interviews were transcribed, they also verified the suitability of the interview process, and confirmed the reliability of the script.

## 2.5 | Data analysis

The qualitative analysis was carried out following the steps proposed by Braun et al. (2019): (1) familiarity with the data; (2) generation of categories; (3–5) search, review, and definition of themes; and (6) final report. We then carried out the transcription, literal reading, and theoretical manual categorization (no software was used). The data analysis started with a thorough reading by two researchers of the information collected (interview transcripts) in order to ascertain an overview

of the interviewees' experiences and to gain an understanding of the content. The analysis continued by organizing descriptive labels, focusing on emerging or persistent concepts and similarities/differences in interviewees' behaviors and statements, all of which were related to care, care technologies and strategies, and challenges faced when using them. Any disagreements were resolved by discussion after careful observation of the interviewees' statements. The coded data from each interviewee were examined and compared with the data from all the other participants (from hospitals and nursing homes, and home-care) to develop categories of meanings. After analyzing the codes, the themes were organized inductively, based on the similarity of the response codes.

## 2.6 | Ethical considerations

The study was approved by the University of Almería Ethics Committee (UALBIO2020/015). All participants received written and oral information about the study, including the right to withdraw and a guarantee of anonymity. All of them signed the consent form prior to participation.

## 3 | RESULTS

After analyzing the codes and ensuring the information saturation, three themes were developed, based on the similarity of the response codes: "Becoming familiar with care technologies: the growing awareness of professionals about techno-care"; "Care technologies for humanizing care during the COVID-19 pandemic" and "Difficulties in the use of technology by health professionals". A detailed description of each theme is given below.

### 3.1 | Theme 1. Becoming familiar with care technologies: The growing awareness of professionals about techno-care

In our analysis, the interviewees were more prone to use and become familiar with care technologies when they perceived them as simple and essential to their care practice. Some examples for these items were protection systems (e.g., coding systems for opening and closing doors or fire detection) and support devices used in caring for individuals (e.g., administrative medical software and apps to assist with practical work).

The interviewees highlighted that some items of technology such as adjustable beds and lifts were essential, since they improve mobility and reduce forced postures at work: "*Adjustable beds have buttons that raise the height, the head, back, feet, it's amazing (...). For us, it's kinder on our backs, to make the bed, to move patients (...), and it's a fundamental item of technology to assist a bedridden person*" (14 - male, aged 41, LPN).

In the same context, the interviewees recognized that computer records are currently part of their day-to-day lives, including medical records, medical tests, and their work schedules. In fact, most

**TABLE 1** Characteristics of the participants.

Interviewee / Code	Location	Profession or Job <sup>a</sup>	Institution	Service	Experience (years)
I-1 male, aged 65	Almería	Psychologist	Nursing Home	Psychology	Psychiatric Hospital and Nursing Home for the Elderly (Almería Provincial Government). Over 30 years' experience.
I-2 female, aged 51	Almería	Nursing homecare	Private care agency (CLECE)	Home Help Service	11 years caring for older adults.
I-3 male, aged 35	Almería	RN	Virgen del Mar Hospital (Public Health System)	A & E	Hospital, nursing homes (around 11 years) and an association of people with mental diseases. Over 15 years' total experience.
I-4 male, aged 41	Granada	LPN and Sociologist	Virgen de las Nieves Hospital (Public Health System)	Internal Medicine	14 years' experience, in clinical practice at hospitals.
I-5 female, aged 63	Granada	Physician	Primary Care Center (Public Health System)	Primary care	37 years' experience, as a primary care physician, with experience in caring in rural areas. Worked during the pandemic and is currently in early retirement.
I-6 female, aged 50	Madrid	Nursing homecare	Care work—'La Comala' Cooperative	Social services for elderly (Person-centered care)	10 years' experience, working with older adults living in home care and as an activist.
I-7 female, aged 51	Granada	Nursing homecare	Care agency (Arquisocial)	Home Help Service	19 years caring for older adults.
I-8 female, aged 61	Granada	Nursing homecare	Granada City Council	Home Help Service	20 years caring for older adults.
I-9 female, aged 41	Bilbao	Sociologist	Fundación Matia	Social services for elderly (Person-centered care)	Has worked in projects and entities related to the elderly population, NGOs for the emotional accompaniment of the elderly, and has carried out management activities for the Fundación. A year and a half of experience at Fundación Matia.
I-10 male, aged 59	Bilbao	Consultant (Psychologist)	Freelance	Innovation, design of policies and strategic plans related to social services	40 years working with people with disabilities, as well as political experience in social services.
I-11 female, aged 29	Granada	Home Help Service Coordinator	Care agency	Home Help Service	6 years' experience, in management.

(Continues)

TABLE 1 (Continued)

Interviewee / Code	Location	Profession or Job <sup>a</sup>	Institution	Service	Experience (years)
I-12 female, aged 53	Málaga	LPN	Nursing Home and public hospital	Nursing Home and Outpatient Rehabilitation Center	Over 15 years' experience in nursing homes, and less than 1 year in public hospitals, starting during the COVID-19 pandemic.
I-13 female, aged 52	Málaga	LPN	Nursing Home	Nursing Home	11 years caring for older adults.
I-14 female, aged 51	Granada	Nursing homecare	Care agency	Home Help Service	Has worked in nursing homes, care centers for people with physical and intellectual disabilities, as well as home care (over 12 years' experience).
I-15 female, aged 23	Murcia	LPN	Nursing Home	Nursing Home	4 years' experience caring for older adults in a nursing home.
I-16 female, aged 36	Almería	Nursing homecare	Nursing Home	Nursing Home	3 years' experience, caring for older adults in a nursing home.
I-17 female, aged 63	Madrid	Founding partner of a cooperative	Business Project "A3Calles"	Home Help Service (recruiting care workers for 'La Comala' Cooperative)	4 years working in care provision from the foundation of the cooperative, and 23 years' experience in management activities in NGOs. Currently in early retirement.
I-18 female, aged 31	Almería	Social educator	Nursing Home	Social educator in Nursing Home	11 years caring for dependent people.
I-19 female, aged 49	Granada	LPN	Nursing Home and Public Health Services	Sleep Disorders Center (outpatient service)	10 years working in nursing home. Less than 1 year of experience in Public Hospital.
I-20 female, aged 44	Almería	Psychologist	Nursing Home (Los Filabres)	Psychology	Experience in directing and managing centers for dependent older adults and as a trainer (over 19 years' experience).

<sup>a</sup> Profession: LPN, licensed practical nurse; RN, registered nurse.

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**Part 1. Introduction**

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*Sociodemographic information*

- Age, sex, city of residence, level of education, employment status and work experience.

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**Part 2. Semi-structured themes**

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*About care technologies*

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- What technological devices to provide care do you know? (including daily life activities) How do they work?
- What is the technology used by patients and/or their families like? Do you find any difficulty in using it?
- What tasks do you think robots can perform in the field of care? Is there interaction between them and the users?
- What do you think about using home automation to care for the elderly?
- How has the COVID-19 pandemic influenced the use of care technologies?

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*Assessment of care technologies*

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- What is your view on the use of care technologies?
  - Do you think that using devices and technology has changed the way caring is performed?
  - Do you think care technologies dehumanize or improve care?
  - What drawbacks or difficulties do you find with the use of care technologies in your caregiving work? (Debate on labor and privacy control, job reduction).
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**FIGURE 1** Interview guide.

interviewees welcomed the transition from paper to online format: *"In the past you had the user's file on paper, you wrote and filed it. Now we have a computer program, you enter the user's data, and the name appears with his/her photo, so you know who he/she is. In addition, you can see all the observations, you can mark the time he/she got up, what state he/she was in when he/she got up... postural changes, if you found the patient in a good position, etc."* (I15 - female, aged 23, LPN). These advances allow professionals to standardize their records and to have quick access to the data on a person's progress, which facilitates decision-making and the organization of work among different professionals (i.e., hairdressing appointments, cleaning the bathroom or the bed).

Another vital use of care technology according to interviewees was related to how they treat older people using software protocols for cognitive stimulation, as noted in the following excerpt: *"In the Psychology department, we have a computer for the cognitive stimulation programs [Smart Brain program], which facilitates all the work that we used to do on*

*paper. Now, with these programs, if the user progresses well, the program increases the difficulty."* (I1 - male, aged 61, Psychologist).

The perception of how useful these devices are is even greater when they can perform functions which humans are unable to do directly, which saves time, resources, travel, money, and bureaucracy. Examples of these are devices used to record information and take photographs to record the evolution of skin lesions and wounds (teledermatology), or to identify clinical and analytical parameters, which in turn helps the health professional to make quick decisions: *"The first thing you do is to take the temperature, blood pressure and oxygen saturation, and you make a decision based on that, such as "you have to put on a mask or nasal oxygen cannulas", "you have to give medication" or "you have to call the doctor"* (I4 - male, aged 41, LPN).

Finally, despite some skepticism, some interviewees recognized that care technologies could alleviate feelings of loneliness among older persons. Nevertheless, they believe this is only true in circumstances



where it is impossible for the human being to be present: *“Any method that produces the feeling of company in the person seems like a great idea to me, although there’s no doubt that human contact is always better than a robot, so when that contact does not exist, I think a robot can have a useful role to play”* (I5 - female, aged 63, Physician); *“In 30–40 years, care technologies will be fully integrated, for example the robots, although it’s quite a challenge not to fall into the trap of dehumanizing care (...). For people who are alone, I definitely agree they could have a companion robot, because, for example, there was a recent case of a person who was found in the north of Spain who had been dead for four years; he lived alone, and no one had known”* (I8 - female, aged 61, Nursing homecare).

### 3.2 | Theme 2. Care technologies for humanizing care during the COVID-19 pandemic

The COVID-19 pandemic has marked a watershed moment in the implementation and adaptation of techno-care as a means of maintaining humanization in care. During the pandemic, the social and emotional support provided by families was interrupted due to the contact restrictions imposed during lockdown. In this scenario, technological devices were used in an attempt to minimize older people’s isolation and loneliness. In nursing homes, for example, older patients moved from having collective meals in a dining room into eating alone in their own rooms. Likewise, all common areas were closed, and the family visits were restricted: *“There came a time when residents were unable to leave the unit, family visits were cancelled, and the only way to contact family and the outside world was using tablets. That is why these electronic devices became particularly useful for the elderly, mainly for those with a good cognitive state, and were hugely beneficial to the emotional situation of families”* (I1 - male, aged 61, Psychologist).

Both videoconferencing tools (e.g., Zoom or Google Meet), together with mobile phone messaging applications (e.g., WhatsApp), were widely used because they were well-known and easy to use, and helped to comfort older people and their families, thus generating satisfaction among social and healthcare workers. Nursing assistants, registered nurses, or social and homecare workers empathized with the suffering of relatives who were unable to visit their family members during lockdown for periods of up to 4 months or more:

*“The most comforting moments were the video calls (...) Tablets and mobile phones were donated to the nursing home (...). And what a difference they made! I remember one elderly lady, in her nineties, phoning her son to tell him that she had recovered and had just left the ICU. It brought tears to my eyes... wow! Then they thanked you (...). I remember the daughter of a man who was really ill, close to death... I remember he told me: You’re the one who phoned me the other day, and I told him: how did you recognize me if you can only see my eyes? And he said: I recognize you because you’re the one who touches my father’s hair... Because I used to lean on the bed next to the patients, and always stroked their hair when they made the video call so that they felt the warmth of the family”* (I16 - female, aged 36, Nursing homecare).

Technological devices were also used to entertain and stimulate older individuals and help them to recall memories, with television, radio and voice activation devices used both at home and in nursing homes: *“In the nursing home there were sessions of music therapy; I think people are using the radio a lot now to play relaxing music, and also television to watch a series and pass the time, which is even more necessary now during the pandemic... because some people have had to self-isolate in their rooms. I think it’s been used as support in that way, (...), fortunately, the use of these devices is increasing”* (I3 - male, aged 35, RN).

Finally, in order to respect the rules of social distancing and to reduce transmission of the virus, loudspeakers were set up in rooms and bathrooms in some centers to attend to the demands of older people and give information on waiting times. This led to better, more person-centered care, while avoiding physical contact.

### 3.3 | Theme 3. Difficulties in the use of technology by health professionals

One of the opinions expressed most frequently by interviewees in this study was that human care could not be replaced by technological devices: *“Sometimes you arrive at homes and see that smile... That cannot be replaced by a robot or TV... human treatment cannot be replaced”* (I7 - female, aged 51, Nursing homecare). This was also noted by other interviewees who stated that new technological devices require a lot of attention, which, in turn, may cause professionals to focus less on important details such as looking at the person, touching them or talking to them.

Despite the positive aspects of technology, its drawbacks during the COVID-19 pandemic were also commented on by interviewees. Technological care in the public primary care system has become completely virtual and by telephone, which has not only led to widespread public disapproval, but also a lack of recognition of the effort made by the health personnel who have had to adapt to this way of working. In addition, nursing assistants felt obliged to incorporate techno-care, and did not perceive it as facilitating their work, but as increasing the care burden: *“In the nursing home, we were on video calls all the time. Luckily for us, the receptionist started doing them with the tablet and the mobile because we couldn’t cope”* (I19 -female, aged 49, LPN). Combining the assistance provided as before with new demands for care during the pandemic made them have to prioritize tasks, and so those related to the use of electronic devices were usually delegated to others. In this way, therapists, social educators or other reception or administrative professionals relieved the work stress of the nursing assistants.

Although the interviewees recognize that online schedules and computerized clinical information systems speed up registration work, they are ambivalent about how they feel about their use and learning how to use them. On the one hand, they get satisfaction from knowing how to use the technologies, but on the other, it has been a steep learning curve which has had negative repercussions (e.g., sadness and burnout) for some professionals, particularly for those entering new working environments.



In the home environment, there is a greater feeling of detachment from using technological resources than in the hospital area, due to the lack of familiarity with their use. Thus, useful tools such as sling lifts are sometimes excluded from daily care due to the perceived complexity and lack of training in their use: *"They'd bought it [the patient sling lift] online (...), but they [the family] didn't know how to use it. When I arrived at night... they were going to bring her back and they were looking for another way of moving the lady, because she weighed over ninety kilos. And I said, how are you using it? They were following the instructions, and I told them that we did not use the instructions, but we crossed the straps over, since that way there was no way the woman's feet would fall out and make her fall"* (I14 - female, aged 51, Nursing homecare).

While difficulties in handling direct personal care devices mainly occur in the home care environment, in the hospital setting, care professionals faced important challenges while using the health institution's computer program. Several interviewees mentioned the *Diraya* computer system, used to unify access to clinical information and medical tests of patients from any health center belonging to the Andalusian Public Health Service. The lack of knowledge of the different subprograms resulted in anxiety and fear of inputting incorrect data or making a mistake with a person's information, which in some cases may lead to dissatisfaction with the job or applying for a change of unit within the health institution.

These workers were only able to learn about these systems with the help of other colleagues from the health center, who helped them in free moments while carrying out their own work, since none of the interviewees say they were given initial training when starting in a new clinical work environment.

Another of the major challenges in implementing techno-care is the problem of accessibility affecting older adults and their families, as well as professionals. The interviewees mentioned the high cost of the most advanced devices, the scarce socio-health coverage, many families not being able to afford them, as well as the poor conditions in many homes which made installing these devices more difficult, thus leading to an unwillingness to use them among older people and relatives: *"They were used to an ordinary walking stick and now technology is advancing (...) but the new ones cost more than a traditional stick, and what's more, the state doesn't cover the cost, and they don't adapt to them well"* (I20 - female, aged 44, Psychologist).

Our data also suggested that those working in home care had greater difficulties in managing technologies and accessing training courses for providing care. They were more often frustrated with computers and using the internet: *"The Community of Madrid offers a training course, which has always been face-to-face, but what can women who are interns or who work from Monday to Sunday do? They're unable to attend the training course, so we managed to convince the local Madrid government to offer online courses. Then, the problem arose that these women don't have access to technology—they don't have computers or internet access"* (I17 - female, aged 63, founder of a cooperative)".

Finally, another drawback was the distrust of the interviewees with techno-care, as they perceive certain technological tools as a way of controlling them at work. In this context, although some interviewees recognize that the use of mobile applications allows them to view their

shift schedule instantly, they also stress the obligatory nature of its use, which often requires the worker to consult the schedule after the working day has finished: *"In home care, you have to use WhatsApp—there's no choice (...). So, all notifications, schedule changes, and user changes are sent to you on WhatsApp, and so you're obliged to use a smart phone"* (I14 - female, aged 51, Nursing homecare). In other cases, workers felt that the tools were controlling them during their rest periods, especially the times when they leave the workplace for breakfast and when they return.

## 4 | DISCUSSION

Our findings revealed that technology plays an essential role in care (e.g., hospitalization, homecare, nursing homes) and results in numerous benefits in the care of older people. The use of care technologies has increased in the COVID-19 pandemic, due to lockdown restrictions, and professionals are becoming increasingly familiar with the devices used. Nevertheless, they tend to have different views on care technologies: on the one hand, they recognize that care technologies can help them in their work; on the other, they recognize certain barriers in using care technologies in social and health settings, particularly related to an unwillingness to substitute human care and the difficulties encountered in accessing and using the devices.

Concerning the benefits of techno-care, our findings were in line with previous studies. Several authors have identified that technologies can promote comfort, diminish the workload of care personnel, increase the possibility of caring for populations in areas of difficult access and enhance labor flexibility, simplicity, and affordability for those caring for older adults (Doraiswamy et al., 2021; Kivekäs et al., 2020; Manocchia, 2020; Odendaal et al., 2020).

Likewise, techno-care also provides an opportunity to improve the coordination between primary and specialized care services, thus reducing costs and saving time (Gonçalves-Bradley et al., 2020). It can also reduce the burden on medical systems and health costs, as well as helping in the early detection, diagnosis, treatment and even prediction of health problem and wellness (Yang et al., 2020).

When care technologies become easier to access and more familiar to the workers, they will be better accepted in the social and health environment. Of all the technological devices available, mobile devices are considered the most useful, especially for decision-making in health care (Gonçalves-Bradley et al., 2020; Odendaal et al., 2020).

One example of this is the real-time monitoring system used for controlling the health of older adults in nursing homes (Durán-Vega et al., 2019): using a biomedical bracelet connected to a mobile application, professionals can instantly view parameters such as heart rate, body temperature and blood oxygenation, and ensure closer communication with family members.

Among other monitoring tools that perform protective functions for the older population and, at the same time, facilitate the work of nursing staff, are the systems used to prevent pressure ulcers in nursing homes (Yap et al., 2019), apps used for preserving motor skills and cognitive abilities (Trombini et al., 2021), and sensors (i.e.,



bed sensors) to report physiological aspects associated with their pathologies (Choukou et al., 2021).

Another important finding of the present study was that the care technologies developed considerably during the COVID-19 pandemic. The lockdown imposed by the pandemic resulted in a wider general acceptance of these devices, particularly among older individuals, who used the devices to maintain an independent lifestyle and guarantee safety (e.g., video-calls, food deliveries, environmental sensors, or camera surveillance with video at home) (Choukou et al., 2021).

Likewise, telemedicine consultations, virtual meetings between professionals, prescription software, monitors and training courses have been some of the technological features which have now been fully embraced by health professionals (Shah et al., 2020; Xu et al., 2021).

Despite all the positive aspects of care technologies, the interviewees pointed to a number of challenges and weaknesses found while using them to care for older people. First, a lack of integration was noted between the different health care systems and servers (Oelschlägel et al., 2021). This, together with the insufficient training given to the professionals, led to misunderstandings and a lack of coordination between the hospital and outpatient/home care, resulting in techno-care being used more often in the hospital setting in detriment of homecare (Herry, 2019; Kivekäs et al., 2020).

Drawbacks related to the use of care technologies include the current focus of tele-health services on rehabilitation and curative treatments in older adults instead of focusing on preventive aspects (Doraiswamy et al., 2021); the existence of predefined value limits on the devices which are not adapted to the context of people with pathologies where physical deterioration occurs at a faster rate (Oelschlägel et al., 2021); growing inequalities due to socioeconomic, educational, ethnic and geographical variations in families and problems derived from substituting the intuitive intelligence of experienced professionals (Yang et al., 2020).

Other drawbacks are the inability of tele-health services to meet the needs of older people with physical and cognitive limitations; feelings of threat to professionals trained in clinical skills; slowness of the technological systems; inexperience in the use of information and communication technologies and feelings of shame about the possibility of making mistakes; job insecurity and exposure to patients outside work; the risk of imbalance between care technologies and face-to-face care with individuals (Doraiswamy et al., 2021; Manocchia, 2020; Øyen et al., 2018; Odendaal et al., 2020); constant reminders of death for the patient or their relatives when viewing the deterioration in vital measurements (Oelschlägel et al., 2021), and cybersecurity and patient privacy issues (Choukou et al., 2021; Shah et al., 2020).

Although currently, a number of powerful, sophisticated technological resources have been developed, some authors point to their minimal use among home care professionals, despite being aware of their potential benefits (Øyen et al., 2018). For this reason, it is key to offer more training in using care technologies to older individuals in order to close intergenerational gaps and strengthen interpersonal relationships, as well as to help professionals feel more confident about using care technologies at work. Training plays a crucial role in the acceptance of care technologies to perform routine tasks, which

results in the staff being able to provide better care. Finally, public policies must support these steps in order to guarantee the benefits of techno-care and overcome the barriers to its use.

#### 4.1 | Limitations

The present study has certain limitations that should be considered when interpreting our findings. First, this study reflects the experiences of social and health professionals from Spanish health care facilities and homecare services. It is difficult to guarantee that the same results would be observed in other countries, since the access to care technologies varies widely societies. Second, we used a purposive sample, and for this reason, the results can only be generalized with caution, even in Spain. Third, some information concerning familiarity with the technology they used, training details and prior experience with technology were not collected. Fourth, it is important to note that this study was carried out during the COVID-19 pandemic and there are several restrictions concerning data collection and face-to-face contact. Therefore, the contact with the professional was limited to one face-to-face interview due to these restrictions. Likewise, the workload during this period was very intense and the response of this professionals using other ways of contact (virtual meetings, messages, phone calls) was also very limited to obtain effective feedback. In view of these problems, we decided to use the feedback from two researchers of the project as reported in the Methods section. Finally, the study was carried out during the COVID-19 pandemic, and this may have influenced the participants' statements, since they were made under stress during a major health crisis.

#### 5 | CONCLUSION

Techno-care is becoming an important element of care in Spanish healthcare services, stimulated by the advent of the COVID-19 pandemic. Although this appears to have had a beneficial effect on social and health workers, care professionals encounter a number of challenges in incorporating care technologies in practice, both in public health institutions and in the field of homecare and nursing homes. Managers should be aware of these aspects and promote further training among their staff.

#### AUTHOR CONTRIBUTIONS

All authors have seen and approved the final version of the manuscript being submitted. They warrant that the article is the authors' original work, hasn't received prior publication and isn't under consideration for publication elsewhere.

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### CONFLICT OF INTEREST STATEMENT

All the authors declare no conflicts of interest.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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