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SPECIAL ISSUE: PATIENT AUTONOMY AND NEW TECHNOLOGICAL ADVANCES IN MEDICINE

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Transnational review on the use of information and communication technologies and technoscience in healthcare: Their impact on the autonomy and governance of individuals and communities

Concepción Unanue Cuesta

Department of Sociology and Social Work, University of Valladolid, Valladolid, Spain

Correspondence
Concepción Unanue Cuesta, Department of Sociology and Social Work, University of Valladolid, Office 117 Paseo de Belén, 1, 47011 Valladolid, Spain.
Email: mariaconcepcion.unanue@uva.es

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Abstract

The impact and use of Information and Communication Technologies (ICTs) in healthcare settings has been increasing since 2019. This is greatly due to the COVID-19 pandemic. But beyond accommodating an extraordinary and complex situation in terms of healthcare services, or beyond replacing personalised care delivered by healthcare professionals (HCPs), has there been a process of information and consultation for communities and HCPs? Do we have the basic requirements needed to make such use commonplace in health care? What will the impact be on communities and their governance? Have we arrived here by consensus or by imposition? Our purpose has been to conduct a transnational analysis by approaching communities, social actors, and healthcare professionals in three territories in a pilot study following a qualitative methodology. The aim being to discover the potential impact of such measures beyond the right to health and if such measures are compatible with the purpose of population settling in rural areas. Furthermore, to identify if this entails a conflict of value and priorities or if we need new ethical reviews both for communities and healthcare professionals.

KEYWORDS
communities' autonomy, eHealth, ethical and legal regulation in telemedicine and virtual care, technoscience and healthcare

1 | INTRODUCTION

Our literature review on telemedicine and health care through Information and Communication Technologies (ICTs) shows information dating back to the 1970s, when telemedicine was understood as a coupling link among surgeries, health centres, and people's homes (understanding the set of units as a whole), and telemedicine being just another option as we see in Mark RG.[1] However, if we consider the American Telemedicine Association (ATA's) definition, telemedicine is understood as the exchange of medical information between different points with the use of electronic communication means, for the health and education of the

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[1] Mark, R. M. (1974). Telemedicine system: The missing link between homes and hospitals? *Modern Nursing Home*, *32*, 39–42.

patient and the health service provider with the aim of improving patient care.[2] And it is indeed in this definition that we find the central topic of our analysis; that is, the objective is to improve healthcare delivery for people. Therefore, to ascertain such improvement, we must consider the results, impact, characteristics, specific needs and opinions of individuals and communities. We must also consider whether individuals and communities are really perceiving an improvement in their healthcare provision.[3]

We must further consider two key elements in the HCP–patient relationship such as the assurance of effective communication and the respect for the voluntary choices made by individuals,[4] which we may not be able to guarantee within this new ICT paradigm. Moreover, a key imperative for health professionals (not to be disregarded) is the HCPs' autonomy in their professional practice so they can freely deliver care, and for which they must have the necessary freedom of choice when deciding how to treat their patients.[5]

According to Higher Education registration data in Spanish, Portuguese and Italian faculties of medicine obtained from their institutional websites plus publicly available information from hospitals, medical practices, and rural health centres, 64% of all medical students are women. If we look at the number of current practitioners in professional practice in the public health sector, the figure increases to around 71%. And despite those figures, we do not find a mirror reflection in decision-making and positions of responsibility in the healthcare service sector. The areas focus of our research show that the percentage of women in such positions is only 20%. Currently, we have no data available concerning such metric applied to LGTBQ+ people nor a way of obtaining this information.

However accidental and innocent all this may seem, it exerts a direct impact on the health of communities, diagnoses, and the manner of treatment and time dedicated to each patient. It also has an impact on how emergencies are prioritised, as women's health needs are hardly considered within the healthcare delivery model. Indeed, as for ailments of women, they are attributed to conditions or disorders related to psychological causes. LGTBQ+ people are not even considered. We can be seen in gynaecological clinical protocols applied to lesbian women.

This paper presents the results of a study carried out during the third quarter of 2021, throughout 2022 and during the first 2 months of 2023 in the cross-border rural context of the Castilla-León region, Portugal, and southern Italy. The latter region better known as the Italian *Mezzogiorno*.

Among the study participants, we have had residents of the afore-mentioned territories, users of healthcare services in those areas, healthcare professionals who work and/or live in the surveyed areas, and people representing neighbourhood and community associations from the areas under study, as well as some local political representatives.

In our research, we have also applied a gender perspective and an intersectional approach.

If we pay attention to the territories where the study has been conducted, we observe similar characteristics that are very specific both in terms of the population and in terms of the infrastructure required to enable minimum levels of access and use of ICTs for healthcare delivery.

Regarding our sample, the study population was predominantly ageing and male, and organised into community groups specifically in terms of relations, decision-making, and distribution and handling of information.

Regarding the infrastructure for the access and use of ICTs, we can say there is no stable connection in the rural settlements under study. In fact, in some of those places, there is hardly any mobile telephony coverage. Here, we should also consider the gender gap and the generational digital divide present in the areas under investigation.

The above leaves us facing a geographical area with particular characteristics, which limits the impact of the use of ICTs in health care, and in turn influence the capacity for self-determination and decision-making of the populations when it comes to individual and community health. Furthermore, this may also entail new obligations for health practitioners.[6]

2 | METHODOLOGY

Since subjecting the study results to quantitative analysis may have resulted in findings of insufficient significance (due to the levels of depopulation in what has become the *Empty Europe*), we have used an investigative, qualitative, prospective, and multicentre methodology. The use of qualitative methodology allows us to show proof of reality and measure reality. It further allows us to delve into our findings and understand them (including root causes), relying on the engagement of the local populations in the study.

The proposal for a qualitative method includes the possibility of gathering the viewpoints and opinions of those individuals who participate in the study. This gives us the opportunity to consider how people understand, experience, or are affected by the subject matter of our research, all within the context of very real and everyday experiences of individuals and communities. It further allows us to communicate and consult on the research process and the object of study, which in turn gives communities certain freedom and capacity to make suggestions during the study. This adds flexibility and adaptability throughout the information gathering and the data analysis stages, and it moreover facilitates engagement in

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[2] American Telemedicine Association (ATA) (2020). https://www.americantelemed.org/

[3] Braun, M., Hummel, P., Beck S., & Dabrock, P. (2021). Primer on an ethics of AI-based decision support systems in the clinic. *Journal of Medical Ethics*, *47*(12), e3.

[4] Chandra, S., Mohammadnezhad, M., and Ward, P. (2018). Trust and communication in a doctor–patient relationship: A literature review. *Journal of Health Communication*, *3*(3), 1–6.

[5] Wilson, C. B. (25 March 2013). Physician autonomy essential to patient care. https://www.wma.net/blog-post/physician-autonomy-essential-to-patient-care/.

[6] Rajpurkar, P., Chen, E., Banrjee, O., & Topol, E. J. (2022). AI in health and medicine. *Nature Medicine*, *28*(1), 31–38.

the discussions and the drawing of conclusions. Furthermore, it means we can consider some fundamental questions such as people empowerment, collaboration based on engagement, circulation of knowledge, and social change.[7]

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Out of the toolkit of qualitative methodology, we opted for in-depth interviews, semistructured interviews, and focus groups, which have allowed us to reformulate and clarify questions whenever necessary. We have used those tools to achieve greater depth of information so that we could inquire into and consider the answers and are able to consider the suggestions made by participants, individuals, and communities alike.

Concerning quality and ethics in our research, we have been especially careful with matters of truthfulness, commitment, and intellectual ethics; impartiality, accountability, and respect for human rights (privacy, freedom of choice and opting out of the study, individuals, and communities' right to self-determination and to their cultural values and priorities).

Yet in line with Espinoza,[9] ethical aspects must be present from the very beginning when conducting a study: from the design and planning phases to data sharing and data discussion, and also when obtaining results and drawing conclusions. We arrive at this juncture after deliberating on the application of the fundamentals of qualitative research.

Here is an overview of the different phases and elements of our qualitative approach with special focus on research ethics:

- Preparation and design. Focus on the subject matter of the study while analysing the capabilities of the research team and of those persons who will collaborate with the implementation. Special care must be taken not to expose people who opted in, preventing any harm coming to them from within the community or even preventing the study from generating exclusion or confrontation dynamics.
- Study questions. The questions must be as balanced and suitable as possible for communities, because deliberating over and answering some questions may have a personal or a group impact (own housing, community dynamics, events that entailed confrontation…). Communicate the purpose of the study and communicate all questions tabled by individuals or by the community as a whole.
- Work sample. Explain what is expected of those who decide to participate in the study, including the possibility of opting out if so wished. Try to introduce as much diversity as possible in the work sample so that it is representative, stressing certain issues such as avoiding gender bias, agism, ability bias, LGTB+ bias, racial discrimination, and so on.
- Information and data collection. Avoid any influence the investigators could exert (whether knowingly or not). Guarantee alternative spaces for the participation of those people who (for unknown reasons) may not wish to answer questions as part of a focus group. Pay attention to topics that are not the main ones to begin with but could crop up in the groups, which means that understanding the relevance of said topics for communities and individuals is crucial.
- Data discussion and conclusion. Even though we are in search of objectivity, we need to remember the subjectivity of the issues we work with and analyse both for individuals and communities, and for that we must take special care so that participating in our research does not cause any harm to or interferes with the dynamics of the community, nor causes any harm to the lives of individuals. This means that as researchers, we must observe the rules of scientific research protocols and not lose sight of those ethical questions. This will allow us to identify potential ethical dilemmas throughout the different phases of the study, without missing the chance to contribute and not just draw and procure data, information, collaboration, and so on.

The above-mentioned elements would include aspects of research quality that fall within the criteria under the COREQ. 32 checklist (Consolidated Criteria for Reporting Qualitative Research). COREQ aims to ensure complete and transparent reports, interviews, and focus groups conducted in a precise, comprehensive, and credible manner.[10]

We also used triangulation as a tool, which lends reliability to qualitative research by analysing the ideas or realities under investigation and similar facts from multiple perspectives.[11] Triangulation allows the use of different strategies as a way of delving into the knowledge acquired.[12]

3 | HOW WAS THE STUDY CONDUCTED?

It must be said that the fieldwork phase and other research phases were applied in the same manner in all three territories under study, based on a multicentre approach.

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[7] Bastidas, E., & Gonzales, C. (2009). Social cartography as a tool for conflict analysis and resolution: The experience of the Afro-Colombian communities of robles. *P & C Studies*, *15*(2), 1–14. https://core.ac.uk/download/pdf/51073157.pdf

[8] Allen, P., Black, N., Clarke, A., Fulop N., & Anderson, S. (Eds). (2001). *Studying the organisation and delivery of health services: Research methods* (pp. 40–55). Routledge.

[9] Espinoza E., & Toscano, D. (2015). *Metodología de investigación educativa y técnica*. Ediciones Utmach.

[10] Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal of Quality Health Care*, *19*(6), 349–357.

[11] Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed.). Sage.

[12] Donolo, D. S. (1990) Triangulación: Procedimiento incorporado a nuevas metodologías de investigación. *Revista Digital Universitaria*, *10*(8), 1-10. http://www.revista.unam.mx/vol.10/num8/art53/art53.pdf

The study consisted of three research teams coordinated by the principal investigator, which contributed multiple perspectives,[13] and reduced the possibility of investigating bias.[14]

Initially, we worked separately with two samples, and subsequently during the focus groups phase (and finally when discussing the data) encouraged the participation of both samples in the same spaces.

This resulted in one population sample made up of people living in our territories and another sample of healthcare professionals working in our territories (general practitioners, nursing staff, consultants in district health centres and external specialists who attend the district health centres when there is no such profile in the centre but who visit the population in those areas).

The total participating sample amounted to 487 people.

The total number of study participants by territory was as follows:

- Spain. General population: 137 HCPs: 31 Total: 168.
- Portugal. General population: 117 HCPs: 19 Total: 136.
- Italy. General population: 102 HCPs: 14 Total: 116.

Population age groups for residents' sample was as follows:

- 65 years or older: 46.2%.
- 50–64 years: 20.1%.
- 30–49 years: 17.1%.
- 18–29 years: 9.2%.
- 17 years or younger: 7.4%.

Population by gender was as follows:

- 65 years or older: 57% men and 43% women.
- 50–64 years: 49.3% men and 50.7% women.
- 30–49 years: 56.2% men and 43.8% women.
- 18–29 years: 62% men and 38% women.
- 17 years or younger: 49.6% men and 50.4% women.

3.1 | Fieldwork: Phase I

Sample A—Resident population in territories under study

Initially, informal meetings were held in public spaces in different areas of the territories to be surveyed.

During the meetings, the research team would introduce themselves, introduce the study, and further ask the participants to contribute with ideas and points of view concerning the research, if they wished to do so.

We held 10 informal meetings with an average attendance of 71 people at each one of the territories. The age range of the participants was 30–82 years. We intentionally tried to achieve equal gender and age representation. Furthermore, we sought to organise women-only groups with the participation of at least one female researcher to create 'safe spaces' for those women to express themselves and speak openly. We likewise stressed the advisability of having as much diversity as possible in the participant base, considering intersectionality.

Sample B—HCPs working in territories under study

We contacted health centres, hospitals, and surgeries directly in the relevant study areas. After introducing the research project, we were advised that the best time for the initial informal interviews would be at the end of working shifts, as these could be organised in advance and the practitioners could stay on another 20 or 30 min.

Moreover, we contacted those external consultants who only visit the area once or twice a week (or whenever they have appointments) and confirmed that they could also be interviewed at the same time as the in-house healthcare staff.

The meetings were scheduled for the end of working shifts for those days when we had the greatest number of HCPs attending. In the end, we were able to hold five meetings per territory.

To those five initial meetings, we added two other meetings held with the 24-h Accident and Emergency team.

We stressed the need that gender-balance representation would be fundamental for the sample, as well as intersectionality.

3.1.1 | Initial findings

Sample A

- Participants showed awareness of telecare and had a positive opinion of it.
- They admitted to having searched for health-related topics over the Internet for their own health or the health of a family member, without being sure about the reliability of the sites consulted. They also confessed not to understand the information because of the language and data used by those sources.
- They held the HCPs in their local and regional healthcare centres in high regard, both professionally and personally.
- 48% of the sample did not own a computer, tablet, or mobile phone with an internet connection. This figure differs in some areas in Portugal, and the average is 42%.
- The most repeated terms that came up in relation to telemedicine and ICTs in health care were *distrust*, *insecurity*, *fear*, *deception*: something that would negatively impact quality of life and autonomy at individual and community level.
- It would mean losing the few HCPs they have.
- They declared that changes in this respect would affect their health and their right to decide where to live, as those changes would determine such decision.

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[13] Perelló, S. (2011). *Metodología de la investigación social*. Dykinson.

[14] Tashakkori, A., & Teddlie, C. (2003). The past and future of mixed methods research: From data triangulation to mixed model designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook on mixed methods in the behavioral and social sciences* (pp. 671–702). Sage.

- Participants further showed much mistrust and many doubts regarding the processing and storing of information and images generated during online consultations.
- In their opinion, those who cannot speak properly owing to physical impediment, women suffering gender violence, minors suffering violence and abuse at home, children, LGTBQ+ population, people with cognitive impairment, and socially excluded groups would be most negatively impacted by such potential changes.
- They would not give up emergency services.
- Some positive feedback collected was on the use of electronic prescriptions in areas where this service was already in use, follow-ups by health tracking devices and suchlike, and other devices for the monitoring of vital signs and other parameters. They suggested that such systems and devices are positive schemes for optimum adherence to prescribed treatment.
- Women stated they would lose another common space such as the surgery's waiting room, which may be the only free and safe space for those women (for a variety of reasons) who need such spaces. In the case of victims of gender violence, they stressed the possibility of seeing the doctor alone and speaking freely without their husbands. They further stressed the need to be able to talk about actual conditions and pain being experienced without these being branded ‘psychological’ issues whenever consultations move to the online space. In their opinion, ‘we will all end up on medication unnecessarily’.
- In most cases, when there is a mobile phone in the household, it is the men who have it. This means the digital divide would become a health divide too. A gender digital divide would have a direct impact on women's health and their quality of life.
- They thought that there would be a new appreciation and revaluation of women's traditional knowledge in terms of health and healthcare in the community such as the use of medicinal plants and natural remedies, observation and classification of data, self-help networks for all stages in life and emergency help, for instance during childbirth.

Sample B (Healthcare Professionals)

- They showed lack of trust in a hybrid healthcare system that could potentially saddle them with overwork (onsite and online work).
- Despite acknowledging the positive aspects of the use of ICTs, they were reluctant because of workload issues and the potentiality of losing social contact. They were also reluctant because of the impossibility of ensuring full quality 24-h signal coverage and connection in all rural settlements and throughout the year.
- In some cases, some people were ‘left behind’ (dropping out) from the healthcare system altogether. There would be more people with serious illnesses in advanced stages. The feared that technoscience will bring about new forms of social exclusion.
- They were sure that for a time they would need some training to avoid the improvisation experienced during the pandemic and to be able to guarantee quality of care.
- On a more positive note, they said that the time they would usually spend travelling between different villages could be dedicated to analysing test results, follow-ups, diagnosing with the help of other colleagues, reviewing specialised information, and the possibility of doing so without rushing.
- They said that in their professional practice, they discuss information over the Internet, seeking advice from reliable and specialised spaces and conferring with colleagues.
- 100% of primary care staff confessed to loving their work, which is greatly due to the personal contact they have with other people.
- 76% of specialised medical staff confessed that if they would avoid travelling to district health centres, if possible. Their aspiration was to obtain a permanent position in larger population centres or in cities, as they see this work as a transitional stage in their careers.
- The nursing staff are the HCPs with the closest bond to local populations, holding most of health-related and personal knowledge, which allows them to have a social and health overview of those populations that in turn has a direct impact on treatment follow-ups, on needs detection, and on a more effective and efficient healthcare services provision. They did acknowledge that ICTs would make their work easier, but they cannot fathom a change in the rural healthcare delivery model.

3.2 | Phase II

With the information and results gathered in Phase I, we moved onto Phase II of the study during which we worked with focus groups, privileged informants, and representatives of local associations and the social fabric of the communities from different areas.

In Sample A (resident population) and Sample B (HCPs), we had to include another sample at this stage of our research. That is, people who work in computer programming and ICTs in the study territories, amongst whom some are telephone, tablet, and computer application developers.

- *Focus groups*—Two types of focus groups were arranged. One with members of the community and another with healthcare staff. Each type held 10 group meetings in every area under research lasting between 45 and 90 min. Later, the groups were mixed and matched for the exchange and discussion of thoughts and ideas. These were hybrid groups with participants from the community and from healthcare services, five groups for each study area with their meetings lasting between 45 and 60 min. These groups already had a component of programming and ICT specialists with links to the territory.
- *Interviews and conversations with privileged informants*:

Retired HCPs living in the areas: 12 general practitioners and six consultants.

HCPs who work and live in the areas: 16 people.

HCPs who live in the areas only seasonally, but work in urban hospitals: eight nursing staff, four medical staff.

Health administration staff: six customer services staff from urban health centres, and four from specialist urban clinics.

18 representatives from associations; six political representatives; eight opinion leaders, and four social leaders.

Nine programming and ICT professionals with links to the areas.

- *Mixed debate groups*—These groups included HCPs in active service in each territory and resident population with the aim of exchanging information and raising concerns. There were three discussion groups: one in Aliste (Zamora), Spain, another in Portelo, Portugal, and another in Italy's southern region. The group meetings lasted 90 min each with 12 attendees per group.

Furthermore, we worked with three *groups that included participants from all three territories*. Each one of these groups was made up of 12 people and their meetings lasted 90 min. This work was carried out synchronously through online platforms.

Not everyone who had requested participation in the focus groups was able to do so, and thus, the communities talked about the possibility of arranging one final working group to which every research participant was invited. This session was conducted with the help of online platforms. This final group had 20 attendees and lasted 120 min.

Then, the research team reviewed and transcribed the information, determining the most relevant questions from the different groups and producing in this way a summary of the main points of consensus and dissent, which were considered essential.

The information and data obtained during the study is triangulated. To be more precise, I mean the information from level 1, level 2, individual interviews, and everything else collected through participant observation during the study.

4 | DATA ANALYSIS AND DISCUSSION

We used Atlas.ti-8, software for qualitative analysis, to organise, process, and analyse all data and information collected. We initially worked with the data from each territory separately, and subsequently we analysed and worked with the data from all three territories as a whole set.

The results arising from the participants' sample produced some conclusions shared in all three territories under study:

- Digitalisation of health is not a conclusion, or a finish line, but a new form of intervention to resolve problems and enhance processes.
- ICTs will not replace physical communication or in-surgery onsite contact.
- For any such system to be acceptable to both population and HCPs, it would have to be a hybrid system whereby ICTs supplement and facilitate contact and communication without replacing in-person services.
- Monitoring technologies are those ranking the highest in appreciation and more easily embraced by the population. They are also highly valued by the healthcare professionals.
- Technologies for treatment follow-up and medication are very important for proper and full treatment adherence as prescribed in terms of frequency, dosage administration and correct completion of full treatment as prescribed, and for a healthy lifestyle.
- ICTs are highly valued to resolve queries and find information regarding treatments, possible concerns and to obtain reminders on drug dose regimen, frequency, or side effects.
- Availability of access to connected devices must be guaranteed for the entire population if we are to avoid new exclusion groups in terms of access to health. The minimum requirements for such equipment would be a large screen with good resolution to allow health professionals to clearly identify anything the patient may be showing them, be it injuries, skin rashes, pigmentation, or inflammation of any kind. Moreover, the equipment available to the population must have light-weight high-resolution mobile cameras so people can send images; microphones and speakers; powerful anti-virus programmes to ensure doctor-patient confidentiality, privacy, and patient data confidentiality for each patient. Any platform to be used must guarantee privacy, security and confidentiality, and good connectivity to optimise quality-of-service provision and quality of access to medical information. They must also enable identity verification and remote informed consent.
- Special attention must be given to cases with a hearing, sight, or cognitive impairment. Triage processes would need to be improved to optimise telemedicine services by identifying specific symptoms relevant to patients who most need to be prioritised. This would also include suggestions on the best healthcare format or mode for each case to ensure all patients receive the best possible care at the right time administered by the right person through the most appropriate means.
- ICTs and telehealth appointments would be particularly convenient in the case of those in-person enquiries that might be unnecessary and could be resolved online.

We have gathered the following information from the healthcare professionals participating in the study: 81% of HCPs stated they feel that dealing with red tape is a waste of their time; 15% of all HCP who participated think that appointments should be primarily done in person; 41% think that the optimal ratio of onsite and online appointments (every 10 consultations) could be 7:3, respectively.

In turn, we have gathered the following information from the community participating in the study: 83% stated having had appointments in the past 2 years that could have been dealt otherwise than in person. That remote healthcare or remote follow-ups could be the way to improve nonserious cases, nonurgent cases, where the patient usually must travel sometimes over 30 min plus waiting time, particularly just for queries.

- While we are fully immersed in *humanising healthcare*, we must not allow ICTs, AI, and technoscience to slow down such humanisation drive nor to turn healthcare and healthcare processes into 'production lines' where time with a patient is externally controlled and productivity is prioritised over human welfare and rights. The right to universal health coverage (quality healthcare) and the working rights of our health professionals must be preserved.

- Among all participating groups the greatest consensus was there must be a guaranteed infrastructure with good connection to telehealth. Moreover, that all necessary technological and IT elements must be provided, including offering good access to users, as well as specialised personal assistance available whenever necessary so that the community can benefit from service changes and in this way overcome any resistance to change.
- There must be a consultation process with communities. Community groups must be considered, and they must be allowed to participate throughout all stages of transition and roll-out of ICTs in healthcare. For this, they must receive information that is clear and accessible; their communication, participation and decision-making dynamics must be respected so their individual and community autonomy always takes precedence.
- Social actors must be involved in those processes to ensure universal accessibility and prevent new exclusion groups in matters of health. Otherwise, we would be moving away from the universality of health in our three territories and detracting from the Sustainable Development Goals pertaining to health care and health.
- Particular attention must be given to how the actual delivery of services will take place and to prevent any potential gaps arising falling back on women in new health and care spaces. Communities, HCPs, and authorities together must give some thought to the ethics of care.
- There must be a joint and equal effort between HCPs, communities, and individuals to achieve balance in this process and to avoid creating new information management and decision-making hierarchies, which would generate exclusion dynamics limiting the self-determination of all participating actors.
- Any new process must be respectful of the dignity and privacy of individuals and communities, having regard to cultural distinctiveness, respecting human rights as a minimum nonnegotiable level, and also respecting human rights in the face of cultural relativism.
- All data from medical records, from online and telephone consultations, through telephone messaging applications, and by any other means should be accessible, interoperable, and reusable, as well as protected and processed under ethical standards, particularly in relation to AI techniques. Always considering the monitoring and application of ethical and deontological criteria in all projects that may be carried out.

5 | FINDINGS AND CONCLUSIONS FOR FURTHER THOUGHT

Below we show the main research conclusions, which could be delved into in future studies; issues that as an imperative would require dialogue and ethical debate:

- Human oversight. AI systems, technoscience, and ICTs must enable fair societies by supporting human action and fundamental rights, by promoting individual and community freedom of choice, and ensuring accessibility for all.
- Security. We need algorithms that allow us to trace, identify, and resolve potential errors, which would stress the need for transparency in following the traceability of the systems used.
- Privacy and data control. Citizens and communities ought to have total control of their own data and such data will not be used to harm or discriminate.
- Social and environmental welfare. Encouraging positive social change on the pillars of environmental sustainability and responsibility.
- Accountability. There must some oversight and auditing systems to allow for accountability in respect of processes and results.
- Human rights must always be the basic pillars, even if they are not definitive and perfect, but at least they are a basic minimum from which to build up.
- General confidentiality and doctor–patient's confidentiality exist to protect ‘privacy’. Any medical action implies the handling of data and information that are private. The content thereof is highly sensitive and requires ethical and legal protections.
- The use of technoscience, ICTs, and AI in healthcare provision ought to be understood exclusively as a tool. The provision of care offered by technologies must be understood and actioned as healthcare provision with all its implications regarding protocols, legal assurances, professional ethical practice, information, and respect of personal and community choices.

- Communities and professionals unreservedly accept the use of technologies for follow-ups, treatment adherence, medication control without any initial ethical conflict in the following cases:
- Devices to check vital signs and other body parameters such as blood pressure, sugar levels, iron levels, heart rhythm, hours and quality of sleep, everyday activity, oxygen levels, and so on.
- Devices to monitor lifestyle.
- Systems for dispensing and controlling medication.
- Communication systems such as messaging applications.
- Patient and relative information systems, which can simultaneously alert patient and family (if in different households or locations).
- Consultation and answering queries about treatments or diagnosis that may have not been fully understood.
- Possibility to ask for a second opinion using ICTs by sharing medical records and tests already carried out.
- Harnessing all community and healthcare networks and focal points dedicated to people's welfare.
- Alerts concerning changes in medication dose or frequency.
- Alerts about check-ups or appointments coming up.
- Active patient engagement and patient autonomy, and community engagement and autonomy in the healthcare pathway.

Strategic matters for further ethical thought:

- Governance. A move towards collaborative and participative models, involving individuals, communities, and healthcare staff.
- Commitment and participation of the authorities, who must guarantee and provide the connectivity, necessary means, and usability by training all those involved.

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ORCID

Concepción Unanue Cuesta http://orcid.org/0000-0001-6081-7969

AUTHOR BIOGRAPHY

Concepción Unanue Cuesta is a graduate in Anthropology, Sociology, and Social Work and holds a PhD in Anthropology. She is professor in the Department of Sociology and Social Work at the University of Valladolid and a member of the research groups: Applied Social Science Research Group. University of Valladolid. -Femininario Interdisciplinar “Teoría Feminista y Teoría QUEER” (Interdisciplinary Feminist Theory and Queer Theory), University of Vigo, Spain.—Innovation Group of the University of Valladolid: Human Rights, Legal Human Rights, Legal Clinic and Service-learning. Human Rights Observatory. University of Valladolid. Her research interests lie in LGTBIQ+ diversity, especially in relation to “Lesbian,” Ethics and Gender in research and social diagnosis, Ethics of professional intervention: importance of agency and autonomy of individuals and groups. Rural Identity, Identity in mining communities.

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