

Exploring ethical risks of using a telepresence robot in Canadian long-term care homes

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Abstract— While telepresence robots may help improve efficiency of family virtual visits in long-term care, there are potential technology risks and ethical concerns. This qualitative descriptive study explores the technological risks and ethical issues associated with the adoption of robots in the specific context of long-term care (LTC) homes. We employed purposive and snowballing method to recruit 30 participants: interdisciplinary staff, operational leaders, researchers, and ethicists. Semi-structured interviews were conducted by Zoom virtual meetings. Thematic analysis was performed to identify themes. Technology risks include safety, more work, privacy, cost and justice, and human connection. Participants emphasize ethical considerations should focus on six principles (ETHICS): Engagement of stakeholders, Technology benefit and risk assessment, Harm mitigation, Individual autonomy, Cultural safety and justice, Support of privacy. There is a growing interest and fear about using robotics in LTC. Practice leaders should reflect on ethical considerations and engage relevant stakeholders in making technology decisions for everyday care.

Keywords—ethical risks, telepresence robots, long-term care

I. INTRODUCTION

There is a growth of expectations that assistive technology would offer good support to everyday care and improve quality of life [1]. Research has shown assistive technologies promote social engagement among older people [2,3]. However, the rapid developments in technology and adoption of these tools into LTC homes can also bring unintended harm, burdens, and negative consequences as well [4]. Recently, telepresence robots are used to support LTC residents to remote connect with families and friends [5]. While assistive technology may help enhance staff's capacity to provide care and benefits residents, evidence on immediate technological risks and long-term ethical issues, as well as unintended social consequences to both individuals and the organizations (LTC homes) have been limited [6,7]. A recent systematic review reports that 67% of current assistive technologies for dementia are designed in absence of explicit ethical assessment [7]. This raises serious concerns about the ethical viability of using assistive technologies among older people with dementia [8]. Ethical concerns such as ensuring fair technology access (distributive justice) and preserving the privacy of end-users have not been fully explored [8]. Previous reviews also highlighted ethical concerns about informed consent, privacy, data security and affordability [9]. Other identified ethical implications include stigma, social isolation, user-engagement in the design and implementation of the technology as well as the ethical dilemma about whether assistive technologies

would replace human care [10]. Mulvenna et al. [11] developed an 'Ethical by Design' Manifesto to engage designers and users to consider ethical issues about the application of technology for dementia care. Building on the emerging literature concerning ethical consideration for using assistive technologies in LTC, our study aims to elaborate the technological risks and ethical issues in telepresence robot use in LTC.

II. METHODS

A. Recruitment

Long term care residents, families, interdisciplinary staff, operational leaders, and ethicists at a large health authority in the province of British Columbia, Canada participated in this study. Telepresence robots are mobile and offer video-enabled virtual visits. We applied a purposive sampling approach to search for a balance of participants with various demographic backgrounds, gender, job and experience representations for the first wave of interviews. From there, a snowballing approach was taken to recruit more respondents through recommendations and referrals by the informants. Our team is made of a patient partner living with dementia, a family partner, an educator at the Alzheimer Society, a graduate student, and an academic researcher. Ethics approval was obtained from the Research Ethics Board from the University of British Columbia. All participants signed a written informed consent form.

B. Data collection and analysis

Semi-structured interviews were conducted to obtain information regarding perceived risks and ethical concerns about the adoption of telepresence robots in LTC. Participants were asked: (1) Tell us about your opinions about using the telepresence robot in LTC homes. (2) What are the technological risks and ethical issues associated with the adoption of robots in LTC homes? (3) What is needed to manage the risks for safe and ethical use. Each interview lasted for about 30-60 minutes; field notes were taken during all the interviews. The interviews were conducted virtually by Zoom meetings. The interviews were audio recorded and transcribed verbatim.

III. RESULTS

A. Safety

Safety risk has been viewed as one of the most significant risk concerns for robot use in LTC. Although the telepresence

robot was designed for autonomous navigation to avoid collision, some participants voiced concerns that the mobile robots could malfunction or move into wrong places, such as bathrooms or unintended places. One participant reported the clutter in the hallway and resident room confused the sensors of the robot, hindered optimal movement of the robot. Other nurses and care staff participants discussed the robot could be used as a weapon in situations of behavioral events. For instance, a nurse alluded to an incident of an angry resident who pushed the robot to the ground and broke the face of the telepresence robot. Staff talked about the need of risk assessment and risk management to avoid resident fights/ conflicts and prevent injuries in residents. Currently, there is no evidence-based guidance that is specific to the robot use in LTC homes, highlighting the need for the development of policy and guidelines to inform risk analysis and safe practice.

B. More work

Staff also brought up the issue of extra work that is required to care for the robots. For example, robots need to be charged, wiped, and disinfected, maintained, and repaired. The pandemic brings staffing shortage, staff struggle to keep up with the day to day clinical practice. *"The robots are put in the back burner because we simply do not have time."* One participant said, *"It is a lot of work to motivate people learn about what the robots do and how to use them. Some LTC homes just not have the capacity to adopt new practice and support staff training."* A few participants discussed their experiences of enlisting local champions and leaders to support education and adoption. An educator mentioned that they need practical recommendations on how to train and prepare staff, residents, and families effectively. Participants across sites echoed that many of their staff are older and not technology savvy, they need help to gain confidence, feel safe and comfortable with the robot, suggesting it takes time and work to provide education and ongoing support. A nurse supervisor summarized it well, *"If the person doesn't have the support or the training to use it, the robots will not be used. Many of our staff are older, they may not themselves be comfortable with the technology. That can create some barriers."*

C. Privacy

According to the participants, privacy is another major risk relevant to both staff and residents. A researcher participant voiced her concern about resident being monitored with camera installed in the robots - *'Big Brother'* surveillance of residents' lives. Also, residents with dementia may not be aware of the presence of the robot which can bring unwelcomed intrusion into their daily lives. Although the robot offers an 'end' button on the touchscreen to stop connection, the older person may not be able to see it and know how to use it. Many frontline staff emphasized that people need to be respected in their autonomy, consent, freedom to decline use, and dignity. One operation leader remarked:

I see inevitable opportunities for robots to address issues of social isolation and loneliness by increasing virtual visits of families and friends. At the same time, I see the risk infringing on their privacy. Families may drive the robot in a public area with a group of residents. The residents may be seen being cared for by staff in intimate situations.

It is also important to consider staff discomfort and anxiety. One nurse asked, *"Can the telepresence hear us*

when it is off?" A leadership participant argued, *"we have nothing to hide, we provide good care, so we should have nothing to worry about."* All participants agreed upon photographing and recording should not be allowed unless the resident give consent. Participants remarked that older adults should have control about when to have contact, how to initiate and end call as well.

D. Cost and justice

The robot could also stop working or malfunction. In the interviews, it was obvious that the managers were aware of ongoing costs for the LTC homes in replacing and repairing technologies to meet the demands of daily practice. It was interesting that leadership participants regarded the cost is not an issue as long as there are resident benefits. In contrast, staff were very nervous about the cost of the robot. For instance, one staff said,

"I know the residents would talk about the robots among themselves, had a good time. The robots are stimulating interaction. However, the robots are expensive. We only have two telepresence robots here. The problem is how to make them available for residents and by whom. Like now, the recreation staff have been off sick for two weeks; the robots are locked up because they are expensive. No one has access to the robots when the residents need them the most when family can't come in to spend time with them."

Another participant alluded to the cost to ensure fair distribution as there are a wide range of differences in LTC homes. Some bigger homes are more able to make technology investment, compared to other smaller homes. The infrastructure for the LTC home is vitally important, for example, the Wi-Fi systems needs to consistent, and high speed. Many staff complained that they do not have strong internet connection in every resident's room. Some families were able to pay and install personal Wi-Fi in the individual resident room, suggesting an inequity issue to technology access. Many of our participants felt strongly about the importance of preserving social equity by ensuring that the level of access to and mechanisms of distribution of robots in LTC benefit all groups of resident population.

A regional director said, *"I think that there's certainly a lot of potential there for robotics technologies in LTC, especially during a time that we live in, occasionally having lock downs within LTC homes, where people aren't able to socialize in the same way."* A recreation staff noted, *"setting up a phone call on a telephone can take up a lot of time for staff, and it can be difficult to manage when we are short staffed. Telepresence robots can take some of that prep work out of it and make it easier to connect to family members."*

E. Human Connection

While most participants believed the robots could be used as tools to improve efficiency, some voiced their concerns about robots replacing human care. A few participants worried about family may over rely on the telepresence robots for virtual visits. One commented, *"With the convenience of the robot, family members and friends may no longer feel obligated to visit, because they have virtually visited them."* Overall, participants see the benefits of having the robots to allow safe virtual visit, especially when the resident is in isolation with COVID infection. A staff gave a recent example about the robot was placed in room to support

unlimited visits when a resident was in palliative care. Family members and friends overseas were able to visit and spend quality time with the resident by singing his favorite songs and playing piano to him. It is important to ensure that robots introduced to the residents do benefit the person and not just to save time, improve efficiency, or reduce burden on staff's workload. If possible, every effort should be made to support the ability of residents to exhibit self-determination and assert preferences regarding the extent to which robots in everyday care. The older adults' quality of life should be the end goal of the use of robots in care.

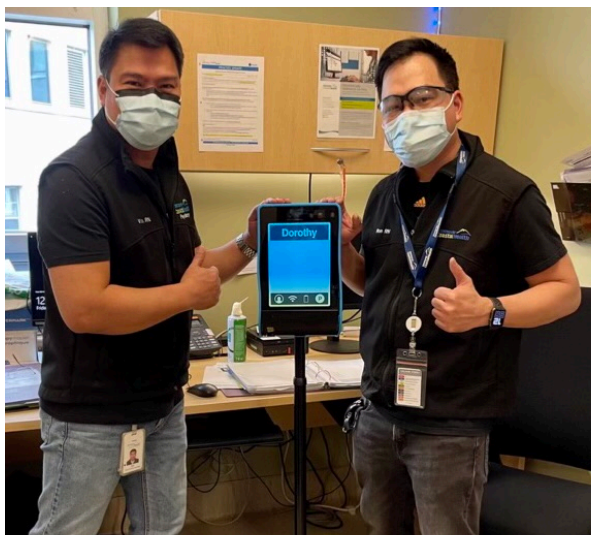


Fig. 1 Staff and the telepresence robot named "Dorothy"

IV. IMPLICATIONS

Based on the results of the interviews, we offer six preliminary recommendations for practice leaders to consider. We call them: **ETHICS**: Engagement of stakeholders, Technology benefit and risk assessment, Harm mitigation, Individual autonomy, Cultural safety and justice, Support of privacy.

E – Engagement of stakeholders

To address ethical tensions that arise in implementing technologies, relevant stakeholders (e.g., residents, families, staff) should be involved in making planning. All plans and decisions must, as much as possible, appeal to reasons that are mutually agreed for shared goals. Decision-makers should document, and be prepared to justify, the decisions that they do or do not make.

T – Technology benefit and risk assessment

Benefits and harms, risks and burdens should be assessed. Decisions should promote the well-being of stakeholders (resident, family and staff) and increase the common good while minimizing the overall burdens. The distribution of technology should not place unfair burdens on individuals/groups, which can perpetuate systemic or structural inequities.

H – Harm mitigation

Stakeholders and those impacted by decisions should be protected, as much as possible from harm. If harm cannot be fully mitigated, do the stakeholders view the benefits of the technology outweigh the risks?

I – Individual autonomy

Pay attention to how procedures and care plan are built to support technology use to protect individual autonomy. Avoid infringements on individual autonomy and choice.

C – Cultural safety and justice

Practice leaders should inquire diverse perspectives of stakeholders of all groups to ensure inclusion. Respecting stakeholders' worldview and lived experiences, incorporation cultural safety into all aspects of decision-making and practice is essential for justice and fairness. LTC should be environments that are socially, spiritually, physically and emotionally safe. Attempts should be made to ensure that individuals are respected and will not be judged for their identity, age, racial background, and disabilities.

S – Support of privacy

Practice leaders have a responsibility to put appropriate strategies in place to mitigate any risk of infringement of privacy. For example, policies, regulations, practice guidelines should be developed to support for team to deal with ethical challenges. Investment should be made to provide staff education about ethical decision making. Residents, families and all staff should have access to ethicists' support and resources.

V. CONCLUSION

This paper offers a unique contribution to the knowledge base of ethics for robot use in LTC. We have three main conclusions. First, we argue for the need to bring relevant stakeholders together to negotiate a wide range of values of both technology benefits and risks in decision making. Second, our practical recommendations, ETHICS provides a useful framework to spark and support conversations for reflexive technology practice in LTC. Third, our study findings suggest more research is needed to gain a more inclusive understanding of various ethical values of robotic use in LTC - who is affected in what ways, and what can be done to address the risk and burdens of emerging technologies.

ACKNOWLEDGMENT

We are grateful for the collaborative partnership with Alzheimer Society of British Columbia. We want to express appreciation for the support by the Canada Research Chair and UBC Hampton award funding.

REFERENCES

- [1] R. M. Johansson-Pajala, K. Thommes, J. A. Hoppe, et al., "Care Robot Orientation: What, Who and How? Potential Users' Perceptions," *Int. J. Soc. Robot.*, vol. 12, pp. 1103-1117, Jan. 2020, doi:10.1007/s12369-020-00619-y.
- [2] L. Hung, C. Liu, E. Woldum, et al., "The benefits of and barriers to using a social robot PARO in care settings: a scoping review," *BMC Geriatr.*, vol. 19, no. 1, Aug. 2019, Art. no. 232, doi: 10.1186/s12877-019-1244-6.
- [3] L. Hung, A. Berndt, C. Wallsworth, et al., "Using touchscreen tablets to support social connections and reduce responsive behaviors in dementia care: A scoping review," *Dementia*, vol. 20, no. 3, pp. 1124-1143, May 2020, doi: 10.1177/1471301220922745.
- [4] A. Fiske, P. Henningsen, and A. Buyx, "Your Robot Therapist Will See You Now: Ethical Implications of Embodied Artificial Intelligence in Psychiatry, Psychology, and Psychotherapy," *J. Med. Internet. Res.*, vol 21, no. 5, May 2019, Art. no. e13216, doi:10.2196/13216.

- [5] W. Moyle, U. Arnautovska, T. Ownsworth, and C. Jones, "Potential of telepresence robots to enhance social connectedness in older adults with dementia: An integrative review of feasibility. *Int Psychogeriatrics*," *Int. Psychogeriatrics*, vol. 29, no. 12, pp. 1951-1964, Sep. 2017, doi:10.1017/S1041610217001776.
- [6] M. Niemelä, L. van Aerschoot, A. Tammela, I. Aaltonen, and H. Lammi, "Towards Ethical Guidelines of Using Telepresence Robots in Residential Care," *Int. J. Soc. Robot.*, vol. 13, no. 3, pp. 431-439, Feb. 2019, doi:10.1007/s12369-019-00529-8.
- [7] T. Wangmo, M. Lipps, R. W. Kressig, and M. Ienca, "Ethical concerns with the use of intelligent assistive technology: Findings from a qualitative study with professional stakeholders," *BMC Med. Ethics*, vol. 20, no. 1, Dec. 2019, Art. no. 98, doi:10.1186/s12910-019-0437-z.
- [8] A. Hall, C. Brown Wilson, E. Stanmore, and C. Todd, "Moving beyond "safety" versus "autonomy": A qualitative exploration of the ethics of using monitoring technologies in long-term dementia care." *BMC Geriatr.*, vol. 19, no. 1, May 2019, Art. no. 145, doi:10.1186/s12877-019-1155-6.
- [9] S. Chapman, J. Miller, and J. Spetz, "The Impact of Emerging Technologies on Long-Term Care and the Health Workforce," UCSF Health Workforce Research Center on Long-Term Care, San Francisco, CA, USA, 2019. [Online]. Available: <https://w3.accelera.com/blog/the-impact-of-emerging-technologies-on-airline-service-delivery>.
- [10] R. C. Locsin and H. Ito, "Can humanoid nurse robots replace human nurses?," *J. Nurs.*, vol. 5, no. 1, Jan. 2018, doi:10.7243/2056-9157-5-1.
- [11] M. Mulvenna, J. Boger, and R. Bond, "Ethical by Design: A Manifesto," in *ACM Int. Conf. Proc. Series*, New York: Association of Computing Machinery, Sep. 2017, pp. 51-54, doi: 10.1145/3121283.3121300.