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Abstract— **This extended abstract is a report on older people's perception of interactive robots in health- and elderly care. A series of focus groups was conducted. In total 31 older people participated. The majority of the participants viewed interactive robots in health- and elderly care as an asset but they also voiced concerns regarding reliability, practical handling, costs and fear of mechanical care.**

I. Introduction

Nowadays, the vast majority of humans are living a longer and healthier life than in the past. This is a positive development, although it put financial pressure on public expenditure [1], as it is presumed that an aging population increases the need for health and elderly care services [2, 3]. The aging population in combination with that there are fewer young people to provide and finance these services, challenge current welfare systems [4]. In the rhetoric of an aging population and shortage of care professionals, interactive robots are portrayed as a solution to resolve these problems by making healthcare more efficient and effective [5, 6]. Robots are described as a means to increase quality of care and decrease expenditure in health- and elderly care, including for those who are aging at home [7]. It is argued that robots also improve the well-being and working environments of care personnel and have positive effects on the private sector, especially in regard to the development of robotic technology products and know-how, which can lead to new sales and open up export possibilities [6, 8]. In this rhetoric, older peoples' perspective is seldom acknowledged. This paper, on the other hand, takes its point of departure in older people's opinions and views of robots in health- and elderly care. The assumption is that older people do not just absorb the versions of "reality" in regards to robots that is presented in the political rhetoric (mentioned above) but construct their own versions of "reality" of robots in health- and elderly care. How older people think, act and feel in regard to robots are interesting as it reflects social norms and values, which may impact societal acceptance of robots. As social norms and values often link the state of what is considered "good" or "bad" technologies in addition to "good" or "bad" standards of living, aging and well-being [9]. Social norms and values constitute our social and cultural understanding of a phenomena [10].

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II. Method

Focus groups were used as method to understand robots in health- and elderly care from the older participants perspective and their construction of meaning and knowledge through interaction with each other and the researchers [11].

A series of focus groups was led by a facilitator (first author), who directed the flow of questions and videos (table I). The questions were open-ended and the method involved facilitating the participants to freely discussing the questions and their disagreements in a positive atmosphere. Another researcher observed and took notes during the focus groups (second author). Each focus group were recorded via voice memo on an iPhone and written field notes were taken during and after each focus group. The data analysis was performed in three steps: first by data familiarization, generation of initial coding, searching the voice recordings for themes, secondly by comparing the emerging themes with the field notes. Then grouping the subthemes from the first and second step to core themes and comparing and modifying the core themes with the answers from the individual questionnaire to verify and confirm the findings[12].

TABLE I
THE STEPS OF THE FOCUS GROUPS

Step 1.	Introduction and welcome
Step 2.	A short video presentation of different robot applications in health- and elderly care
Step 3.	Individual questionnaire regarding the perceptions of the robot applications in the video
Step 4.	The participants were asked to describe and design their ideal robot and explaining what they would like it to do
Step 5.	Group discussion about the participants ideal robot
Step 6.	Group discussion about risks and opportunities of robots in health and elderly care
Step 7.	Group discussion about what hinders the participants to adapt and use a robot?
Step 8.	Group discussions about under the circumstances in which the participants would adopt a robot
Step 9.	Wrap up

A total of 31 older people participated in the focus groups. Fifty-five percent were women and forty-five percent were men. They ranged in ages from 70 to 85 (mean 76.8). Participation was voluntary, and they had been recruited from senior citizens organizations' in the surrounding area. The focus groups were conducted during September 2018 in Stockholm, Sweden and lasted about two hours each. The researchers followed the guidelines on research ethics issued

by the Swedish Research Council [13]. The research is carried out as part of the INBOTS project (www.inbots.eu), in which our task is to share knowledge of robotics with the public to encouraging understanding of interactive robotics, including the impacts of robotics and their limitations.

III. RESULTS

The data analysis revealed tacit assumptions and values, among the participants, regarding robots in health- and elderly care. When being asked about designing and describing their ideal robot, most participants wanted a robotic home maid that was able to take care of cleaning and laundry. Some wanted the robotic home maid to be a conversational partner, while others only wanted it to carrying out tasks they asked it to do without any social interaction. Similarly to the workshops we did in 2013 [14], the robot should be in the background and blend into the living environment. It should be small and easy to operate by verbal commands. During the focus group discussions opportunities, risks, pre-conditions and barriers for adopting robots were lively discussed. The data was thematically analyzed into four core themes: 1) potential of using robots in health and elderly care; 2) concerns of using robots in health and elderly care; 3) pre-conditions for using a robot; and 4) barriers to using a robot (table II). Due to limited space only a summary of each theme is presented

TABLE II

THEMES	SUBTHEMES
POTENTIAL OF USING ROBOTS IN HEALTH-AND ELDERLY CARE	Decreased health- and elderly care costs Increased working conditions for healthcare and elderly care professionals Increased patient service Increased delivery of care with constant quality Patient independence and integrity Twenty-four-seven service and assistance
CONCERNS OF USING ROBOTS IN HEALTH AND ELDERLY CARE	Mechanical care "over reliance" of robots in health- and elderly care Reliability Vulnerability and dependency Safety
PRE-CONDITIONS FOR USING A ROBOT	Needs/purpose Technology interest Finances Availability
BARRIERS FOR USING A ROBOT	The word "robot" Costs Size and appearance Reliability Question of responsibility Practical handling and usability

A. Potential of using robots in health- and elderly care

Most of the participants had similar arguments to the potential of using robots in health- and elderly care as the political rhetoric mentioned in the introduction[6]. Robots were perceived as means to reduce health- and elderly care costs, increase working conditions for health care professionals as robots were perceived as being able to do heavy lifts and transport supplies and patients. The efficiency and quality of care was also believed to increase as robots can work around the clock without being affected of lack of sleep or distracted by personal affairs. The common understanding among the participants was that robots may support independence and the feeling of safety. As a discussion between three of the participants illustrate:

We are just more and more who get really old (man, 83 years old(a)).

It won't be enough trained care assistants to take care of us when we become frail and in need of help. It worries me. I am lucky to be in good health (lady, 79-year-old(b)).

Be as it may, robots and machine will probably take care of us. I think I would prefer a robot instead of a care assistant who has a bad day (lady, 85-year-old(c))

Me too. I would not like to have a stranger helping me showering or with methods for toileting (person a)

A *robot would be able to call for help and assist around-the-clock if something happens to me* (person c)

B. Concerns of using robots in health and elderly care

Although the older participants could see the potential of robots in health- and elderly care, they also raised concerns. They felt that technological innovations were generated at a high speed, which made it difficult to keep up, cope and understand the possibilities and the risks at an individual level, and at a societal level. They feared that there might, in the future, be an over-reliance of robots in health- and elderly care, as the sector is facing huge challenges to provide good and preventive care of older people. Uncertainty, about if robots may increase independence or actually increase vulnerability and dependency was another concern that was vigorously discussed. It was believed that health and elderly care providers ought to be responsible for ensuring that robots enhance, not degrade the quality of life of their older patients/customers. Robots in health and elderly care raised several questions about security, privacy and integrity: Is there confidentiality in the data collected by robots at home or at care facilities? Who owns the data and who uses it? What happens if the robot is hacked or malfunctions and the data collected is used for decision making? Can it then give false diagnosis or lead to deceptive decisions?

Robots were perceived as providing health and elderly care providers with new possibilities for monitoring older people at home or in nurseries in their drive to reduce their ever-

increasing costs. In some cases, surveillance and monitoring was perceived as justifiable and reasonable. As in case of preventing falls or other harmful situations. However, it was perceived as a fine line between robots providing safety or instead invading privacy and integrity, as in monitoring and surveillance of exercise, health and social activities. It was very much down to the individual's right and possibility to give consent.

It was agreed on that robots need to be reliable fail-safe systems that can cause no harm or hazard to people. Fears was also raised that robots even if fail-safe system might drive the transformation of care to mechanical care and loss of physical human contact and socialisation. In this regard, mechanical care was associated with non-human standardised care without flexibility and adjustment to the individual's needs. Robots were perceived as unable to easily respond to altered circumstances and needs, while humans were perceived as superior to interpret care situations and changed circumstances, and adjust accordingly to specific needs of care.

C. Pre-conditions for using a robot

When discussing why and when the older participants would adopt a robot, the most common answer was when I have a need for one. None of them felt any urgent need of a robot at this moment in time. As one participant said:

I do not need a robot because I am still able to do most things I like to do but if I have a stroke or limited mobility then I might get a robot (lady, 83 years)

The extract illustrates that the person did not acknowledge any current need of robots but that the perception might change if her state of health changed. Robots per se represented disability aid for fragile elderly people with either cognitive decline or for people declined mobility, a representation that none of the participants identify themselves as. Other research has shown the same findings, that older people do not feel a current need of robots but they believe that robots might be useful in the future or for other more frail old people [15, 16]. If the participant were to get a robot, it need to be of relevance to them. They said that if a robot was perceived as beneficial enough to them, they may have an interest and the motivation to learn how to use it. At least, if they could afford to buy or lease it. However, an important pre-condition for adopting a robot was sufficient training so that they felt safe handling the robot, as well as continuous support and help if anything unanticipated happened.

D. Barriers for using a robot

Low awareness about robots in health- and elderly care was notice among the participants during the focus groups. The participant mentioned that they did not really know what a robot is and that they did not know what a robot could do for them. Furthermore, the word robot provoked negative feelings among the participants. The word robot was associated with automation and replacement of humans, while the participant suggested that we may use the word aid or robotic/mechanic help instead because then they associated it as supplement to humans instead of replacement. Most of them mentioned that they were not sure if they could handle a robot. They had prior experience with technology that had complicated interfaces and that were difficult to use, which ended up not being used at all. The reliability, size and appearance of the robot had a crucial impact on if they would ever consider having a robot or not. Another barrier, was the question of responsibility of the robot's action. Questions about responsibility were raised: What happens if the robot bump in to my furniture and scratch them? Who will pay for the damage? What happens if the robot run riot? What happens when complex robotic solutions do not work, who is then responsible? This kind of questions need to be answered with no uncertainties before the participants would considering getting a robot.

Another barrier vividly discussed was the cost of robots and who would pay. Swedish eldercare is mainly publically financed and universal (in regards that it aims to and is utilized by all socio-economic strata of the Swedish society), which means that there are certain eldercare service rights and public obligations to provide eldercare service for all older Swedish citizens in need. It also includes aides and medical equipment, if needed at home. Participants reasoned about a scenario where older people made their own choices based on a smorgasbord of interactive robotic solutions at a certain cost. The availability of robotic solutions in that case should be based on to provide the least reasonable level of living. In this scenario older people themselves could determine what kind of robot (out of the available stock at the smorgasbord) they wanted and needed. This solution was considered as fair because everyone, who needed care, would have the same choices and fair (equal) because the robots would in that scenario be subsidized by the Swedish government so that everyone paid the same amount of money for the robotic solution. The participants said that one barrier in this scenario could be that decisions on the social robotic smorgasbord may be influenced by differences between different municipalities in the country. Thereby it might be an unfair relationships between rural areas and cities, different municipalities, etc.

IV. DISCUSSION

In this paper, we have only had the space to give a glimpse of the findings from the focus groups with older people. Many of our findings confirm past research on older people's perception of robots: older people are a heterogeneous group of individuals who perceives robots and their need of robotic assistance differently [5, 17, 18]; and older participants who participates in research regarding robots are in general positive towards the development of robots [18-22].

What become clear during the focus groups, is the importance of individual autonomy. Every individual wants to be a free and independent being, regardless of age or health status. However, the reason for human life is

interdependence, and therefore no individual can actually be free in herself. Freedom is thus achieved only in relation to other people, and the exercise of power each individual has over another human being. Robots, for the participants, triggered a feeling both of loss and gain of autonomy and independence. Interdependence with robots could help an individual to establish independence and autonomy. If such freedom and autonomy is achieved in the human relation to robots, by each human individual exercises her power over the robots. As the human is the one who makes all the decisions and the robot obey. However, they also expressed fear over human interdependence with robots. Much of the concerns were driven by the perception of robots having the ability to be superior to humans and thereby exercise their "robotic" power over human individuals. In such scenario, robots were not perceived as evil but that people were in the hands of robots due to that humans had become dependent on robots to achieve autonomy. In case of system break down, power outage or the robots being hacked, fears were raised that people might become extremely vulnerable and at risk.

The high speed in which new technological innovations and robots are developed also frightened the participants. They felt that it was hard to keep up with the development and find reliable sources of information. They explained that there were two school of thoughts among their older friends. The ones who embrace technological change and want to learn more, and the ones who were oppose to technological change and who wanted to reinforce the past. Needless to say, but the first group was represented in the focus groups. However, regarding the second group - non-user and the one's opposed technological change raises interesting inquires . Why are they opposed? Is there a way to prepare older people for technological change and lifelong learning? Are there any difference in quality of life between the first and second group? If so, how do their everyday life differs?

V. Conclusion

Robots were perceived by the participants to add new elements of uncertainties in health- and elderly care. Although the participants thought that robots might become an asset in health- and elderly care, they also worried about robots being adopted without adequate knowledge about their societal impact and risks.

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