

Review

The use of care robots in aged care: A systematic review of argument-based ethics literature

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ABSTRACT

Background: As care robots become more commonplace in aged-care settings, the ethical debate on their use becomes increasingly important. Our objective was to examine the ethical arguments and underlying concepts used in the ethical debate on care robot use in aged care.

Methods: We conducted a systematic literature search for argument-based ethics publications focusing on care robot use in aged-care practices. We used an innovative methodology that consisted of three steps: (a) identifying conceptual-ethical questions, (b) conducting a literature search, and (c) identifying, describing and analyzing the ethical arguments in connection with the conceptual-ethical questions.

Results: Twenty-eight appropriate publications were identified. All were published between 2002 and 2016. Four primary ethical approaches were distinguished: (a) a deontological, (b) a principlist, (c) an objective-list, and (d) a care-ethical. All approaches were equally represented across the articles, and all used similar concepts that grounded their diverse ethical arguments. A small group of publications could not be linked to an ethical approach.

Conclusions: All included publications presented a strong ethical rationale based on fully elaborated normative arguments. Although the reviewed studies used similar grounding concepts, the studies' arguments were very diverse and sometimes diametrically opposed. Our analysis shows how one envisions care robot use in aged-care settings is influenced by how one views the traditional boundaries of the ethical landscape in aged care. We suggest that an ethical analysis of care robot use employs “democratic spaces,” in which all stakeholders in aged care, especially care recipients, have a voice in the ethical debate.

1. Introduction

With expanding care technology, the issue of whether better technology can contribute positively to the current state of aged care is gaining more attention. Moreover, there is a rapidly increasing imbalance between the number of older adults needing care and a decreasing number of caregivers (World Health Organization, 2015). Care robots are viewed by some as a promising technological development that has the potential to mitigate this growing care recipient-caregiver disparity. These robots can be considered as embodied forms of semi-independent or independent technology. They support caregivers and/or older adults in physically assistive tasks. For example, the “My Spoon Robot” can aid someone with eating problems, and the “Sanyo Bath Robot” provides hygienic care to older adults (Bedaf, Gelderblom, & de Witte, 2015). Other care robots serve as social supports (e.g. the seal-like robot Paro or the dog-like robot AIBO) (Bemelmans, Gelderblom,

Jonker, & de Witte, 2012). There are also care robots that combine both functions, being socially assistive. They give assistance through social interaction (Feil-Seifer & Matarić, 2005) (e.g. the human-like robot Robovie, and the robot, Pearl) (Kachouie, Sighadeli, Khosla, & Chu, 2014).

Many studies have examined how care robots can be used in aged-care settings (Bedaf et al., 2015; Kachouie et al., 2014; Robinson, MacDonald, & Broadbent, 2014); their effectiveness (Bemelmans et al., 2012; Mordoch, Osterreicher, Guse, Roger, & Thompson, 2013); what factors influence older adults' acceptance or rejection of care robots (De Graaf & Allouch, 2013; Flandorfer, 2012); and older adults' attitudes toward socially assistive robots (Vandemeulebroucke, Dierckx de Casterlé, & Gastmans, 2017). Nonetheless, as robot technology advances, care robots become increasingly independent. As the conviction of their use in aged-care practices builds, there is a growing need to ethically reflect on this use. Indeed, the field of roboethics addresses

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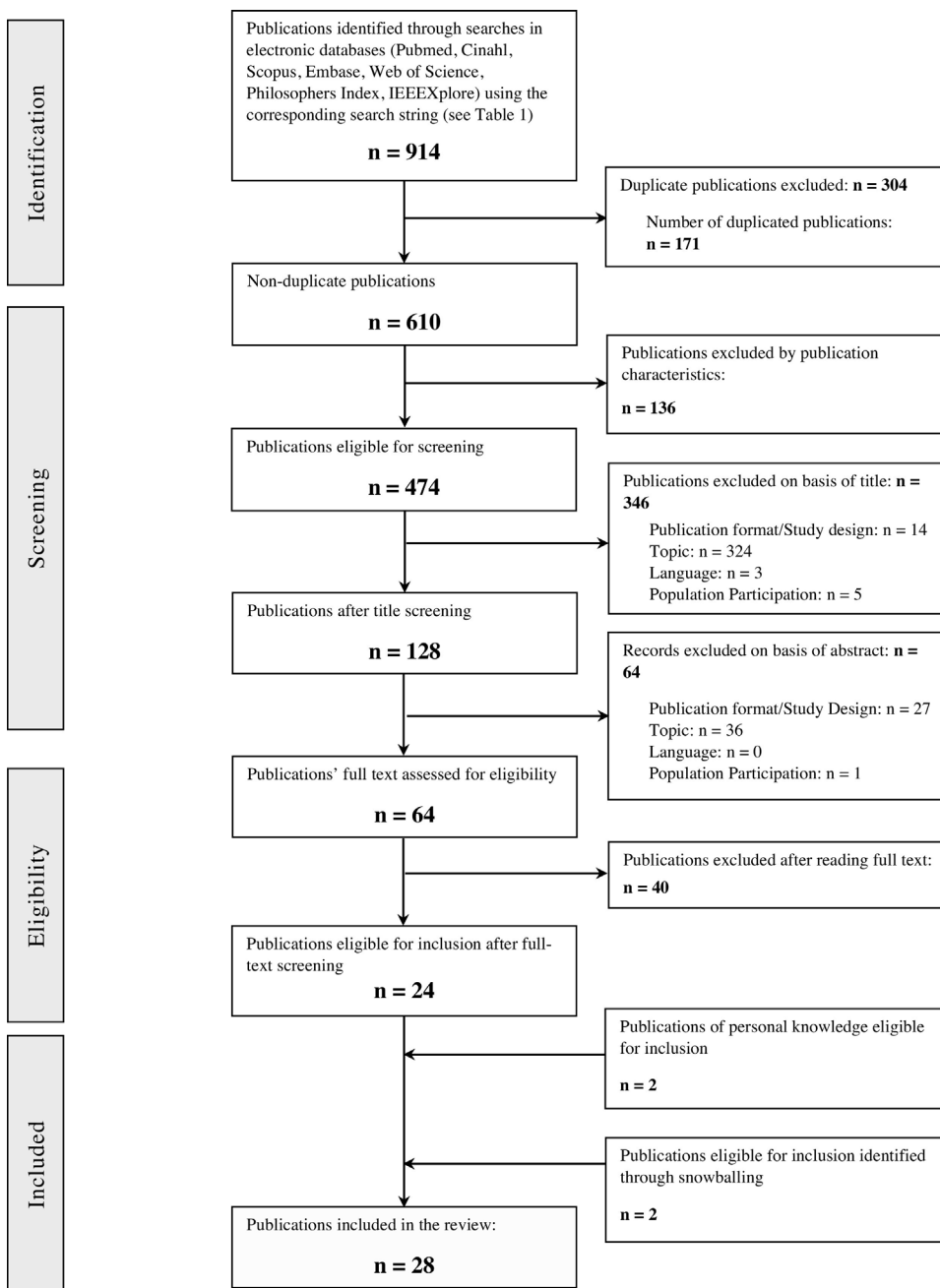


Fig. 1. Electronic search for literature identification and the selection process (after Liberati et al., 2009).

care robot use in aged-care practices (Lin, Abney, & Bekey, 2014; Tzafestas, 2016). Although these studies are valuable, we believe they do not address all arguments in the ethical debate about using care robots in aged care. Furthermore, the arguments presented in these studies have received limited analysis. To address this, we conducted a systematic review of the normative literature motivating the ethical debate on care robot use in aged-care practices.

2. Methods

Systematic reviews of normative literature are published frequently (Mertz, Kahrass, & Strech, 2016). Their goal is to promote informed decisions and judgments in all segments of healthcare, to improve research that aids these decisions and to continuously improve the standards of bioethics (McCullough, Coverdale, & Chervenak, 2007; Sofaer & Strech, 2012). The methodology developed for the present review shares these goals. Three steps were undertaken in our analyses.

First, we identified the conceptual-ethical questions; second, we conducted a literature search that addressed the questions; and third, we identified and described the ethical arguments in connection with the conceptual-ethical questions.

2.1. Conceptual-ethical question(s)

Our research questions sought to gain a deeper understanding of the ethical debate and its arguments through discovery of the grounding concepts of those arguments. As such these questions were essentially conceptual-ethical questions, resulting in two aims. One aim was to present an overview of the arguments used in each study. The second aim was to present an overview of the concepts that grounded an argument. We did this, because the same concepts can be used to develop different, even opposite, arguments. Consequently, this information leads to a better understanding of authors' ethical stance and why a certain concept was chosen to ground a specific argument. The

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