



Novel Socially Assistive Robot for Alzheimer's and Dementia Home Care; Lived Experiences of Families

University of New Hampshire, College of Health & Human Services, Department of Occupational Therapy
Audrey Downs, OTS Advisor: Dr. Sajay Arthanat, Ph.D., OTR/L., ATP

Research question

- Informal caregivers for individuals with AD/DR experience high levels of subjective burden
 - Potential for caregivers to benefit from SARs
 - Little research conducted on SARs in homes
- How does the use of SARs in a home setting impact the health and wellbeing of individuals with AD/DR and their informal caregivers, specifically in relation to caregiver burden?**

Methods

Design & Recruitment

Mixed Methods
 Recruitment: UNH research network & purposive sampling
 Rigor measures: triangulation & member checks - 100% agreement

Data Collection

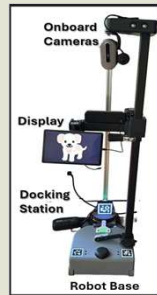
Qualitative interviews: questions based on Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)
Goal Attainment Scaling: track SAR efficacy in meeting care team goals

Data Analysis

Open coding & Inductive analysis for qualitative interviews
Goal Attainment Scaling calculations

Background & Relevance

- Over 7 million adults living with Alzheimer's Disease and Related Dementia (AD/DR) in America (Alzheimer's Association).
- Most individuals with AD/DR are cared for by unpaid family members; 15 million informal caregivers provide 18 billion hours of care annually (Arthanat et al., 2020).
- AD/DR causes progressive physical and cognitive decline, creating a strenuous task profile and high levels of caregiver burden; often leading to lower quality of life for both caregivers and care recipients (Wang et al., 2024; Zuschnegg et al., 2024).
- Socially assistive robots (SARs) are autonomous, interactive devices that can provide timed reminders and monitor home environments, potentially alleviating some burden (Arthanat et al., 2020; Zuschnegg et al., 2024).
- SAR efficacy depends on user acceptance, effectiveness of the SAR in meeting care team goals, and if caregivers feel they are also caring for the SAR, referred to as dual burden (Arthanat et al., 2020; Zuschnegg et al., 2024).



Intervention Protocol

Care recipient stands at microwave for x seconds, indicating confusion

Presence detected by motion sensors, SAR moves to microwave

SAR displays customized instructional video on microwave use

Dyad 1 Goals

- Medication adherence
- Walking outside triggered by warm weather
- Caregiver exercising with care recipient

Dyad 2 Goals

- Medication adherence
- Wearing appropriate footwear on walks
- Independently taking out trash
- Independently using coffee machine and microwave

Progressive Goal Attainment



Progressive Goal Attainment



Lived Experiences – Interviews Quotes

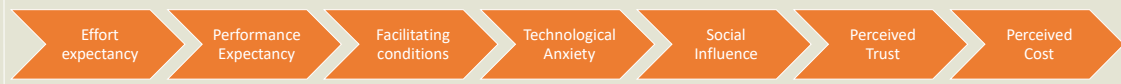
"It's that keeping him from getting frustrated with not being able to do things and to give him that satisfaction of being able to do things on his own."

"I'm getting rewarded more watching him being able to do these things."

"Maybe that's just because I'm realizing how beneficial it is. So the benefits outweigh any kind of work that I put into it."

"I'm very strongly of the opinion that she [SAR] needs to have more functionality and she's going to be a big help to me. And I say that because I think I'm functioning at a pretty high level now."

Unified Theory of Acceptance and Use of Technology Principles



Discussion

- SAR did not function at level of human CG but successfully provided complementary care
- Lessened CG burden & increased CR independence (esp. dyad 2); rewarding for CG to witness

Implications

- Valuable for couples aging in place, especially if CG experiencing slight cognitive decline
- OTs in home health can encourage automated reminder use (Reminder app, Amazon Alexa)

Future Research

- Evaluate SAR capacity to monitor for CG decline
- >SAR functionality (2-way communication; physical abilities)
- Limitations: small sample size, inability to provide 24/7 tech support (typically available for commercial products)

References

Alzheimer's Association. 2025 *Alzheimer's Disease Facts and Figures*. Alzheimer's Association, 2025.

Arthanat, S., Begum, M., Gu, T., LaRoche, D. P., Xu, D., & Zhang, N. (2020). Caregiver perspectives on a smart home-based socially assistive robot for individuals with Alzheimer's disease and related dementia. *Disability and Rehabilitation: Assistive Technology*, 15(7), 1-10. <https://doi.org/10.1080/17483107.2020.1753831>

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478. <https://doi.org/10.2307/30036540>

Wang, S., Huang, Y., Yat, A., Ho, M., & Davidson, P. (2024). Factors influencing the psychosocial well-being of people with dementia and their informal caregivers: A systematic review of dyadic studies. *International Journal of Mental Health Nursing*, 33, 560-581. <https://doi.org/10.1111/inm.13279>

Zuschnegg, J., Häußel, A., Ladron, G., Orgel, T., Russegger, S., Schneebberger, M., Felner, M., Holler, M., Dimitrios Prodromou, Schultz, A., Roller-Wirnsberger, R., Paletta, L., Kaini, M., & Schüssler, S. (2024). Psychosocial effects of a humanoid robot on informal caregivers of people with dementia: A randomised controlled trial with nested interviews. *International Journal of Nursing Studies*, 162, 104967-104967. <https://doi.org/10.1016/j.ijnurstu.2024.104967>



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Acknowledgement: This study was funded by the National Institute on Aging (R01 AG075892) - Effectiveness and adoption of a Smart home-based social assistive robot for care of individuals with Alzheimer's Disease. Principal Investigators: Sajay Arthanat, UNH, Occupational Therapy & Momotaz Begum, UNH, Computer Science. UNH IRB reviewed and approved this study: IRB-FY2022-379