

Application Fields and Innovative Technologies

Impact of a Non-Verbal AI Communication Robot on Care Staff in a Disaster-Affected Japanese Facility D. Haba, R. Miyashita, K. Tatsukawa, T. Kondo, F. Ohashi, A. Kitamura, C. Konya, H. Sanada, M. Matsumoto *Gerontechnology* 25(s)

Purpose The 2024 Noto Peninsula earthquake in Japan and subsequent heavy rains severely damaged long-term and short-stay care facilities in Japan, leaving staff to deal with personal losses while continuing to care for older adults with dementia and physical impairments. This study investigated whether an autonomous non-verbal AI communication robot, LOVOT (GROOVE X, Japan) (Figure 1) could improve health-related quality of life (QoL) and well-being among nurses, care assistants, and physiotherapists providing daily support to these residents. We also evaluated the robot's safety, acceptability, and intention to continue use, as any intervention must be easy to adopt and pose no added risk in frail care environments. **Method** From February to June 2025, we conducted an interventional ABAB design in three units—dementia care, general care and short stay—in a disaster-affected facility in Japan. Forty-nine healthcare professionals (care assistants, nurses and physiotherapists) participated. After a two-week baseline, the LOVOT robot was introduced for two weeks (A1), withdrawn for two weeks (B1), reintroduced for two weeks (A2) and finally withdrawn for two weeks (B2). After each phase, participants completed the EQ-5D-5L (health utility) and WHO-5 (subjective well-being) questionnaires [1, 2]. Safety was assessed using items on perceived danger, falls and collisions. Acceptability was measured with 17 semantic differential items covering likeability, perceived intelligence and emotional response [3], and the frequency of interaction (petting, touching, holding and engaging) was rated on a six-point scale. Intention to continue use was measured by three Likert items concerning interest, boredom and perceived necessity. Friedman tests with Wilcoxon signed-rank post hoc tests and Bonferroni correction compared outcomes across phases. **Results and Discussion** Most participants were women, median age ~50 years; 75.7% reported disaster-related damage at home. Baseline WHO-5 scores averaged 60 %, slightly below Japanese norms, while EQ-5D-5L utilities matched population averages [4, 5]. Staff engaged actively with the robot during intervention phases, and no robot-related accidents were reported. However, QoL and well-being scores did not change significantly across phases ($p > .05$). Acceptability items such as “felt calm,” “at peace,” “liked,” and perceptions of competence and intelligence improved transiently ($p < .05$) but not after adjustment. Staff in dementia care units perceived more positive effects than those in general care units, possibly reflecting different workloads or receptiveness to social robots. Although these short-term interventions did not yield statistical improvements, this is the first study to deploy an autonomous non-verbal robot for disaster-affected caregiving staff. The robot's safety and welcome reception suggest it could be a viable component of mental health support strategies in crises, offering companionship and brief respite. Future research should test longer exposure, integrate robot interactions with structured stress-management programs and examine outcomes for both caregivers and the older adults they serve. Such work could reveal whether robots like LOVOT provide scalable, adaptable support in regions with limited mental health resources during recovery.

References

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Keywords: care staff, non-verbal AI robot, quality of life, well-being, disaster

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Acknowledgement: This study was supported by JSPS KAKENHI (Grant Number 24H00660) and by a collaborative research grant from Molten Corporation.

