

Robots helped patients' with drug and exercise routines

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Associate Professor Elizabeth Broadbent with an iRobi robot. Credit: University of Auckland

A pilot randomised controlled trial using robots to help people at home with Chronic Obstructive Pulmonary Disease has found that the robots helped patients take their medication, carry out exercises, and keep them company.

The study, "Using robots at home to support [patients](#) with COPD: A pilot randomised controlled trial," was recently published in the *Journal of Medical Internet Research*.

Lead author Associate Professor Elizabeth Broadbent of the University

of Auckland's School of Medicine, says the pilot study aimed to investigate the effectiveness of a robot delivering telehealth care to increase adherence and home rehabilitation, improve quality of life, and reduce hospital readmission compared to a standard care [control group](#).

Hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) are expensive, with the average cost per admission in New Zealand around NZ\$4800. While the robots did not significantly reduce patients' [hospital admission rates](#), there was a trend for costs to be lower for those patients who had robots.

"The research is helpful as it suggests that a homecare robot can improve adherence to [medication](#) and increase exercise," she says.

"But further research is needed with a larger sample size to further investigate effects on hospitalisations after improvements are made to the robots. The robots could be especially useful for patients struggling to take their medication."

The study randomly allocated patients to one of two groups. In all, 25 people received an iRobi robot in their homes for four months in addition to standard care, while 29 received standard care alone. All participants had COPD. Other inclusion criteria included patients had to be relatively isolated and get out of the house less than four times per week, be living alone or with a spouse who was also largely housebound, geographic rural location, and aged between 16 and 90 years.

The iRobi robots were programmed to measure heart rate, breathlessness, and quality of life on a weekly basis. They reminded patients when to take medication and inhalers and recorded patient adherence several times a day; reminded patients to do their rehabilitation exercises, and displayed videos of a patient performing these at least twice weekly; provided education about COPD via video

modules and pop-up messages; allowed participants to use an "I am feeling unwell" function on demand; and showed trends over time of health status and adherence on the screen to the patient.

The robot was also integrated with wifi linked Smartinhalers to monitor inhaler use. The data was sent to a secure web server that managed all robot and patient data and logged all activities, with alerts if the measurements were out of range or patients were not adherent. Specialist physiotherapists monitored the patients' health data.

The study found that while there was no significant difference in the number of respiratory related hospitalisations between groups, the group with robots were significantly more consistent in taking their long-acting inhalers than the control group. The participants with robots also significantly increased their rehabilitation exercise frequency compared to the control group, though there were no significant differences in quality of life.

Of the 25 patients who had the robot, 19 had favourable attitudes. They said the robot helped remind them to take their medication, they enjoyed doing the exercises with it, and their friends and family were interested in the robot, particularly young children who enjoyed visiting to see the participant as well as the robot.

They commented that the robot raised awareness for the family about when they should be taking medication and about their illness. Most people said they enjoyed having the robot because they felt it had a personality and was good company. As a consequence, many participants had given their robot a name over the time they had it.

However six people did not enjoy having the robot, three of whom returned it before the 4 month period was complete. They said they did not find the robot useful because they were very good at managing their

medication and exercise on their own. The other three said they were unnerved by having the [robot](#) in their home.

More information: Elizabeth Broadbent et al. Using Robots at Home to Support Patients With Chronic Obstructive Pulmonary Disease: Pilot Randomized Controlled Trial, *Journal of Medical Internet Research* (2018). [DOI: 10.2196/jmir.8640](https://doi.org/10.2196/jmir.8640)

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