

# A randomized controlled trial of home teleassistance for older adults in need of care in Costa Rica

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Rapid population aging has transformed long-term care (LTC) demand across Latin America. In Costa Rica, the older adult population has doubled since 2000, recording one of the fastest aging rates and the lowest fertility in the region. In 94% of cases, care is provided by family members, most of whom are women, whose labor remains unpaid and unrecognized (Chaverri-Carvajal & Matus-López, 2026).

Law No. 10192, enacted in April 2022, created Costa Rica's National System of Care and Support for Dependent Adults and Older Adults (SINCA), which includes residential facilities, day centers, home-based care, home teleassistance (HT), and cash transfers for cases of difficult geographic access, making it the first middle-income nation in Latin America to establish a comprehensive legal framework for LTC (Matus-López & Chaverri-Carvajal, 2022). Four years later, Costa Rica has been classified as a high-income economy, and broader LTC service provision remains underdeveloped (Comas-Herrera et al., 2026). Yet implementation of in-kind services has been limited, with public support restricted to cash transfers for low-income women caring for severely dependent relatives (Chaverri-Carvajal & Matus-López, 2023; Chaverri-Carvajal & Alvarenga Fournier, 2026).

Between October 2024 and October 2025, the Municipality of Heredia financed and launched the first public HT service for dependent older adults in Costa Rica alongside a randomized controlled trial. Technical and regulatory oversight was provided by the Ministry of Human Development and Social Inclusion (MDHIS) and the Inter-American Development Bank (IDB). The protocol was approved under IMAS-PE-1086-2024.

Although Uruguay and subnational programs in Chile operate HT services, no prior RCT evaluation of such a service exists in the region (Benedetti et al., 2022). Home teleassistance is a social, not medical, service: it connects dependent older adults to a staffed support center via a fixed terminal and portable device, 24 hours a day, 365 days a year. Each user has an individualized care plan and receives scheduled calls accordingly; users and their

caregivers may also call at any time. The service encompassed five functions: emergency response coordination; structured outreach to prevent social isolation; medication reminders; medical appointment notices; and advisory support for family caregivers. The call center was staffed by psychologists, social workers, physicians, and trained operators following standardized protocols.

## Methods

The service was evaluated using a two-group, pre-post randomized controlled trial (RCT) with difference-in-differences (DiD) estimation (DiD compares before-and-after changes in the treatment group with the same changes in the control group, isolating what the service caused from what would have happened anyway).

A total of 636 participants were enrolled (treatment: 318; control: 318), constituting a parametric sample of the dependent older adult population in Heredia, all aged 65 or older, stratified by dependency level, sex, geographic subregion, and socioeconomic status. Baseline surveys were administered in fall 2024, and endline surveys in fall 2025 after 12 months of service operation.

The trial was designed to test four prespecified hypotheses concerning quality of life, loneliness, unnecessary hospital visits, and caregiver burden (Chaverri-Carvajal & Arguedas, 2024). Seven outcomes were assessed: mental and physical health-related quality of life (SF-36 MCS and PCS); loneliness; emergency (911) calls and hospital nights; and caregiver outcomes including weekly caregiving hours and caregiver burden (Zarit scale). Average treatment effects were estimated using DiD contrasts and tested using t-statistics ( $p < .05$ ;  $p < .01$ ;  $p < .001$ ).

## Findings

Six of the seven outcomes showed statistically significant improvements in the treatment group (Figure 1). Weekly

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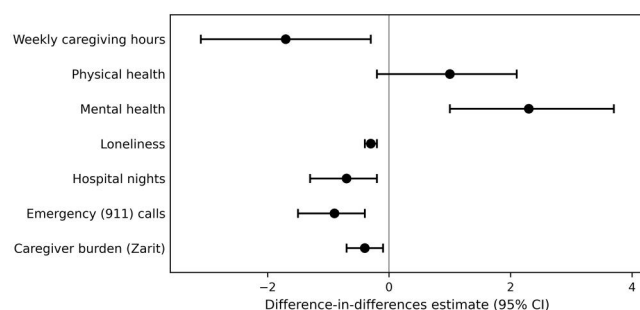


**Figure 1** Difference-in-differences estimates of the impact of the home teleassistance program. CI = confidence interval.

caregiving hours fell in the treatment group ( $\text{DiD} = -1.685$ ,  $p = .020$ ), as did caregiver burden on the Zarit scale ( $\text{DiD} = -0.399$ ,  $p = .010$ ). Mental health-related quality of life improved significantly (SF-36 MCS  $\text{DiD} = +2.337$ ,  $p = .001$ ). Loneliness declined markedly ( $\text{DiD} = -0.317$ ,  $p < .001$ ). The service reduced hospital nights ( $\text{DiD} = -0.717$ ,  $p = .010$ ) and emergency (911) calls ( $\text{DiD} = -0.212$ ,  $p < .001$ ). Physical health quality of life showed no significant change ( $\text{DiD} = +0.970$ ,  $p = .099$ ).

## Implications for long-term care policy

This trial provides the first experimental evidence from Latin America that HT can improve the mental well-being of dependent older adults, reduce loneliness, lower avoidable health care utilization, and alleviate caregiver burden. The strongest effects were observed in reductions in loneliness, emergency calls, and hospital nights. These findings are consistent with international evidence showing that HT interventions are most effective when they provide continuous social monitoring and preventive support (Stevenson et al., 2013).

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The absence of significant effects on physical health-related quality of life is not unexpected. Home teleassistance is primarily a preventive and social support intervention rather than a rehabilitative treatment and does not aim to improve physical health directly (Hirani et al., 2014).

Unlike Spain and the United Kingdom, where teleassistance is an established component of nationally integrated LTC systems, Latin American experience remains heterogeneous. Uruguay coordinates teleassistance nationally through its Sistema Nacional Integrado de Cuidados, subsidizing accredited private providers under common eligibility rules (Aranco & Sório, 2019; Matus-López & Cid Pedraza, 2016), whereas Chile has relied primarily on subnational initiatives (Pan American Health Organization & Inter-American Development Bank, 2023). Mexican Institute of Social Security ran a home tele-alarm program in 2009 with a

predominantly health-sector orientation, closer to clinical monitoring than to the social support model examined here (Giraldo-Rodríguez et al., 2013), whereas the municipality of Tigre, Argentina, partnered with the Red Cross on a small teleassistance service for older adults living alone, operating as a public-civil society partnership from 2018 to 2020 (Benedetti et al., 2022).

In Costa Rica, SINCA already recognizes HT as a formal LTC benefit, although national implementation remains pending (Chaverri-Carvajal & Matus-López, 2021). This trial therefore evaluates a municipal-level response to that gap. Home teleassistance also compares favorably on cost: it costs approximately \$25 per month, compared with an average of \$673 for home care services and \$804 for residential care (Chaverri-Carvajal & Arguedas, 2024). By 2026, Heredia had enrolled all control group participants as active users, evidence that the service is administratively viable at the municipal level.

Yet relying on each local government to independently organize and finance its own HT service risks reproduces the territorial inequalities in access that SINCA was created to correct, because fiscal capacity and administrative expertise vary widely across Costa Rican municipalities. Countries where HT has scaled nationally, such as Uruguay and Spain, have done so through nationally coordinated financing rather than independent local initiatives. SINCA could similarly finance and operationalize the HT benefit it already recognizes, through a combination of general taxation, intergovernmental transfers, and income-related copayments, an ex-ante/ex-post financing mix of the kind documented across LTC systems (Costa-Font et al., 2015). This is especially consequential where, as in Costa Rica, subnational fiscal capacity is uneven (World Health Organization, 2024).

Implementation also depends on institutional capacity beyond financial resources. With no domestic template to draw on, Heredia designed the service's content and protocols from scratch. A second, more specific challenge arose from the trial's own architecture: reaching the parametric sample required first recruiting and enrolling participants across both study arms, and only then launching service operations for the treatment arm, a sequence that a straightforward, nonexperimental rollout would not have required. Generating this level of demand, for a service the population was not accustomed to requesting, required sustained outreach, including radio and television announcements, promotional videos, visits to community groups of older adults and churches, and flyer distribution in public parks, to inform older adults and their families (Chaverri-Carvajal & Arguedas, 2024).

Workforce capacity poses a related but distinct challenge. Regional evidence documents persistent shortages of certified care personnel across Latin American LTC systems (Pan American Health Organization & Inter-American Development Bank, 2023). Heredia's HT service was staffed by psychologists, social workers, physicians, and trained operators following standardized protocols. Scaling HT nationally would require replicating this staffing model across territories, an approach consistent with teleassistance programs in more consolidated LTC systems that rely on multidisciplinary teams of sociosanitary professionals (De Cola et al., 2020). Meeting this requirement at scale would depend on national investment in training and certification pathways, instead of leaving each municipality to recruit and prepare its own workforce independently. Far from replacing

home-care services or reducing the need for care workers, this workforce complements existing LTC provision while allowing more intensive home-based services to be targeted toward individuals with greater care needs.

## Conclusion

In Costa Rica, LTC coverage has remained narrow despite its legal framework. The trial demonstrated that municipally funded HT can improve psychosocial well-being, reduce avoidable health care utilization, and reduce the caregiving burden. These reductions in hospital nights and emergency calls were achieved despite minimal formal integration between HT and the health sector, suggesting that closer coordination could yield even larger gains. Nevertheless, lower caregiving intensity should not be interpreted as evidence of automatic labor market reintegration among family caregivers, because structural barriers sustaining unequal care responsibilities remain unchanged. Preventive social care of this kind may generate health care savings, yet the national government has continued to rely on strictly means-tested LTC provision. The subsequent interest from other municipalities in replicating the Heredia model underscores the risk of an uneven, fragmented expansion of HT across the country. Ensuring equitable access will require the national government to finance and operationalize the HT benefit SINCA already recognizes, through pooled national resources rather than left to each municipality's independent fiscal capacity.

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## Conflicts of interest

None declared.

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