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TOPIC COLLECTION: PREVENTING SERIOUS FALL INJURIES

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Letter from the Editor

About one in four older Americans fall each year, resulting in about 30,000 deaths and 800,000 hospitalizations annually. Exercise, medication modification, and environmental safety measures have all been shown to reduce the incidence of falls in the elderly in clinical trials, but mortality attributable to falls has continued to rise.

In a pragmatic cluster-randomized trial reported in the New England Journal of Medicine, 86 primary care practices were randomized to offer an evidence-based, multifactorial, individually tailored, nurse-implemented intervention designed to reduce falls in older adults, or usual care. More than 5000 patients (mean age, 80 years) were enrolled and followed for up to 44 months. Unexpectedly, the rate of first serious fall injuries did not differ significantly between groups, nor did rates of hospitalization and death. Why did this promising intervention fail? The authors suggest that patients may not have adhered sufficiently to their treatment plans due to financial or transportation barriers, may have been unwilling to modify their medications or home environments, or were inadequately monitored. The findings highlight the difficulties sometimes encountered in translating findings from well-resourced, tightly controlled clinical trials into real-world practice. The disappointing outcome suggests that additional resources may be needed to encourage and monitor behavior change in older adults if the full benefits of evidence-based interventions are to be realized on a population level.

In related research recently summarized in NEJM Journal Watch, Liu-Ambrose and colleagues found that a home-based strength and balance program led to fewer major falls in older adults than usual care; Li et al. found that tai chi was more effective than a standard multimodal exercise intervention in preventing falls in older adults; and Bang and others showed that patients with at least moderate hearing loss in one or both ears were at significantly increased risk for postural instability.

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ORIGINAL ARTICLE

A Randomized Trial of a Multifactorial Strategy to Prevent Serious Fall Injuries

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ABSTRACT

BACKGROUND

Injuries from falls are major contributors to complications and death in older adults. Despite evidence from efficacy trials that many falls can be prevented, rates of falls resulting in injury have not declined.

METHODS

We conducted a pragmatic, cluster-randomized trial to evaluate the effectiveness of a multifactorial intervention that included risk assessment and individualized plans, administered by specially trained nurses, to prevent fall injuries. A total of 86 primary care practices across 10 health care systems were randomly assigned to the intervention or to enhanced usual care (the control) (43 practices each). The participants were community-dwelling adults, 70 years of age or older, who were at increased risk for fall injuries. The primary outcome, assessed in a time-to-event analysis, was the first serious fall injury, adjudicated with the use of participant report, electronic health records, and claims data. We hypothesized that the event rate would be lower by 20% in the intervention group than in the control group.

RESULTS

The demographic and baseline characteristics of the participants were similar in the intervention group (2802 participants) and the control group (2649 participants); the mean age was 80 years, and 62.0% of the participants were women. The rate of a first adjudicated serious fall injury did not differ significantly between the groups, as assessed in a time-to-first-event analysis (events per 100 person-years of follow-up, 4.9 in the intervention group and 5.3 in the control group; hazard ratio, 0.92; 95% confidence interval [CI], 0.80 to 1.06; P=0.25). The rate of a first participant-reported fall injury was 25.6 events per 100 person-years of follow-up in the intervention group and 28.6 events per 100 person-years of follow-up in the control group (hazard ratio, 0.90; 95% CI, 0.83 to 0.99; P=0.004). The rates of hospitalization or death were similar in the two groups.

CONCLUSIONS

A multifactorial intervention, administered by nurses, did not result in a significantly lower rate of a first adjudicated serious fall injury than enhanced usual care. (Funded by the Patient-Centered Outcomes Research Institute and others; STRIDE ClinicalTrials.gov number, NCT02475850.)

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*A list of investigators in the STRIDE trial is provided in the Supplementary Appendix, available at NEJM.org.

Drs. Bhasin, Gill, Reuben, Latham, and Peduzzi contributed equally to this article.

N Engl J Med 2020;383:129-40.
DOI: 10.1056/NEJMoa2002183

Home-Based Exercise Program Prevented Falls Among Elders

In a Canadian study, the incidence of major falls dropped by about one third.

Two recently published reports focus on the need for cost-effective fall prevention in an aging population. Canadian investigators enrolled 345 community-living people (mean age, 82) who had experienced falls in the previous year. Participants were randomized to either a home-based strength and balance program plus usual care or to usual care alone (usual care was provided by a geriatrician). The intervention involved five visits from a physical therapist during the first 6 months, exercises (for strength and balance) performed three times weekly, and walking at least 30 minutes twice weekly. At 12 months, fewer major falls had occurred in the intervention group than in the control group (236 vs. 366; adjusted relative reduction, 36%). No differences were noted in fall-related fracture rates between groups.

Researchers in the U.S. used a national database to assess mortality from falls in older adults (age, ≥75). They found that age-adjusted, fall-related mortality more than doubled between 2000 and 2016 (from 52 to 122 per 100,000 person-years).

COMMENT

In the Canadian study, falls were self-reported, so reporting bias is possible. Nevertheless, given the costs and consequences of falls, replication and evaluation of the relatively modest home-based exercise program is worthy of consideration in other clinical settings. ***— Thomas L. Schwenk, MD***

Liu-Ambrose T et al. Effect of a home-based exercise program on subsequent falls among community-dwelling high-risk older adults after a fall: A randomized clinical trial. **JAMA** *2019 Jun 4; 321:2092. (https://doi.org/10.1001/jama.2019.5795)*

Hartholt KA et al. Mortality from falls among US adults aged 75 years or older, 2000–2016. **JAMA** *2019 Jun 4; 321:2131. (https://doi.org/10.1001/jama.2019.4185)*

Pahor M. Falls in older adults: Prevention, mortality, and costs. **JAMA** *2019 Jun 4; 321:2080. (https://doi.org/10.1001/jama.2019.6569)*

Tai Chi Is More Effective Than Balance and Strengthening Exercises for Fall Prevention

In high-risk elders, tai chi lowered the rate of falls substantially.

Falls in older adults often are preventable with proper training. In this study, researchers in Oregon randomized 670 older adults (mean age, 78; mostly white women) at high risk for falling to one of three interventions:

- Tai ji quan (better known as tai chi)
- Multimodal exercise that incorporates strengthening, aerobic training, balance training and flexibility exercises
- Stretching (control group)

All interventions consisted of 60-minute sessions, held twice weekly for 24 weeks, with progressively increasing intensity as participants adapted. The cost per person for either tai chi or multimodal exercise was roughly US$900. At 6-months the tai chi group experienced significantly fewer falls than the multimodal group and the control group (11 vs. 16 and 27 falls/100 person-months). No serious adverse events were associated with the interventions.

COMMENT

The multimodal exercise intervention has been the commonly accepted standard for fall prevention, but these results suggest tai chi is superior. ***— Thomas L. Schwenk, MD***

Li F et al. Effectiveness of a therapeutic tai ji quan intervention vs a multimodal exercise intervention to prevent falls among older adults at high risk of falling: A randomized clinical trial. **JAMA Intern Med** *2018 Sep 10; [e-pub]. (https://doi.org/10.1001/jamainternmed.2018.3915)*

Hearing Loss and Postural Instability

These two clinical deficits were associated in a population-based study.

Some studies have suggested that hearing loss is a risk factor for postural instability and falls. To explore this association, Korean researchers conducted this study of nearly 4000 participants (age, ≥40; mean, 58) in a cross-sectional, population-based health survey. Each participant underwent pure-tone audiometry and a modified Romberg postural instability test. The latter test involves standing first with eyes open, and then with eyes closed, on a thick polyurethane foam pad; postural instability — defined as inability to maintain balance while standing on the pad for at least 20 seconds with eyes closed — was identified in 3.3% of participants.

After adjustment for age and sex, participants who had at least moderate hearing loss in one or both ears (threshold, >40 dB on audiometry) were at significant excess risk for postural instability (odds ratios, ≈2.0–3.0).

COMMENT

This study, which shows an association between hearing loss and balance problems, confirms my anecdotal observations in primary care practice over the years. Possible mechanisms, discussed in an editorial, include "shared dysfunction of the cochlear and vestibular sensing organs" and a contribution of auditory cues to "environmental awareness." Regardless of the mechanism, the findings suggest that we should discuss balance and tendency to fall with our hearing-impaired patients. ***— Allan S. Brett, MD***

Bang S-H et al. Association between hearing loss and postural instability in older Korean adults. **JAMA Otolaryngol Head Neck Surg** *2020 Jun; 146:530. (https://doi.org/10.1001/jamaoto.2020.0293)*

Lubetzky AV. Balance, falls, and hearing loss: Is it time for a paradigm shift? **JAMA Otolaryngol Head Neck Surg** *2020 Jun; 146:535. (https://doi.org/10.1001/jamaoto.2020.0415)*