EFFECTIVENESS OF A PREVENTIVE PROGRAM FOR THE REDUCTION OF FALLS IN OLDER ADULTS

EFECTIVIDAD DE UN PROGRAMA PREVENTIVO PARA LA DISMINUCIÓN DE CAÍDAS EN ADULTOS MAYORES

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Abstract

Introduction: Thirty percent of people over 65 reports at least one fall yearly. Prevention can reduce fall rates. Objective: to determine the effectiveness of a preventive program in reducing falls in older adults. Methods: a randomized trial from June 2018 to June 2019 in 40 general practices. Results: during the 12 months, 291 falls occurred in the intervention group versus 367 falls in the control group. 58.1% of patients reported no falls in the 12 months in the intervention group. Conclusions: general practice is an ideal setting for a fall prevention program for the community older adults.

Keywords: Falls, elderly, prevention, primary care, prevention, primary care.

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Resumen

Introducción:El 30 % de las personas mayores de 65 años reportan al menos una caída cada año. La prevención puede reducir las tasas de caídas.Objetivo: determinar la efectividad de un programa preventivo en la reducción de caídas en adultos mayores.Método: se realizó unensayo aleatorizado de junio de 2018 a junio de 2019 en 40 prácticas generales.Resultados: Durante los 12 meses ocurrieron 291 caídas en el grupo de intervención frente a 367 caídas en el grupo control. El 58,1% de los pacientes no refirió caída en los 12 meses en el grupo de intervención.Conclusiones: la práctica general es un escenario ideal para un programa de prevención de caídas en personas mayores en la comunidad.

Palabras clave: Caídas, adulto mayor,prevención,atención primaria

Introduction

Falls and fall-related injuries are common in community-dwelling older people and increase exponentially with age. For example, approximately 30% of people over 65 report at least one fall yearly [(1)].

A fracture is the most common fall-related injury resulting from hospitalization (89%). Fractures are often followed by permanently reduced mobility, admission to long-term care, increased healthcare costs, and excess mortality[(2)].

About 40% to 70% of people who have recently fallen fear falling, leading to activity restriction, social isolation, and worsening quality of life. Despite these serious consequences, older people are often unaware of the risk of falling[3].

Due to demographic changes and the high prevalence of falls in the elderly, the need for systematic periodic fall risk assessments and subsequent interventions in this group seems mandatory. Therefore, general practitioners see these patients regularly and can identify patients at risk for falls.

Therefore, the Falls Prevention Network Europe (ProFANE) has recommended an annual assessment[4]. Identified patients should be offered an effective exercise program. A Cochrane review confirmed that group and home exercise programs reduce the number of falls in community-dwelling older people[5]. According to other reviews, effective exercise intervention programs should include balance and progressive strength training[2].

Although falls prevention programs have many proven benefits, few trials have integrated exercise-based falls prevention programs into the general medical practice setting [6]. Therefore, the primary objective of our research was to investigate whether the implementation of an exercise-based falls prevention program in the Ecuadorian primary care setting, consisting of 16 weeks of group exercise in combination with individualized home-based exercise based on a training program, can significantly reduce the number of falls per person in community-dwelling older people at high risk of falls compared with those receiving usual care over one year. The secondary objectives were to explore the incidence of fall-related injuries and the effects of the training program on physical function and fear of falling.

Method

A two-level cluster randomized trial (general practices and patients) was conducted. General practitioners included community-dwelling seniors aged = 65 years with an increased risk of physical falls in the trial. The patient-level intervention program consisted of a supervised physical training program from June 2018 to June 2019 (1 hr/wk) with strength and power training, challenging balance and gait training with increasing levels of difficulty, behavioral aspects, a self-monitoring and perceptual training program, and functional training performed by a falls prevention instructor (physiotherapist or sports physician). Forty general primary care practices in Ambato were included. This study was approved by the Universidad Regional Autónoma de Los Andes (UNIANDES).

Increased risk of falls was defined as one or more falls in the past 12 months, low physical function (Timed-up-and-Go-Test or Chair-Stand-Test >10 seconds or subjective or objective balance deficits or fear of falling[7,8] . At least one criterion was necessary for inclusion in the study. Those who were not living independently or had physical or mental restrictions that interfered with assessing physical fall risk or participating in an exercise program were excluded.

The database and statistical processing of the data were performed and analyzed in the SPSS 26 statistical program (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used for the results collection, presentation and interpretation, and the significance level was set at 0.05 to consider a result significant. The quantitative data used summary measures, such as arithmetic mean and standard deviation.

Demographics, body mass index, fall risk assessment, comorbidities, and medications were assessed by trained general practitioner assistants who were not otherwise involved in the study design or exercise program.

The main outcome of the fall prevention program was to reduce the number of falls. Because some people do not distinguish between tripping (without injury) and falling (with injury) in everyday language, both terms were explicitly asked about. For each day, patients marked whether they had fallen or tripped. When a fall was reported, detailed information was obtained through structured telephone interviews with trained assistants in the first two weeks of the following month. In this study, a fall was defined as “an unexpected event in which the participant falls to the ground, floor, or lower level.”

Secondary outcome measures were the number of people who fell, the number of fall-

related injuries, improvements in physical function and fear of falling. Physical function was assessed using the 'Timed-Up-and-Go-Test' (TUG)[7], strength with the 'Chair-Stand-Test' (CST) and balance with the modified Romberg Test (mRomberg) as previously described[8,9].

Physicians and one staff member from each general practice participating in the intervention and usual care groups received training in 3.5-hour workshops that included general fall information and risk assessments. The incidence rate ratio was estimated to investigate the difference in the cumulative number of falls per individual within 12 months in the intervention group versus the control group.

The primary endpoint was tested as confirmatory; secondary endpoints were tested without adjustment for multiple testing. The relative risk in the intervention group versus the control group of having a fall or an injurious fall was calculated using two generalized hierarchical linear logistic regression models. Per the secondary outcome considered, a three-level linear mixed-effects model was used.

Results

Forty general practices participated in the study. Seven general practices withdrew after randomization and before recruiting patients. A total of 378 patients (65 to 94 years, mean age 78.1±5.9 years, 285 women) were included in 33 practices. Reasons for loss to follow-up were documented (n=78 patients).

The falls prevention program was organized in cooperation with the general practices participating in the patients' living environment. Four to 12 participants participated in each training group. In total, 181 patients (82%) participated in more than ten training sessions. Forty-six percent of the patients (101 of 222 participants) performed the home exercise program ten times or more (average 6.7 times). No adverse effects were observed during the exercise program. More than 50% of all patients reported at least one fall in the year prior to the study.

Table 1. Demographic data and results of physical function variables were distributed in the intervention and control groups.

Features		**Interventiongroup**		**Control group**	
Demographic data					
Gender (male/female)		50/172		43/113	0,213
Age (years)	N=222	78±6	N=156	78±6	0,600
BMI (kg/m^2)	N=222	27±5	N=156	27±5	0,574
Lives alone, n (%)	N=222	98(44,0)	N=156	60(38,5)	0,197
Physicalfunction					
TUG	N=222	13,0±5,5 12,0 (5,0-40,8)	N= 155	16,2±8,4 14,0(6,0-45,0)	<0,001
CST	N = 214	17,4±9,3 15,0 (7,0-90,0)	N=137	19,4±10,1 16,7(7,6 - 68,0)	0,024
mRomberg	N= 221	25,4±6,1 30,0 (2,0-30,0)	N=153	24,0±7,9 30,0 (2,0-30,0	0,071

Source: statisticalanalysis

Data are presented as mean ± standard deviation and median (min-max), respectively; BMI, body mass index; CST, chair stand test; mRomberg, modified Romberg test; TUG, Timed-Up-and-Go-Test; p-values for reference differences (t-test for normally distributed data, Mann-Whitney U-test for skewed data).

During the 12 months, 291 falls occurred in the IG (n=222) versus 367 falls in the CG (n=156). In the IG, 58.1% (n=129) of patients reported no falls in the 12 months vs. 50.6% (n=79) in the CG. The linear mixed model showed a significantly lower incidence rate (IRR) for falls (IRR: 0.54; 95% confidence

interval (CI): [0.35, 0.84]; p=0.007) in IG compared to CG.

70 of 156 patients in the CG experienced falls (44.9%) compared with 73 of 222 (32.8%) patients in the IG. The odds ratio of being a faller was significantly lower in the IG compared to the CG (OR: 0.52, [0.29, 0.91], p = 0.021). During the 12 months of 658 falls, 479 telephone interviews provided more information on fall-related injuries. In the CG, 59 of 156 patients reported at least one fall-related injury compared with 63 of 222 patients in the IG. The incidence rate of fall-related injury was significantly lower in the IG than in the CG (IRR: 0.66; [0.42, 0.94]; p=0.033).

GI patients showed small improvements in the Timed-Up-and-Go-Test, while CG patients required significantly more time (p=0.014). No significant difference was found in the time required for the chair stand test between GI and CG (p= 0.466). However, after 12 months in the CG, 20 of 114 patients could not rise from a chair five times compared to 12 of 184 patients in the GI. Balance performance on the mRomberg test was significantly increased in the IG compared to the CG (p=0.037).

At the start of the intervention, 100 of 179 patients in the IG were successful on all balance tests compared with 64 of 105 patients in the CG. After 12 months, 115 of 179 IG patients and 54 of 105 in the CG patients performed all balance tests successfully. In addition, fear of falling was significantly reduced in the IG (p=0.022).

Discussion

The results of the study confirmed that the implementation of an exercise-based falls prevention program in the primary care setting, consisting of 16 weeks of group exercise in combination with an individualized home training program, can significantly reduce the number of falls per individual, the number of people who fall, and the incidence rate of fall-related injuries in community-dwelling older people at high risk for falls compared with those receiving usual care.

During the 12-month trial period, 291 falls occurred in the intervention group and 367 falls were reported in the control group, with a significantly lower incidence rate of falls in the IG compared with the CG and a significantly lower likelihood of falls. The benefits were more pronounced than the results of a 12-month falls prevention program previously described by Lord et al., who reported 31% fewer falls in the intervention group. However, the adherence rate in that program was only moderate[10,11].

A systematic review showed greater effects in intervention programs focused on challenging balance exercises, individual-specific exercises (for intensity and type of exercise) and walking less[12–14]. These aspects were included in the study design. In addition, best practice recommendations for people at high risk of falls (small groups and closer supervision) were included. The results confirm that general practices are a promising setting for preventing falls in older people. Primary care physicians have direct access to seniors at high risk for falls, providing effective fall prevention contact for their patients.

The high impact of physical performance on the risk of falls has been established during the last years[15,16]. Therefore, in addition to improvements in the primary endpoint, the results on physical function confirm the positive effects of the falls prevention program.

Concerns about falling are common in about 43 % of community-dwelling older people[17] and 16 % of people who fall reported reducing their usual activity due to fear of falling ([18]). However, in our study, the fear of falling was significantly reduced after 12 months in the IG[19,20].

In general, studies in a primary care setting impact study design but significantly improve applicability in general patient care. Therefore, implementing an exercise program for many elderly people at high risk of falls, including the “usual elderly patient” in German general practice, without further exclusion criteria. It cannot be ruled out that physicians in the intervention group included patients with better physical fitness compared to the control group. Blinding of the participants was not feasible because half of the patients were assigned to usual care and thus were not included in any exercise intervention. Falls risk assessment was examined by trained staff members from

general practices who were not otherwise involved in the study.

Conclusions

This study shows that general practice is ideal for an exercise-based fall prevention program to prevent falls in at-risk community-dwelling older adults.

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