Exercise and Falls
This document contains all abstracts for publications relating to exercise and falls from July
2020 through to September 2020. These abstracts have been sourced from SafetyLit.org and
include only those relevant to falls prevention.
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the more than 30 distinct professional disciplines relevant to preventing and researching
unintentional injuries, violence, and self-harm. Each week citations and summaries of about
400 articles and reports are included in a PDF document or through an RSS subscription.

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Exercise Intervention RCT’s

Effectiveness of home-based rehabilitation program in minimizing disability and secondary falls after a hip fracture: protocol for a randomized controlled trial


DOI 10.1016/j.isjp.2020.06.002 PMID 32695954

Abstract

INTRODUCTION: Hip fractures are a major health problem globally and are associated with increased morbidity, mortality, and substantial economic costs. Successful operative treatment of hip fracture patients is necessary for the optimization of post-op mobility and functional recovery of the patient. Rehabilitation after surgical stabilization of a hip fracture is crucial in order to restore pre-fracture function and to avoid long-term institutionalization. In particular ongoing exercise which targets balance can prevent up to 40% of falls. Therefore, we have designed a post-discharge home-based physical rehabilitation intervention program to minimize disability and falls in this high-risk elderly population.

Methods and analysis: The study will be an open label, simple randomized controlled trial at a single hospital. The two arms will be equally allocated on a 1:1 ratio into intervention and control groups. The control arm will receive the usual standard postoperative rehabilitation. The intervention group will receive an extended home-based rehabilitation program twice a week continued for 3 months (12 weeks) after discharge. The Primary outcome of the study is occurrence of falls. Falls will be measured at 3, 6, 12, and 24 months by research-assistant follow-up telephone calls for both the groups. Mobility-related disability will be measured with a self-reported test at every routine follow-up for up to two years using a performance-based short battery tool. Negative binomial regression model will be used to compare number of falls in both the groups by computing incidence ratio rates.

Ethics and dissemination: Approval for the conduction of this study has been taken from the Ethical Review Committee (ERC) of the institution. Evidences which will be obtained from this study will facilitate to propose changes in existing guidelines and policies for treating fall and hip fracture patients. Trial registration This trial is registered on clinicaltrials.gov ID: NCT04108793.

Language: en

Keywords

Physical activity; Disability; Rehabilitation; CTU, Clinical trial unit; Elderly population; ERC, Ethical Review committee; Hip fracture; Secondary falls; THR, Total hip replacement
Effects of a 16-week multimodal exercise program on gait performance in individuals with dementia: a multicenter randomized controlled trial
(Copyright © 2020, Holtzbrinck Springer Nature Publishing Group - BMC)
DOI 10.1186/s12877-020-01635-3 PMID 32677897

Abstract
BACKGROUND: There is a high prevalence of gait impairments in individuals with dementia (IWD). Gait impairments are associated with increased risk of falls, disability, and economic burden for health care systems. Only few studies have investigated the effectiveness of physical activity on gait performance in IWD, reporting promising but inconsistent results. Thus, this study aimed to investigate the effectiveness of a multimodal exercise program (MEP) on gait performance in IWD.

METHODS: In this parallel-group randomized controlled trial, we enrolled 319 IWD of mild to moderate severity, living in care facilities, aged ≥ 65 years, and being able to walk at least 10 m. The control group (n = 118) received conventional treatment, whereas the intervention group (n = 201) additionally participated in a 16-week MEP specifically tailored to IWD. We examined the effects of the MEP on spatiotemporal gait parameters and dual task costs by using the gait analysis system GAITRite. Additionally, we compared characteristics between positive, non-, and negative responders, and investigated the impact of changes in underlying motor and cognitive performance in the intervention group by conducting multiple regression analyses.

RESULTS: Two-factor analyses of variance with repeated measurements did not reveal any statistically significant time*group effects on either spatiotemporal gait parameters or dual task costs. Differences in baseline gait performance, mobility, lower limb strength, and severity of cognitive impairments were observed between positive, non-, and negative responders. Positive responders were characterized by lower motor performance compared to negative and non-responders, while non-responders showed better cognitive performance than negative responders. Changes in lower limb strength and function, mobility, executive function, attention, and working memory explained up to 39.4% of the variance of changes in gait performance.

CONCLUSIONS: The effectiveness of a standardized MEP on gait performance in IWD was limited, probably due to insufficient intensity and amount of specific walking tasks as well as the large heterogeneity of the sample. However, additional analyses revealed prerequisites of individual characteristics and impacts of changes in underlying motor and cognitive performance. Considering such factors may improve the effectiveness of a physical activity intervention among IWD.

TRIAL REGISTRATION: DRKS00010538 (German Clinical Trial Register, date of registration: 01 June 2016, retrospectively registered, https://www.drks.de/drks_web/setLocale_EN.do ).

Language: en

Keywords
Physical activity; Cognition; Walking; Dual task; Neurodegenerative disorder; Physical functional performance
Combining cognitive stimulation therapy and fall prevention exercise (CogEx) in older adults with mild to moderate dementia: a feasibility randomised controlled trial
(Copyright © 2020, Holtzbrinck Springer Nature Publishing Group - BMC)
DOI 10.1186/s40814-020-00646-6 PMID 32724661

Abstract
BACKGROUND: People living with dementia (PLwD) have a high fall risk as cognitive impairment compromises control of gait and balance. Fall prevention exercises that are effective in healthy older adults may not work for PLwD. Cognitive stimulation therapy (CST) has been shown to improve global cognition in PLwD. A programme which combines cognitive (CST) with physical exercises may reduce falls in PLwD. The aim of this study was to assess the feasibility of undertaking a full scale randomised controlled trial to test the effectiveness of CogEx in decreasing falls in PLwD. Specific objectives included recruitment strategy, data collection, outcome measures, intervention fidelity and facilitator/participant experience.

Methods: A mixed methods feasibility randomised controlled trial recruited people from residential aged care. Inclusion criteria were ≥ 65 years old, Montreal Cognitive Assessment (MoCA) score of 10 to 26 and able to participate in a group. Participants were randomised to CST or CST combined with strength and balance exercises (CogEx). Both CST and CogEx groups were for an hour twice a week for 7 weeks. Descriptive statistics were used to report pre- and post-intervention outcome measures (MoCA, Geriatric Depression Scale-15, Quality of Life-Alzheimer’s Disease, Alzheimer’s Disease Assessment Scale-Cognitive 11, Brief Balance Evaluation Systems Test and Short Form Physical Performance Battery) and attendance. Qualitative analysis of participant focus groups and facilitator interviews used a conventional approach. Sessions were video recorded and exercise completion documented.

Results: Thirty-six residents were screened with 23 participants randomised to intervention (CogEx, n = 10) or control (CST, n = 13). The assessments took 45 min to 1.5 h, and there was repetition between two cognitive measures. Ten facilitators completed training with the manualised programme. Exercises were combined into the hour-long CST session; however, limited balance training occurred with participants exercising predominantly in sitting. The facilitators felt the participants engaged more and were safer in sitting.

Conclusions: The results demonstrated that while fall prevention exercises could be scheduled into the CST structure, the fidelity of the combined programme was poor. Other components of the study design need further consideration before evaluation using a randomised controlled trial is feasible.

Trial registration: anzctr.org.au (ACTRN12616000751471) 8 Jun 2016, Australian New Zealand Clinical Trials Registry.

Language: en

Keywords
Exercise; Dementia; Cognitive stimulation therapy
Balance training monitoring and individual response during unstable vs. stable balance Exergaming in elderly adults: findings from a randomized controlled trial
DOI 10.1016/j.exger.2020.111037 PMID 32730797

Abstract
OBJECTIVE: Exercise-based fall prevention programs mainly refer to multimodal and challenging balance exercises. Individual load monitoring and interpretations are crucial to enable adequate adaptation responses on the individual level. Thus, assessing internal responses to external stimuli throughout an intervention period need to be adequately addressed. The aim of this secondary analysis of a 3-armed randomized controlled trial was to analyze internal and external loads of unstable vs. stable balance Exergame training in healthy seniors. We intended to elucidate whether differences of external and internal load criteria occur over the intervention period.

METHODS: A total of 51 healthy seniors (females: n = 34; males: n = 17; age: 69 ± 6 years; BMI: 27 ± 5) were allocated to either volitional stepping (VOL), volitional stepping under unstable conditions (VOL + US) or an inactive control group (CON). VOL and VOL + US completed 8 weeks of Exergame based step training (three weekly sessions, 45 min each) using the Dividat Senso device. Twelve different balance Exergames were used, consisting of virtual reality like video games. The original nonswinging, stable platform was employed for VOL, whereas VOL + US used an adapted Senso mounted on a swinging Posturome Rack. The instability level was increased for VOL + US only every second week. External (game scores) and internal (perceived efforts, using the rated perceived exertion scale (RPE)) load measures were individually recorded for every session. Statistical analysis was carried out using linear mixed-effects modelling.

RESULTS: Although VOL + US completed similar games at identical training volumes under unstable conditions, the achieved game scores did not significantly differ between both training groups (p = 0.71). Both intervention groups notably improved their game scores over the 8 training weeks (p < 0.01). A significant time x group interaction effect was observed for perceived effort (p < 0.01), serving as an internal load measure. Subsequent post-hoc testing revealed significant greater perceived exertion values in each of the first 7 weeks (p < 0.05) in VOL + US compared to VOL. No between-group differences were found for RPE in week 8. Whereas RPE values in VOL + US decreased over time (week 1: 4.6 ± 1.9; week 8: 3.1 ± 1.6), VOL indicated similar RPE values for all weeks (week 1: 3.1 ± 1.3; week 8: 2.9 ± 1.4). A detailed analysis of all twelve games revealed that differences in perceived exertion depend on the game content: in 75% of the involved games the RPE level was significantly higher in VOL + US compared to VOL (p < 0.05).

CONCLUSION: Monitoring internal and external loads on individual level are paramount for gaining adequate training adaptations. Our results indicate that between-group differences in perceived efforts a) can funnel over time, b) depend on game content and c) do not necessarily affect overall scoring. Future studies should individually employ and monitor measures of perceived efforts to guarantee an adequate challenge to the balance system within exercise-based fall prevention programs.
Language: en

Keywords
Virtual reality; External; Internal; Seniors; Step training; Training load
Cost-effectiveness of the PDSAFE personalised physiotherapy intervention for fall prevention in Parkinson's: an economic evaluation alongside a randomised controlled trial


DOI 10.1186/s12883-020-01852-8 PMID 32781987

Abstract

BACKGROUND: PDSAFE is an individually-tailored, physiotherapist-delivered, balance, strength and strategy training programme aimed at preventing falls among people with Parkinson's. We evaluated the cost-effectiveness of PDSAFE compared with usual care for people with Parkinson's at higher risk of falling, from a UK National Health Service and Personal Social Service perspective.

METHODS: Resource use and quality of life data (EQ-5D-3L) were collected from 238 participants randomised to the PDSAFE intervention and 236 participants randomised to control, at baseline, 3 months, 6 months (primary outcome), and 12 months. Adjusted cost and quality-adjusted life-years (QALYs) were estimated using generalised linear models and uncertainty estimated using a non-parametric bootstrap.

RESULTS: Over 6 months, the PDSAFE intervention was associated with an incremental cost of £925 (95% CI £428 to £1422) and a very small and statistically insignificant QALY gain of 0.008 (95% CI - 0.006 to 0.021). The resulting incremental cost-effectiveness ratio (ICER) was £120,659 per QALY and the probability of the intervention being cost-effective at a UK threshold of £30,000/QALY was less than 1%. The ICER varied substantially across subgroups although no subgroup had an ICER lower than the £30,000 threshold. The result was sensitive to the time horizon with the ICER reducing to £55,176 per QALY when adopting a 12-month time horizon and assuming a sustained treatment effect on QoL, nevertheless, the intervention was still not cost-effective according to the current UK threshold.

CONCLUSIONS: Evidence from this trial suggests that the PDSAFE intervention is unlikely to be cost-effective at 6 months. The 12-month analysis suggested that the intervention became closer to being cost-effective if quality of life effects were sustained beyond the intervention period, however this would require confirmation. Further research, including qualitative studies, should be conducted to better understand the treatment effect of physiotherapy and its impact on quality of life in people with Parkinson's given existing mixed evidence on this topic.


Language: en

Keywords

Cost; Quality of life; Cost-effectiveness; Parkinson’s; Physiotherapist
Exercise and Risk Factors for Falls

Do exercises prevent falls among older adults: where are we now? A systematic review
(Copyright © 2020, Lippincott Williams and Wilkins)
DOI 10.1016/j.jamda.2020.05.010 PMID 32646820

Abstract
OBJECTIVE: To determine whether single interventions (SI), multifactorial interventions (MI), or multiple component interventions (MCI) including vitamin D supplementation prevent the incidence of falls and fall risk factors among older adults who are community-dwelling or living in long-term care facilities.

DESIGN: Systematic review.

METHODS: PubMed, Scopus, MEDLINE, and Cochrane were searched with restrictions applied to publication year (2015–2019) and language (limited to studies published in English). After duplicate removal and title and abstract screening, 2 authors independently identified eligible studies on the basis of inclusion criteria. Risk of bias and quality of evidence were assessed.

RESULTS: Thirty-four studies were included after screening titles and abstracts from 855 citations and 129 full-text articles. Thirteen randomized-controlled trials and clinical trials (5 on MI, 1 on MCI, and 7 on SI) including 2232 participants and 21 systematic reviews (assessing SI, MI, MCI, or all) were extracted for qualitative synthesis. Fifteen out of 20 studies that reported outcomes on falls rate found a significant reduction. Seventeen out of 23 studies with outcomes on fall risk factors concluded a significant improvement. Five studies found no significant differences in falls incidence, and 5 studies found no significant differences in fall risks. One study reported worsened outcomes, including poorer balance.

CONCLUSION AND IMPLICATIONS: Although results are inconclusive, SI, MI, and MCI involving exercises may prevent falls. Vitamin D supplementation may be beneficial alongside exercise; however, whether vitamin D use consistently reduces falls incidence or fall risks remains uncertain. Exercises that are individually tailored to participants' capabilities and risks may be the most effective falls prevention interventions. Implementation may reduce medical costs and improve quality of life for older adults who are community-dwelling or are living in long-term care facilities.

Language: en

Keywords
Falls; vitamin D; interventions; geriatric; exercises
Community care staff attitudes towards delivering a falls prevention exercise intervention to community care clients


(Copyright © 2020, John Wiley and Sons)

DOI 10.1111/hsc.13101 PMID 32687249

Abstract

Millions of older people world-wide receive community care services in their home to assist them to live independently. These services often include personal care, domestic assistance and social support which are delivered by non-university trained staff, and are frequently long term. Older people receiving community care services fall 50% more often than individuals of similar age not receiving services. Yet, few ongoing community care services include exercise programs to reduce falls in this population. We conducted an earlier study to examine the feasibility of community care staff delivering a falls prevention program. A critical finding was that while some of the assessment and support staff responsible for service delivery delivered the falls prevention exercise program to one or two clients, others delivered to none. Therefore, the aim of this qualitative sub-study was to understand reasons for this variation. Semi-structured interviews were conducted with 25 participating support staff and assessors from 10 community care organisations. Staff who had successfully delivered the intervention to their clients perceived themselves as capable and that it would benefit their clients. Older clients who were positive, motivated and wanted to improve were perceived to be more likely to participate. Staff who had worked at their organisation for at least 5 years were also more likely to deliver the program compared to those that had only worked up to 2 years. Staff that did not deliver the intervention to anyone were more risk averse, did not feel confident enough to deliver the program and perceived their clients as not suitable due to age and frailty. Experienced staff who are confident and have positive ageing attitudes are most likely to deliver falls prevention programs in a home care organisation.

Language: en

Keywords

qualitative; falls; older people; home care; attitudes; motivation; staff perceptions
The effectiveness of exercises on fall and fracture prevention amongst community elderlies: a systematic review and meta-analysis


(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.jot.2020.05.007  PMID 32695605

Abstract

OBJECTIVE: To analyze the effectiveness of exercise interventions on falls and fall-related fracture prevention among community-dwelling elderlies.

Methods: Literature search was conducted in Pubmed and Embase. Keywords used for literature search were "fracture" AND "fall" AND "exercise". Randomized controlled trials involving community-dwelling elderlies older than 60 years old with physical exercises as intervention were included. A systematic review and meta-analysis was performed. The primary outcomes were falls and fractures.

Results: Twelve studies were included and 4784 participants were involved with a mean age of 75.4. The most common exercise interventions were strength and balance exercises. The results of meta-analysis of 11 studies showed that exercise intervention had beneficial effect on fall prevention (RR = 0.71, 95% CI, 0.62-0.82; I² = 24%, p < 0.0001). The effect was better when exercise intervention applied to women participants (RR = 0.64, 95% CI, 0.49-0.83; I² = 28%, p = 0.00009) compared to men and women participants (RR = 0.75, 95% CI, 0.64-0.89; I² = 24%, p = 0.001). The results of meta-analysis of seven studies showed that physical exercise had significant effect on fracture prevention (RR = 0.54, 95% CI, 0.35-0.83; I² = 25%, p = 0.005). However, the effect was significant when exercise intervention applied to women participants only (RR = 0.37, 95% CI, 0.20-0.67; I² = 0%, p = 0.001) but not significant when exercise intervention applied to both genders (RR = 0.80, 95% CI, 0.58-1.09; I² = 0%, p = 0.15).

Conclusion: Exercise interventions, especially the combination of strength and balance training, were effective in preventing falls. Resistance exercises and jumping exercises were effective for fracture prevention among community-dwelling older population. The effectiveness of exercise interventions on fracture prevention have more significant effect on women. Further studies are needed to test the effectiveness of exercise interventions in men.

Translational potential: The use of effective exercises or biophysical interventions including vibration therapy can be incorporated into Fracture Liaison Services to prevent future fall and fracture.

Language: en

Keywords

Prevention; Systematic review; Exercise; Fall; Fracture
Outcomes associated with scale-up of the Stepping On falls prevention program: a case study in redesigning for dissemination


(Copyright © 2020, Cambridge University Press)

DOI 10.1017/cts.2020.17 PMID 32695497

Abstract

INTRODUCTION: Translating complex behavior change interventions into practice can be accompanied by a loss of fidelity and effectiveness. We present the evaluation of two sequential phases of implementation of a complex evidence-based community workshop to reduce falls, using the Replicating Effective Programs Framework. Between the two phases, workshop training and delivery were revised to improve fidelity with key elements.

Methods: Stepping On program participants completed a questionnaire at baseline (phase 1: n = 361; phase 2: n = 2219) and 6 months post-workshop (phase 1: n = 232; phase 2: n = 1281). Phase 2 participants had an additional follow-up at 12 months (n = 883). Outcomes were the number of falls in the prior 6 months and the Falls Behavioral Scale (FaB) score.

Results: Workshop participation in phase 1 was associated with a 6% reduction in falls (RR = 0.94, 95% CI 0.74-1.20) and a 0.14 improvement in FaB score (95% CI, 0.11- 0.18) at 6 months. Workshop participation in phase 2 was associated with a 38% reduction in falls (RR = 0.62, 95% CI 0.57-0.68) and a 0.16 improvement in FaB score (95% CI 0.14-0.18) at 6 months, and a 28% reduction in falls (RR = 0.72, 95% CI 0.65-0.80) and a 0.19 score improvement in FaB score (95% CI 0.17-0.21) at 12-month follow-up.

Conclusions: Effectiveness can be maintained with widespread dissemination of a complex behavior change intervention if attention is paid to fidelity of key elements. An essential role for implementation science is to ensure effectiveness as programs transition from research to practice.

Language: en

Keywords

falls prevention; Implementation; dissemination; evidence-based programs; fidelity
Effects of enriched physical activity environments on balance and fall prevention in older adults: a scoping review


(Copyright © 2020, Human Kinetics Publishers)

DOI 10.1123/japa.2019-0395 PMID 32732456

Abstract

The incidence of falling, due to aging, is related to both personal and environmental factors. There is a clear need to understand the nature of the major risk factors and design features of a safe and navigable living environment for potential fallers. The aim of this scoping review was to identify studies that have examined the effectiveness of environments, which promote physical activity and have an impact on falls prevention. Selected studies were identified and categorized into four main topics: built environment, environment modifications, enriched environments, and task constraints. The results of this analysis showed that there are a limited number of studies aiming to enhance dynamic postural stability and fall prevention through designing more functional environments. This scoping review study suggests that the design of interventions and the evaluation of an environment to support fall prevention are topics for future research.

Language: en

Keywords

falling; constraints; enriched environments; postural stability
The safety and feasibility of a Halliwick style of aquatic physiotherapy for falls and balance dysfunction in people with Parkinson's disease: a single blind pilot trial


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**DOI** 10.1371/journal.pone.0236391  **PMID** 32730325

**Abstract**

**BACKGROUND:** There is growing evidence that aquatic physiotherapy may be effective for people with Parkinson's Disease (PD) but most studies have investigated land based type exercises in the aquatic environment. Few studies have examined customised aquatic therapies such as the Halliwick concept which focuses on trunk rotation and core stabilisation.

**OBJECTIVE:** The primary aim was to determine the feasibility of a Halliwick style aquatic physiotherapy intervention for people with PD. The secondary aim was to compare the Halliwick intervention with traditional aquatic and land based physiotherapy in terms of disease severity, balance and fear of falling.

**METHODS:** Halliwick style aquatic, traditional aquatic and land based physiotherapy were trialled in a single blind pilot study. All interventions ran for 60 minutes per week over 12 weeks. Feasibility outcomes were safety, adherence and attrition. Secondary outcomes included the Unified Parkinson's Disease Rating Scale motor subsection (UPDRS-III), Berg Balance Scale (BBS), Mini BESTest and modified Falls Efficacy Scale (mFES).

**RESULTS:** 30 participants with moderate PD were recruited. Participant mean age was 72 years (SD 8.4; range 51-86) with moderate disease severity (median Hoehn & Yahr score 3; IQR 1). No falls occurred during intervention sessions, however ten participants reported falls during the study period. No other adverse consequences were reported. All groups had adherence over 85%. No within group significant differences were found in UPDRS-III, BBS or mFES scores post-intervention for all groups, but the Halliwick aquatic group improved significantly in the Mini BESTest post-intervention (p = 0.011, 95% CI -7.36,-1.31, t (10) = -2.98).

**CONCLUSIONS:** Despite people with PD being a vulnerable population, aquatic physiotherapy, including the Halliwick style is a safe treatment option. Promising results for balance in the Halliwick aquatic group were observed, but further studies with larger sample sizes is required to increase confidence in the results.

Language: en
Effectiveness of physical therapy interventions in reducing fear of falling among individuals with neurological diseases: a systematic review and meta-analysis


(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.apmr.2020.06.025 PMID 32745544

Abstract

OBJECTIVE: To summarize the effectiveness of physical therapy (PT) interventions to reduce fear of falling (FOF) among individuals living with neurological diseases.

DATA SOURCES: PubMed, PEDro, Scopus, Web of Science, PsycINFO, CINAHL, and SportDiscuss were searched from inception until December 2019.

STUDY SELECTION: Clinical trials with either the primary or secondary aim to reduce FOF among adults with neurological diseases were selected.

DATA EXTRACTION: Potential papers were screened for eligibility and data extracted by two independent researchers. Risk of bias was assessed by the Cochrane Risk of Bias tool for randomized clinical trials and the NIH Quality Assessment Tool for pre-post studies. A meta-analysis was performed among trials presenting with similar clinical characteristics. The Grading Recommendations, Assessment, Development and Evaluation- GRADE was used to rate the overall quality of evidence.

RESULTS: Sixty-one trials/3954 participants were included in the review and 53 trials/3524 participants in the meta-analysis. The included studies presented, in general, with a low to high risk of bias. A combination of gait and balance training was found to be significantly more effective compared to gait training alone in reducing FOF among individuals with Parkinson's Disease (PD) (Mean Difference- MD = 11.80, 95% CI, 8.22 - 15.38; p < 0.001). Home-based exercise and leisure exercise demonstrated significant improvement in reducing FOF over usual care in multiple sclerosis (MS) (MD = 15.27, 95% CI, 6.15 - 24.38, p = 0.001). No statistically significant between-groups differences were reported among individuals with stroke and spinal cord injury (SCI). The overall quality of evidence presented in this review ranges from very low to moderate according to the assessment with the GRADE approach.

CONCLUSION: Gait with lower limb training combined with balance training is effective in reducing FOF in individuals with PD. Also, home-based or leisure exercise is effective among individuals with MS. However, due to several limitations of the included studies, further research is needed to examine the effectiveness of FOF intervention among individuals with neurological diseases.

Language: en

Keywords

systematic review; fear of falling; meta-analysis; neurological diseases; physical therapy
Changes in the static balance of older women participating in regular Nordic walking sessions and Nordic walking combined with cognitive training


DOI 10.3390/ijerph17155617 PMID 32759833

Abstract

Regular Nordic walking (NW) improves physical fitness, including the ability to maintain balance, in older adults. However, little is known about whether complementing the exercise programme with cognitive training (CT) contributes to increased effects. The aim of the study was to determine and compare the effect of regular NW and NW combined with CT on the ability to maintain static balance in older adults. The study examined 61 women aged 64 to 93 years living in adult day care centres. Twenty people participated in a three-month programme combining NW and CT (group NW + CT), 20 people participated only in NW classes (group NW), and 21 people were a control group (group C). The Romberg balance test, Fullerton Functional Fitness Test, and Attention and Perceptivity Test were used. After the programme, an increase in the time of maintaining the balance (with eyes open on the left and right legs) was observed in groups NW + CT and NW, with no such changes found in group C. This increase was greater in group NW + CT. Increased agility and strength of the hand were predictors of improving the ability to maintain balance. Regular NW improved the ability to maintain balance with eyes open in female residents of adult day care centres.

Language: en

Keywords

aging; physical activity; cognitive training; Nordic walking
Novel mat exergaming to improve the physical performance, cognitive function, and dual-task walking and decrease the fall risk of community-dwelling older adults


(Copyright © 2020, Frontiers Research Foundation)

DOI 10.3389/fpsyg.2020.01620 PMID 32793044

Abstract

Physical exercise and cognitive training were previously demonstrated to improve the physical functioning and decrease the incidence of falls for older adults. This study aimed to utilize an interactive exergame mat system to develop a novel cognitive-physical training program and explore the training effects on physical performance, cognitive function, dual-task walking (DTW), and fall risk compared to the control condition. In this quasi-experimental non-randomized controlled intervention study, 110 community-dwelling older adults participated. The exercise group (n = 56; mean age, 70.7 ± 4.6 years) performed ladder-type, three-by-three grid-type, and circle-type mat exergames with simultaneous cognitive-physical training (EMAT), while the control group (n = 54; mean age, 72.0 ± 5.7 years) underwent a multicomponent exercise intervention focused on physical and cognitive training. A 2 h training session was completed weekly for 3 months. Functional fitness (including upper- and lower-extremity strength and flexibility, grasp strength, aerobic endurance, static balance, dynamic balance and agility), a foot tapping test (FTT), the Montreal Cognitive Assessment (MoCA), DTW, and a fall risk questionnaire (FRQ) were assessed before and after the interventions. The EMAT program enhanced upper-extremity strength, lower-extremity strength and flexibility, aerobic endurance, and dynamic balance and agility; improved DTW and FTT performances; and decreased FRQ score. EMAT also showed a significant advantage over control in terms of lower-extremity strength and flexibility, aerobic endurance, dynamic balance and agility, and FRQ score (all P < 0.05). The current study provides evidence of the effects of a novel mat exergaming program on physical and cognitive performance. EMAT effectively reduced the fall risk and increased the dual-task ability of walking, factors that are important in fall prevention for community-dwelling older adults.

Language: en

Keywords

elderly; cognitive training; combined physical; exergame; fall prevention; smart exercise
The effects of physical exercise on balance and prevention of falls in older people: a systematic review and meta-analysis


(Copyright © 2020, MDPI: Multidisciplinary Digital Publishing Institute)

DOI 10.3390/jcm9082595 PMID 32796528

Abstract

The aims of this systematic review and meta-analysis were to evaluate the effects of physical exercise on static and dynamic balance in the elderly population, and to analyze the number of falls and fallers. A systematic literature search was conducted using PubMed-Medline, Cochrane Central, and Google Scholar to select randomized clinical trials that analyzed the role of exercise on balance and fall rate in patients aged 65 or older. Sixteen articles were included in this review. Applying the Cochrane risk-of-bias tool, three studies were determined to be at low risk of bias, nine at unclear risk of bias, and four at high risk of bias. The meta-analysis showed improvements in dynamic balance (p = 0.008), static balance (p = 0.01), participants' fear of falling (p = 0.10), balance confidence (p = 0.04), quality of life (p = 0.08), and physical performance (p = 0.30) in patients who underwent physical exercise compared to controls. The analysis of the total numbers of falls showed a decreased likelihood of falls in patients who participated in exercise programs (p = 0.0008). Finally, the number of patients who fell at least once was significantly reduced in the intervention group (p = 0.02). Physical exercise is an effective treatment to improve balance and reduce fall rates in the elderly.

Language: en

Keywords

systematic review; falls; older people; meta-analysis; balance; physical exercise
Effects of an intervention to reduce fear of falling and increase physical activity during hip and pelvic fracture rehabilitation


(Copyright © 2020, Oxford University Press)

DOI 10.1093/ageing/afaa050 PMID 32832985

Abstract

BACKGROUND: fear of falling and reduced fall-related self-efficacy are frequent consequences of falls and associated with poorer rehabilitation outcomes. To address these psychological consequences, geriatric inpatient rehabilitation was augmented with a cognitive behavioural intervention ("Step by Step") and evaluated in a RCT.

METHODS: one hundred fifteen hip and pelvic fracture patients (age = 82.5 years, 70% female) admitted to geriatric inpatient rehabilitation were randomly allocated to the intervention or control group. The intervention consisted of eight additional individual sessions during inpatient rehabilitation, one home visit and four telephone calls delivered over 2 months after discharge. Both groups received geriatric inpatient rehabilitation. Primary outcomes were fall-related self-efficacy (short falls efficacy scale-international) and physical activity as measured by daily walking duration (activPAL3™ sensor) after admission to rehabilitation, before discharge and 1-month post-intervention.

RESULTS: in covariance analyses, patients in the intervention group showed a significant improvement in fall-related self-efficacy (P = 0.025, d = -0.42), but no difference in total daily walking duration (P = 0.688, d = 0.07) 1-month post-intervention compared to the control condition. Further significant effects in favour of the intervention group were found in the secondary outcomes "perceived ability to manage falls" (P = 0.031, d = 0.41), "physical performance" (short physical performance battery) (P = 0.002, d = 0.58) and a lower "number of falls" (P = 0.029, d = -0.45).

CONCLUSIONS: the intervention improved psychological and physical performance measures but did not increase daily walking duration. For the inpatient part of the intervention further research on the required minimum intensity needed to be effective is of interest. Duration and components used to improve physical activity after discharge should be reconsidered.

Language: en

Keywords

older people; fear of falling; physical activity; falls efficacy; hip fractures; pelvic fractures
Power training improves bone mineral density and fall risk for a postmenopausal woman with a history of osteoporosis and increased risk of falling: a case report


(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.jbmt.2020.02.026 PMID 32826007

Abstract

The purpose of this case study was to assess the degree to which a 12-month power-based resistance-training program improved bone mineral density (BMD) and fall risk for a 70-year-old postmenopausal woman with osteoporosis and increased risk of falling. After an eight-week strength-development phase, we had the patient perform 44 weeks of resistance training with maximal force mobilization by instructing her to complete as many repetitions as possible during each 60-s set. We used dual-energy X-ray absorptiometry (DEXA) to assess BMD and Dynamic Gait Index (DGI) to assess fall risk before and after the intervention. Post compared to pre-training testing indicated an increase in BMD in the lumbar spine (24%) and femoral neck (29%) resulting in changes in T-score of 0.7 and 0.4 SD, respectively. Testing also revealed a seven-point change in DGI which improved her status to "safe ambulator." After a 12-month period of power training, BMD was increased and fall risk was reduced for a postmenopausal woman with osteoporosis and increased risk of falling.

Language: en

Keywords

Fall risk; Physical therapy; Osteoporosis; Postmenopausal; Power resistance training
Tai chi for the prevention of falls among older adults: a critical analysis of the evidence


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DOI 10.1123/japa.2020-0155 PMID 32839351

Abstract

Despite interest as to the benefits of Tai Chi, there remains a controversy over its effectiveness as an exercise intervention for preventing falls among older adults. This review synthesizes the evidence base with a focus on meta-analyses and randomized controlled trials with community-dwelling older adults. It provides a critical lens on the evidence and quality of the trials. High-quality evidence suggests that Tai Chi is an effective intervention for preventing falls in community settings; however, there is unclear evidence for long-term care facilities and an absence of evidence for hospital settings. When compared directly with other exercise interventions, Tai Chi may offer a superior strategy for reducing falls through its benefits on cognitive functioning. Using data from the current Cochrane review, a new synthesis is presented suggesting that 71-81% of community-dwelling older adults are adherent to class-based Tai Chi interventions. The practical opportunities and challenges for practitioners are discussed.

Language: en

Keywords

meta-analysis; exercise; review; randomized controlled trial; accidental fall
Can treadmill slip-perturbation training reduce longer-term fall risk upon overground slip exposure?


(Copyright © 2020, Human Kinetics Publishers)

DOI 10.1123/jab.2019-0211 PMID 32843581

Abstract

The purpose was to examine and compare the longer-term generalization between 2 different practice dosages for a single-session treadmill slip-perturbation training when reexposed to an overground slip 6 months later. A total of 45 older adults were conveniently assigned to either 24 or 40 slip-like treadmill perturbation trials or a third control group. Overground slips were given immediately after initial training, and at 6 months after initial training in order to examine immediate and longer-term effects. The performance (center of mass stability and vertical limb support) and fall percentage from the laboratory-induced overground slips (at initial posttraining and at 6 mo) were measured and compared between groups. Both treadmill slip-perturbation groups showed immediate generalization at the initial posttraining test and longer-term generalization at the 6-month retest. The high-practice-dosage group performed significantly better than the control group (P <.05), with no difference between the lower-practice-dosage and the control groups at the 6-month retest (P >.05). A single session of treadmill slip-perturbation training showed a positive effect for reducing older adults' fall risk for laboratory-induced overground slips. A higher-practice dosage of treadmill slip perturbations could be more beneficial for further reducing fall risk.

Language: en

Keywords

older adults; dosage; longer-term generalization; stability
Scale-up of the Stepping On fall prevention program among older adults in NSW: program reach and fall-related health service use


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DOI 10.1002/hpja.413 PMID 32860442

Abstract

ISSUE ADDRESSED: We describe the reach of the scale-up of Stepping On, a fall prevention program targeting community-dwellers aged ≥65 years in NSW, along with fall-related ambulance service use and fall-related hospitalisations after scale-up.

METHODS: Data on program provision were received from Local Health Districts. Routinely-collected fall-related ambulance usage and hospital admissions in NSW residents aged ≥65 years between 2009 and 2015 were compared within Statistical Local Areas prior to and following implementation of Stepping On using multilevel models.

RESULTS: Between 2009-2014 the program was delivered in 1,077 sites to 10,096 older adults. Rates of fall-related ambulance use and hospital admissions per 100-person-years were 1-2 in people aged 66-74, 4-5 in people aged 75-84 and 12-13 in people aged ≥85. These rates increased over time (p<.001). The interaction between time and program delivery was not significant for fall-related ambulance use or hospital admissions. The time-related increase in fall-related ambulance usage in people aged 75-84 years may have been moderated by the Stepping On program (rate ratio 0.97, 95% CI 0.93-1.00, p=.045).

CONCLUSIONS: There was no indication of a reduced rate of fall-related ambulance use or hospital admissions across the entire sample. Ambulance call-outs for falls in people aged 75-84 years may have reduced following program participation. SO WHAT?: Program scale-ups need to reach a large proportion of the target population with a focus on those groups contributing most to fall-related health service utilisation. Linking individual participants' health data as part of large-scale evaluations may provide better insights into program outcomes.

Language: en

Keywords

injury; older people; program evaluation; community based intervention
Does yoga reduce the risk of falls in older people?
(Copyright © 2020, BMJ Publishing Group)
DOI 10.1136/bmj.m3246 PMID 32883704

Abstract
Nearly a third of people aged over 65 years and over half of people older than 80 have a fall at least once a year. Falls and fall related injuries can be life changing and may result in chronic disability, admission to assisted living, or death. A fall can also precipitate a fear of falling, which may lead to restriction of activity and hence physical deconditioning. This in turn increases the risk of future falls.

Clinical guidelines from several countries recommend multifactorial interventions for preventing falls in older people, with exercise as a key component. A recent Cochrane review (108 randomised controlled trials, 23,407 participants) concluded there is strong evidence that well designed exercise programmes reduce the number of falls by about a quarter among older people living in the community. Such programmes also reduce the number of people experiencing one or more falls. Exercise that mainly involved balance and functional training reduced falls.

Yoga is a mind-body practice that typically involves a combination of physical postures, breathing exercises, and concentration/meditation. Yoga has become a popular means of promoting physical and mental wellbeing and is shown to improve health related quality of life in older people. Evidence from observational studies suggests it is an acceptable and attractive form of exercise …

Language: en
Effectiveness of exercise intervention on fall-related fractures in older adults: a systematic review and meta-analysis of randomized controlled trials


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DOI 10.1186/s12877-020-01721-6 PMID 32887571

Abstract

BACKGROUND: Exercise intervention can significantly improve physical function and bone strength; however, the effect of exercise on fall-related fractures in older adults remains controversial. This study aimed to assess the effectiveness of exercise intervention on fall-related fractures in older adults by conducting a meta-analysis of randomized controlled trials (RCTs).

METHODS: PubMed, EMBASE, and Cochrane databases were systematically searched for RCTs through November 24, 2019 to investigate the effectiveness of exercise intervention on fall-related fractures in older adults. Pooled relative risk (RR) with 95% confidence interval (CI) was calculated using the random-effects model. Sensitivity, subgroup, and publication bias analyses were also conducted.

RESULTS: A total of 7704 older adults and 428 fall-related fracture events from 20 RCTs were selected for the final meta-analysis. The follow-up duration across included trials ranged from 6.0 months to 7.0 years. The pooled RR suggested that exercise intervention was associated with a reduced fall-related fracture risk in older adults (RR: 0.74; 95% CI: 0.59-0.92; P = 0.007; I2 = 12.6%). The pooled conclusion was robust and not affected by any individual trial. Subgroup analysis revealed that the significant effect of exercise intervention on fall-related fractures was mainly detected when the study reported results from both male and female subjects, when it did not report the baseline body mass index, when individuals received both home- and center-based interventions, when the follow-up duration was > 1.0 year, and when it was a high-quality study.

CONCLUSIONS: Regular exercise intervention could prevent fall-related fractures in older adults. Further large-scale RCTs should be conducted to assess the effectiveness of different exercise programs on fall-related fractures at various sites.

Language: en

Keywords

Exercise; Meta-analysis; Older adults; Fracture risk
Recipient and instructor perspectives of an adapted exercise-based fall prevention programme for adults aged 50+ years with vision impairment: a qualitative study nested within a randomised controlled trial


(Copyright © 2020, BMJ Publishing Group)

DOI 10.1136/bmjopen-2020-038386  PMID 32883736

Abstract

OBJECTIVE: Older adults with vision impairment currently have no access to tailored fall prevention programmes. Therefore, the purpose of this study, nested within an ongoing randomised controlled trial (RCT), is to document the adaptation of an existing fall prevention programme and investigate the perspectives of instructors involved in delivery and the older adults with vision impairment receiving the programme (recipients).

DESIGN: We documented programme adaptations and training requirements, and conducted semistructured, individual interviews with both the instructors and the recipients of the programme from 2017 to 2019. The content of each interview was analysed using behaviour change theory through deductive qualitative analysis.

SETTING: New South Wales and Australian Capital Territory, Australia.

PARTICIPANTS: The 11 trained instructors interviewed were employees of a vision rehabilitation organisation and had delivered at least one programme session as part of the RCT. The 154 recipients interviewed were community-dwelling adults aged ≥50 years with vision impairment and no diagnosis of dementia, and had completed their participation in the programme as part of the intervention group of the RCT.

RESULTS: Six key themes were identified relating to recipient (delivery aptitude, social norms, habit formation) and instructor (individualised adaptation, complimentary to scope of practice, challenges to delivery) perspectives. With initial training, instructors required minimal ongoing support to deliver the programme and made dynamic adaptations to suit the individual circumstances of each recipient, but cited challenges delivering the number of programme activities required. Recipient perspectives varied; however, most appreciated the delivery of the programme by instructors who understood the impact of vision impairment.

CONCLUSIONS AND IMPLICATIONS: This novel qualitative study demonstrates that the adapted programme, delivered by instructors, who already have expertise delivering individualised programmes to older people with vision impairment, may fill the gap for a fall prevention programme in this population.

TRIAL REGISTRATION NUMBER: ACTRN12616001186448.

Language: en

Keywords
epidemiology; preventive medicine; qualitative research; public health; geriatric medicine; ophthalmology
The effect of Tai Chi exercise on postural time-to-contact in manual fitting task among older adults


(Copyright © 2020, Elsevier Publishing)

DOI 10.1016/j.gaitpost.2020.08.124 PMID 32896796

Abstract

BACKGROUND: A fall would impact elderly population's quality of life, which associate with diminished physical and psychological function, and can even be life-threatening. Tai Chi has been used to improve age-related postural instability in locomotion. However, it does not fully explain the mechanism of a lower risk of falling among the Tai Chi population compared to other healthy older adults.

RESEARCH QUESTION: The maintenance of postural stability is more complicated than minimizing postural movements. Postural time to contact is an important temporal measure of postural stability under fitting tasks, which might further clarify the benefits of long term Tai Chi exercise.

METHODS: Participants were required to fit a block (90 × 90 mm) through two different openings (130 × 130 mm and 100 × 100 mm) at two different distances (arm's length or 130 % of arm's length). Kistler forceplate and Vicon system were used to collect center of pressure and kinematic data, respectively. Postural time to contact was used to assess instantaneous perturbation for postural system.

RESULTS: Tai Chi group exhibited significant longer postural time to contact in quiet standing and shorter postural time to contact in fitting tasks, expecting for close-small condition, compared to the brisk walking and sedentary groups (p <.05). In addition, both large and small opening condition, Tai Chi group showed a shorter postural time to contact than brisk walking and sedentary groups (p <.0001).

SIGNIFICANCE: Long term Tai Chi exercise would promote the regulation of posture and decrease the postural constrain to increase the overall stability when performing fitting tasks. Therefore, Tai Chi exercise can be considered as a feasible method to enhance postural control and stability in older adult.

Language: en

Keywords

Tai Chi; Fitting task; Postural stability; Time to contact