Exercise and Falls

This document contains all abstracts for publications relating to exercise and falls from 2021 so far and will be updated quarterly. These abstracts have been sourced from SafetyLit.org and include only those relevant to falls prevention.

SafetyLit provides weekly abstracts of peer reviewed articles from researchers who work in 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.

Contents:

Exercise Intervention RCT's

Acceptability and feasibility of a community-based strength, balance, and Tai Chi rehabilitation program in improving physical function and balance of patients after total knee arthroplasty: study protocol for a pilot randomized controlled trial

Lo CWT, Brodie MA, Tsang WWN, Yan CH, Lam PL, Chan CM, Lord SR, Wong AYL. Trials 2021; 22(1): e129.

DOI 10.1186/s13063-021-05055-5 **PMID** unavailable

Abstract

BACKGROUND: The rate of falls in patients after total knee arthroplasty (TKA) is high and related to lower limb muscle weakness and poor balance control. However, since routine post-TKA rehabilitation is uncommon, it is paramount to explore alternative strategies to enhance balance and physical functioning in post-TKA patients. As Tai Chi is a proven strategy for improving balance in older people, the proposed study aims to determine the feasibility and acceptability of a 12-week community-based post-TKA multimodal Tai Chi program and to collect preliminary data with respect to the efficacy of such a program in improving balance and physical functioning in post-TKA patients as compared to usual postoperative care.

METHODS: A single-blinded 2-arm pilot randomized controlled trial will recruit 52 community-dwelling post-TKA patients (aged > 60 years) in Hong Kong. In addition, 26 untreated asymptomatic controls will be recruited for comparison purposes. The TKA patients will be randomized into either a 12-week multimodal Tai Chi rehabilitation group or a postoperative usual care group (26 each). Participants will perform the outcome assessments at baseline, 6, 12, 24, and 52 weeks after TKA, while asymptomatic controls will have the same assessments at baseline, 12, and 52 weeks after baseline. The rate of recruitment, retention, and attrition, as well as adherence to the intervention, will be measured and used to determine the feasibility of the study and whether a full-scale effectiveness trial is warranted. Further, qualitative interviews will be conducted to explore the acceptability and possible barriers to the implementation of the intervention. Primary and secondary outcomes including both patient-reported surveys and performance-based tests will be compared within and between groups.

DISCUSSION: The study will determine the feasibility and acceptability/potential efficacy of community-based rehabilitation for post-TKA patients and assess whether the intervention has the potential to be assessed in a future fully powered effectiveness trial. The findings will also be used to refine the study design and guide the conduction of a future definitive randomized controlled trial. TRIAL REGISTRATION: ClinicalTrials.gov NCT03615638. Registered on 30 May 2018. https://clinicaltrials.gov/ct2/show/NCT03565380.

Language: en

Keywords

Prevention; Falls; Tai Chi; Coordination; Balance; Rehabilitation; Lower limb muscle strength; Multi-faceted intervention; Total knee replacement

Barriers to implementation of STRIDE, a national study to prevent fall-related injuries

Reckrey JM, Gazarian P, Reuben DB, Latham NK, McMahon SK, Siu AL, Ko FC. J. Am. Geriatr. Soc. 2021; ePub(ePub): ePub.

DOI 10.1111/jgs.17056 **PMID** unavailable

Abstract

BACKGROUND/OBJECTIVES: Evaluations of complex models of care for older adults may benefit from simultaneous assessment of intervention implementation. The STRIDE (Strategies To Reduce Injuries and Develop confidence in Elders) pragmatic trial evaluated the effectiveness of a multifactorial intervention to reduce serious fall injuries in older adults. We conducted multi-level stakeholder interviews to identify barriers to STRIDE intervention implementation and understand efforts taken to mitigate these barriers.

DESIGN: Qualitative interviews with key informants. SETTING: Ten clinical trial sites affiliated with practices that provided primary care for persons at increased risk for fall injuries. PARTICIPANTS: Specially trained registered nurses working as Falls Care Managers (FCMs) who delivered the intervention (n = 13 individual interviews), Research Staff who supervised trial implementation locally (n = 10 group interviews, 23 included individuals), and members of Central Project Management and the National Patient Stakeholder Council who oversaw national implementation (n = 2 group interviews, six included individuals). MEASUREMENTS: A semi-structured interview guide derived from the consolidated framework for implementation research (CFIR).

RESULTS: We identified eight key barriers to STRIDE intervention implementation. FCMs navigated complex relationships with patients and families while working with Research Staff to implement the intervention in primary care practices with limited clinical space, variable provider buy-in, and significant primary care practice staff and provider turnover. The costs of the intervention to individual patients and medical practices amplified these barriers. Efforts to mitigate these barriers varied depending on the needs and opportunities of each primary care setting.

CONCLUSION: The many barriers to implementation and the variability in how stakeholders addressed these locally may have affected the overall STRIDE intervention's effectiveness. Future pragmatic trials should incorporate simultaneous implementation aims to better understand how research interventions translate into clinical care that improves the lives of older adults.

Language: en

Keywords

primary care; implementation science; fall prevention; pragmatic trial

Investigating the feasibility and acceptability of the HOLOBalance system compared with standard care in older adults at risk for falls: study protocol for an assessor blinded pilot randomised controlled study

Liston M, Genna G, Maurer C, Kikidis D, Gatsios D, Fotiadis D, Bamiou DE, Pavlou M. BMJ Open 2021; 11(2): e039254.

DOI 10.1136/bmjopen-2020-039254 **PMID** unavailable

Abstract

INTRODUCTION: Approximately one in three of all older adults fall each year, with wide ranging physical, psychosocial and healthcare-related consequences. Exercise-based interventions are the cornerstone for falls prevention programmes, yet these are not consistently provided, do not routinely address all components of the balance system and are often not well attended. The HOLOBalance system provides an evidence-based balance training programme delivered to patients in their home environment using a novel technological approach including an augmented reality virtual physiotherapist, exergames and a remote monitoring system. The aims of this proof-of-concept study are to (1) determine the safety, acceptability and feasibility of providing HOLOBalance to community dwelling older adults at risk for falls and (2) provide data to support sample size estimates for a future trial.

METHODS: A single (assessor) blinded pilot randomised controlled proof of concept study. 120 participants will be randomised to receive an 8-week home exercise programme consisting of either: (1) HOLOBalance or (2) The OTAGO Home Exercise Programme. Participants will be required to complete their exercise programme independently under the supervision of a physiotherapist. Participants will have weekly telephone contact with their physiotherapist, and will receive home visits at weeks 0, 3 and 6. Outcome measures of safety, acceptability and feasibility, clinical measures of balance function, disability, balance confidence and cognitive function will be assessed before and immediately after the 8 week intervention. Acceptability and feasibility will be explored using descriptive statistics, and trends for effectiveness will be explored using general linear model analysis of variance. ETHICS AND DISSEMINATION: This study has received institutional ethical approvals in Germany (reference: 265/19), Greece (reference: 9769/24-6-2019) and the UK (reference: 19/LO/1908).

FINDINGS from this study will be submitted for peer-reviewed publications. TRIAL REGISTRATION NUMBER: NCT04053829. PROTOCOL VERSION: V.2, 20 January 2020. Language: en

Keywords

geriatric medicine; rehabilitation medicine; telemedicine

The performance of balance exercises during daily tooth brushing is not sufficient to improve balance and muscle strength in healthy older adults

Granacher U, Muehlbauer T, Göstemeyer G, Gruber S, Gruber M. BMC Geriatr. 2021; 21(1): e257.

DOI 10.1186/s12877-021-02206-w **PMID** unavailable

Abstract

BACKGROUND: High prevalence rates have been reported for physical inactivity, mobility limitations, and falls in older adults. Home-based exercise might be an adequate means to increase physical activity by improving health- (i.e., muscle strength) and skill-related components of physical fitness (i.e., balance), particularly in times of restricted physical activity due to pandemics.

OBJECTIVE: The objective of this study was to examine the effects of home-based balance exercises conducted during daily tooth brushing on measures of balance and muscle strength in healthy older adults.

METHODS: Fifty-one older adults were randomly assigned to a balance exercise group ($n = 27$; age: 65.1 ± 1.1 years) or a passive control group ($n = 24$; age: 66.2 ± 3.3 years). The intervention group conducted balance exercises over a period of eight weeks twice daily for three minutes each during their daily tooth brushing routine. Pre- and post-intervention, tests were included for the assessment of static steady-state balance (i.e., Romberg test), dynamic steady-state balance (i.e., 10-m single and dual-task walk test using a cognitive and motor interference task), proactive balance (i.e., Timed-Up-and-Go Test [TUG], Functional-Reach-Test [FRT]), and muscle strength (i.e., Chair-Rise-Test [CRT]).

RESULTS: Irrespective of group, the statistical analysis revealed significant main effects for time (pre vs. post) for dual-task gait speed ($p < .001$, $1.12 \leq d \leq 2.65$), TUG ($p < .001$, $d = 1.17$), FRT ($p = .002$, $d = 0.92$), and CRT ($p = .002$, $d = 0.94$) but not for single-task gait speed and for the Romberg-Test. No significant group × time interactions were found for any of the investigated variables.

CONCLUSIONS: The applied lifestyle balance training program conducted twice daily during tooth brushing routines appears not to be sufficient in terms of exercise dosage and difficulty level to enhance balance and muscle strength in healthy adults aged 60-72 years. Consequently, structured balance training programs using higher exercise dosages and/or more difficult balance tasks are recommended for older adults to improve balance and muscle strength.

Language: en

Keywords

Exercise; Mobility; Balance; Daily life; Healthy aging

Fall prevention interventions in primary care to reduce fractures and falls in people aged 70 years and over: the PreFIT three-arm cluster RCT

Bruce J, Hossain A, Lall R, Withers EJ, Finnegan S, Underwood M, Ji C, Bojke C, Longo R, Hulme C, Hennings S, Sheridan R, Westacott K, Ralhan S, Martin F, Davison J, Shaw F, Skelton DA, Treml J, Willett K, Lamb SE. Health Technol. Assess. 2021; 25(34): 1-114.

DOI 10.3310/hta25340 **PMID** unavailable

Abstract

BACKGROUND: Falls and fractures are a major problem.

OBJECTIVES: To investigate the clinical effectiveness and cost-effectiveness of alternative falls prevention interventions.

DESIGN: Three-arm, pragmatic, cluster randomised controlled trial with parallel economic analysis. The unit of randomisation was the general practice. SETTING: Primary care. PARTICIPANTS: People aged ≥ 70 years. INTERVENTIONS: All practices posted an advice leaflet to each participant. Practices randomised to active intervention arms (exercise and multifactorial falls prevention) screened participants for falls risk using a postal questionnaire. Active treatments were delivered to participants at higher risk of falling. MAIN OUTCOME MEASURES: The primary outcome was fracture rate over 18 months, captured from Hospital Episode Statistics, general practice records and self-report. Secondary outcomes were falls rate, health-related quality of life, mortality, frailty and health service resource use. Economic evaluation was expressed in terms of incremental cost per quality-adjusted life-year and incremental net monetary benefit.

RESULTS: Between 2011 and 2014, we randomised 63 general practices (9803 participants): 21 practices (3223 participants) to advice only, 21 practices (3279 participants) to exercise and 21 practices (3301 participants) to multifactorial falls prevention. In the active intervention arms, 5779 out of 6580 (87.8%) participants responded to the postal fall risk screener, of whom 2153 (37.3%) were classed as being at higher risk of falling and invited for treatment. The rate of intervention uptake was 65% (697 out of 1079) in the exercise arm and 71% (762 out of 1074) in the multifactorial falls prevention arm. Overall, 379 out of 9803 (3.9%) participants sustained a fracture. There was no difference in the fracture rate between the advice and exercise arms (rate ratio 1.20, 95% confidence interval 0.91 to 1.59) or between the advice and multifactorial falls prevention arms (rate ratio 1.30, 95% confidence interval 0.99 to 1.71). There was no difference in falls rate over 18 months (exercise arm: rate ratio 0.99, 95% confidence interval 0.86 to 1.14; multifactorial falls prevention arm: rate ratio 1.13, 95% confidence interval 0.98 to 1.30). A lower rate of falls was observed in the exercise arm at 8 months (rate ratio 0.78, 95% confidence interval 0.64 to 0.96), but not at other time points. There were 289 (2.9%) deaths, with no differences by treatment arm. There was no evidence of effects in prespecified subgroup comparisons, nor in nested intention-to-treat analyses that considered only those at higher risk of falling. Exercise provided the highest expected quality-adjusted life-years (1.120), followed by advice and multifactorial falls prevention, with 1.106 and 1.114 quality-adjusted life-years, respectively. NHS costs associated with exercise (£3720) were lower

than the costs of advice (£3737) or of multifactorial falls prevention (£3941). Although incremental differences between treatment arms were small, exercise dominated advice, which in turn dominated multifactorial falls prevention. The incremental net monetary benefit of exercise relative to treatment valued at £30,000 per quality-adjusted life-year is modest, at £191, and for multifactorial falls prevention is £613. Exercise is the most cost-effective treatment. No serious adverse events were reported. LIMITATIONS: The rate of fractures was lower than anticipated.

CONCLUSIONS: Screen-and-treat falls prevention strategies in primary care did not reduce fractures. Exercise resulted in a short-term reduction in falls and was cost-effective. FUTURE WORK: Exercise is the most promising intervention for primary care. Work is needed to ensure adequate uptake and sustained effects. TRIAL REGISTRATION: Current Controlled Trials ISRCTN71002650. FUNDING: This project was funded by the National Institute for Health Research (NIHR) Health Technology Assessment programme and will be published in full in Health Technology Assessment; Vol. 25, No. 34. See the NIHR Journals Library website for further project information.

Language: en

Keywords

CLUSTER RANDOMISED TRIAL; ECONOMIC EVALUATION; FALLS; FALLS PREVENTION; FRACTURE; PRIMARY CARE

Protocol of a 12-month multifactorial eHealth programme targeting balance, dual-tasking and mood to prevent falls in older people: the StandingTall+ randomised controlled trial

van Schooten KS, Callisaya ML, O'Dea B, Lung T, Anstey K, Lord SR, Christensen H, Brown A, Chow J, McInerney G, Miles L, Ngo M, Perram A, Delbaere K. BMJ Open 2021; 11(4): e051085.

DOI 10.1136/bmjopen-2021-051085 **PMID** unavailable

Abstract

INTRODUCTION: Falls have a multifactorial aetiology, which may limit the effectiveness of the common approach of exercise as the sole intervention strategy. Multifactorial interventions could be more effective in people at high risk of falling; however, the focus of such interventions has traditionally been quite narrow. This paper describes the design of a randomised controlled trial that will evaluate the effectiveness of an eHealth programme, which addresses cumulative effects of key fall-risk factors across the triad of physical, affective and cognitive functions on falls in older people.

METHODS AND ANALYSIS: 518 older people aged 65 years and over with high fall risk, defined as having a history of falls in the past 6 months, self-reported fear of falling or being aged 80 years or over, will be recruited via local advertisements, newsletters and presentations, and randomised to an intervention or health education control group. The intervention comprises balance exercise, cognitive-motor exercise and cognitive-behavioural therapy, with their dosage based on participant's baseline balance, executive function and mood. The primary outcome is the rate of falls in the 12 months after randomisation. Secondary outcomes at 6 and 12 months comprise programme adherence, healthcare use, physical activity, balance and mobility, cognitive function, psychological well-being, quality of life, health literacy and user experience and attitudes towards the programme. Data will be analysed following intention to treat to gauge real-world effectiveness. We will further determine complier averaged causal effects to correct for varying adherence and conduct economic analyses to gain insight into cost-effectiveness and cost-utility. ETHICS AND DISSEMINATION: Ethical approval was obtained from the University of New South Wales (UNSW) Human Research Ethics Committee in December 2017. Outcomes will be disseminated via peer-reviewed articles, conference presentations, community events and media releases. TRIAL REGISTRATION NUMBER: ACTRN12619000540112.

Language: en

Keywords

clinical trials; delirium & cognitive disorders; depression & mood disorders; telemedicine

Motor control and ergonomic intervention home-based program: a pilot trial performed in the framework of the Motor Control Home Ergonomics Elderlies' Prevention of Falls (McHeELP) project

Stasi S, Tsekoura M, Gliatis J, Sakellari V. Cureus 2021; 13(4): e14336.

DOI 10.7759/cureus.14336 **PMID** unavailable

Abstract

OBJECTIVEs Falls are a serious problem that can reduce living autonomy and health-related quality of life of older adults. A decrease in the muscular strength of the lower limbs and the deterioration of balance or motor performance deficits may lead to falls. "Motor Control Home Ergonomics Elderlies' Prevention of Falls" (McHeELP) is a novel motor control exercise program combined with ergonomic arrangements of the home environment. This pilot trial is conducted in order to examine the feasibility and acceptability of the McHeELP program, the selection of the most appropriate outcome measures, and the exact sample size calculation that should be used for the randomized controlled trial (RCT) with Clinical Trial Identifier: ISRCTN15936467. Patients and methods Twenty older adults (aged ≥65 years) who had experienced at least one fall-incident in the past 12 months have participated in the trial; they were randomized in a 1:1 ratio to the McHeELP group (McHeELP-G) and the Control group (CG). The McHeELP-G received a personalized therapeutic motor control and learning exercise program performed three times per week for 12 weeks. Regarding McHeELP - home modification, a booklet that contained basic advice and tips on the modification for their inside and outside home environment was provided to the participants.

OBJECTIVE and self-reported outcome measures, collected at baseline and post-intervention (end of the third month), included functional, fear of falling, and quality of life measurements.

RESULTS The McHeELP intervention was very feasible and acceptable to the participants, and the adherence was excellent (100%). The majority of outcome measures seemed appropriate and significant differences were also revealed between the two groups. Specifically, post-intervention statistically significant improvement was found in the 4 meters walking test, Timed Up and Go test, Sit to Stand test, Tandem Stance test, Functional Reach test, Foot tapping test, EuroQoL-5D-5L - visual analog scale (VAS), Lower Extremity Functional Scale, Falls Self-Efficacy International Scale, and Home Falls and Accidents Screening Tool (HOMEFAST) questionnaire of McHeELP-G (all p-values ≤0.002). No statistically significant difference was observed in the mobility, self-care, usual activities, pain/discomfort subscales of Euro QoL-5D-5L (all p-values >0.05), except the anxiety/depression subscale of McHeELP-G (p=0.008). Moreover, no statistically significant improvement was found regarding McHeELP participants' knee flexion/extension restriction and ankle dorsiflexion/plantar-flexion restrictions. Regarding CG, no statistically significant difference was found (p>0.05), except the Tandem Stance test (p=0.003) and HOMEFAST (p<0.001). Referring to the future McHeELP RCT, it was estimated that a sample size of 25 evaluable patients per group is required.

CONCLUSIONS This pilot trial's findings suggest that it is feasible to deliver an RCT of the McHeLP program to this population. Exercise programs

that are easy to administer need to be developed and implemented to reduce the burden of falls in older adults.

Language: en

Keywords falls; older adults; ergonomics; home-based programme; lower limb; motor control; physiotherapy

Comparison of the effects of education only and exercise training combined with education on fall prevention in adults aged 70 years or older residing in elderly residential facilities

Hong C, Lee H, Lee M. J. Korean Acad. Nurs. 2021; 51(2): 173-187.

DOI 10.4040/jkan.20203 **PMID** unavailable

Abstract

PURPOSE: To compare the effects of education only and exercise training combined with education on fall knowledge, fall efficacy, physical activity, and physical function in adults aged 70 years or older residing in elderly residential facilities.

METHODS: A three-group pre- and post-test design was utilized: education only (EO; n = 23), education and TheraBand (ET; n = 22), and education and walking (EW; n = 22). Fall education was provided for all three groups. In addition, TheraBand exercise training was provided for the ET and a walking exercise for the EW. Data were collected from November 1st, 2017 to February 15th, 2019 and analyzed with χ^2 test, paired t-test, and one-way ANOVA using IBM SPSS/WIN ver. 22.0.

RESULTS: Compared with the EO, the ET and the EW were more effective in terms of fall efficacy, physical activity, and lower extremity muscle strength. The EW showed higher improvement in walking abilities than the EO and the ET.

CONCLUSION: Exercise training combined with education is more effective in preventing falls among community-dwelling adults aged 70 years or older. When considering fall prevention programs for older adults, both TheraBand and walking exercise training combined with education can be chosen based on the participant's physical status. Aggressive strategies to improve daily walking are required to maintain walking abilities among community-dwelling adults aged 70 years or older.

Language: ko

Keywords

Education; Accidental Falls; Exercise; Frail Elderly; Muscle Strength

Home-based, tailored intervention for reducing falls after stroke (FAST): protocol for a randomized trial

Dean C, Clemson L, Ada L, Scrivener K, Lannin N, Mikolaizak S, Day S, Cusick A, Gardner B, Heller G, Isbel S, Jones T, Mumford V, Preston E. Int. J. Stroke 2021; ePub(ePub): ePub.

DOI 10.1177/1747493021991990 **PMID** unavailable

Abstract

RATIONALE: People with stroke experience falls at more than twice the rate of the general older population resulting in high fall-related injuries. However, there are currently no effective interventions that prevent falls after stroke. AIMS: To determine the effect and cost-benefit of an innovative, home-based, tailored intervention to reduce falls after stroke. SAMPLE SIZE ESTIMATE: A total of 370 participants will be recruited in order to be able to detect a clinically important between-group difference of a 30% lower rate of falls with 80% power at a two-tailed significance level of 0.05.

METHODS AND DESIGN: Falls after stroke trial (FAST) is a multistate, Phase III randomized trial with concealed allocation, blinded assessment, and intention-to-treat analysis. Ambulatory stroke survivors within five years of stroke who have been discharged from formal rehabilitation to the community and who have no significant language impairment will be randomly allocated to receive habit-forming exercise, home safety, and community mobility training or usual care. STUDY OUTCOMES: The primary outcome is the rate of falls over the previous 12 months. Secondary outcomes are the risk of falling (proportion of fallers), community participation, self-efficacy, balance, mobility, physical activity, depression, and health-related quality of life. Health care utilization will be collected retrospectively at baseline and prospectively to 6 and 12 months.

DISCUSSION: The results of FAST are anticipated to directly influence intervention for stroke survivors in the community.Trial Registration: ANZCTR 12619001114134.

Language: en

Keywords

falls prevention; home safety; Behaviour change; community participation; randomized trial; stroke

Using augmented reality technology for balance training in the older adults: a feasibility pilot study

Blomqvist S, Seipel S, Engström M. BMC Geriatr. 2021; 21(1): e144.

DOI 10.1186/s12877-021-02061-9 **PMID** unavailable

Abstract

BACKGROUND: Impaired balance leading to falls is common in the older adults, and there is strong evidence that balance training reduces falls and increases independence. Reduced resources in health care will result in fewer people getting help with rehabilitation training. In this regard, the new technology augmented reality (AR) could be helpful. With AR, the older adults can receive help with instructions and get feedback on their progression in balance training. The purpose of this pilot study was to examine the feasibility of using AR-based visual-interactive tools in balance training of the older adults.

METHODS: Seven older adults (66-88 years old) with impaired balance trained under supervision of a physiotherapist twice a week for six weeks using AR-based visual-interactive guidance, which was facilitated through a Microsoft HoloLens holographic display. Afterwards, participants and physiotherapists were interviewed about the new technology and their experience of the training. Also, fear of falling and balance ability were measured before and after training.

RESULTS: Five participants experienced the new technology as positive in terms of increased motivation and feedback. Experiences were mixed regarding the physical and technical aspects of the HoloLens and the design of the HoloLens application. Participants also described issues that needed to be further improved, for example, the training program was difficult and monotonous. Further, the HoloLens hardware was felt to be heavy, the application's menu was difficult to control with different hand manoeuvres, and the calibration took a long time. Suggestions for improvements were described.

RESULTS of the balance tests and self-assessment instruments indicated no improvements in balance performance after AR training.

CONCLUSIONS: The study showed that training with the new technology is, to some extent, feasible for the older adults, but needs further development. Also, the technology seemed to stimulate increased motivation, which is a prerequisite for adherence to training. However, the new technology and training requires further development and testing in a larger context.

Language: en

Keywords

Training; Fall; Postural stability; Augmented reality

StayBalanced: implementation of evidence-based fall prevention balance training for older adults-cluster randomized controlled and hybrid type 3 trial

Halvarsson A, Roaldsen KS, Nilsen P, Dohrn IM, Ståhle A. Trials 2021; 22(1): e166.

DOI 10.1186/s13063-021-05091-1 **PMID** unavailable

Abstract

BACKGROUND: The StayBalanced programme has shown positive effects on fall prevention, balance control and fear of falling. Despite convincing evidence on the efficacy and effectiveness of balance training, there is a gap between research findings and what is provided in community-based and clinical health care settings. Therefore, transferring evidence-based balance training into clinical practice is needed.

METHODS: This project, designed as a hybrid type 3 trial, is a cluster-randomized study with a mixed-method design, carried out in primary health care settings. The aim is to investigate the effectiveness of two different strategies to facilitate the implementation of an intervention, the StayBalanced balance training programme, in primary health care, including evaluation of relative changes and maintenance in patient outcomes between intervention arms over 24 months. The StayBalanced programme will be launched through a website with information on the balance training and how to use it in clinical practice. One implementation strategy will include close facilitation, i.e. support and close follow-ups initiated by the researchers, in addition to access to the website. The other strategy simply includes access to the StayBalanced website. Outcome measures in the project consist of implementation outcomes, such as acceptability, feasibility, fidelity and sustainability of the StayBalanced programme. Outcomes at an individual level for older adults participating in the training will include fall-related concerns, health-related quality of life, balance performance, gait, physical activity, muscle strength in lower extremities, number of falls and compliance with training.

DISCUSSION: This study will generate new understanding of effective strategies for transferring research to clinical practice and thereby reduce an important knowledge gap, as well as aid decision-making for future implementation of evidence-based methods. Furthermore, it will contribute to improved balance and gait, increased level of physical activity and function, and improved health-related quality of life for the individuals participating in the programme. TRIAL REGISTRATION: ClinicalTrials.gov NCT02909374. Registered on September 21, 2016.

Language: en

Keywords

Balance training; Implementation; Older adults; Clinical practice; Transferring knowledge

Effects of dual-task gait treadmill training on gait ability, dual-task interference, and fall efficacy in people with stroke: a randomized controlled trial

Baek CY, Chang WN, Park BY, Lee KB, Kang KY, Choi MR. Phys. Ther. 2021; ePub(ePub): ePub.

DOI 10.1093/ptj/pzab067 **PMID** unavailable

Abstract

OBJECTIVE: This study aimed to investigate the effects of dual-task gait training using a treadmill on gait ability, dual-task interference, and fall efficacy in people with stroke.

METHODS: Patients with chronic stroke (N = 34) were recruited and randomly allocated to the experimental or control group. Both groups underwent gait training on a treadmill and a cognitive task. In the experimental group, gait training was conducted in conjunction with the cognitive task, whereas in the control group, the training and the cognitive task were conducted separately. Each intervention was provided for 60 minutes, twice a week, for a period of 6 weeks for both groups. The primary outcomes were as follows: gait parameters (speed, stride, variability, and cadence) under single-task and dual-task conditions, correct response rate (CRR) under single-task and dual-task conditions, and dual-task cost (DTC) in gait parameters and CRR. The secondary outcome was the fall efficacy scale.

RESULTS: Dual-task gait training using a treadmill improved all gait parameters in the dual-task condition, speed, stride, and variability in the single-task condition, and CRR in both conditions. Difference between the groups was observed in speed, stride, and variability in the dual-task condition. Furthermore, dual-task gait training on a treadmill improved DTC in speed, variability, and cadence along with that in CRR, indicating true improvement of DTC, which led to significant improvement in DTC in speed and variability compared with single-task training.

CONCLUSIONS: Dual-task gait treadmill training was more effective in improving gait ability in dual-task training and DTI than single-task training involving gait and cognitive task separately in people with chronic stroke.

Language: en

Keywords

rehabilitation; stroke; dual-task condition; gait

Randomised trial of virtual reality gaming and physiotherapy on balance, gross motor performance and daily functions among children with bilateral spastic cerebral palsy

Jha KK, Karunanithi GB, Sahana A, Karthikbabu S. Somatosens. Mot. Res. 2021; ePub(ePub): ePub.

DOI 10.1080/08990220.2021.1876016 **PMID** unavailable

Abstract

BACKGROUND: Balance issues and poor gross motor function affect the daily needs of children with cerebral palsy.

PURPOSE: The study objective was to examine the effects of virtual reality gaming and physiotherapy on balance, gross motor performance and daily functioning among children with bilateral spastic cerebral palsy.

METHOD: Thirty-eight children with bilateral spastic cerebral palsy aged 6-12 years with GMFCS- level II-III, Manual Ability Classification System level I-III participated in this randomized controlled trial. The experimental group performed virtual reality games and physiotherapy, while the control group underwent physiotherapy alone. The exercise intensity was 60 minutes session a day, 4-days a week for 6-weeks. Paediatric Balance Scale (PBS), Kids-Mini-Balance Evaluation System Test (Kids-Mini-BESTest), Gross Motor Function Measure-88 (GMFM-88), and Wee-Functional Independence Measure (WeeFIM) were the outcome measures collected at baseline, 6-week post-training and 2-months follow-up.

RESULTS: The time by group interaction of repeated measures ANOVA revealed no statistical significance for all the outcome measures except Kids-Mini-BESTest ($p < 0.05$). The PBS and, Kids-Mini-BESTest improved by a mean (standard deviation) score of 5.1(1.7) and 8.7(2.8) points, respectively in the experimental group as compared to control group [3.4(1.6) and 5.8(2.5) points]. These gains remained at follow-up ($p < 0.001$).

CONCLUSION: Combined virtual reality gaming and physiotherapy is not superior over physiotherapy alone in improving the gross motor performance and daily functioning among children with bilateral spastic cerebral palsy. Virtual gaming, along with physiotherapy, appears to be beneficial in their balance capacity, warranting further trials to investigate the same in children with GMFCS level-III.

Language: en

Keywords

balance; Bilateral spastic cerebral palsy; daily activities; virtual reality

Home-based, tailored intervention for reducing falls after stroke (FAST): protocol for a randomized trial

Dean C, Clemson L, Ada L, Scrivener K, Lannin N, Mikolaizak S, Day S, Cusick A, Gardner B, Heller G, Isbel S, Jones T, Mumford V, Preston E. Int. J. Stroke 2021; ePub(ePub): ePub.

DOI 10.1177/1747493021991990 **PMID** unavailable

Abstract

RATIONALE: People with stroke experience falls at more than twice the rate of the general older population resulting in high fall-related injuries. However, there are currently no effective interventions that prevent falls after stroke. AIMS: To determine the effect and cost-benefit of an innovative, home-based, tailored intervention to reduce falls after stroke. SAMPLE SIZE ESTIMATE: A total of 370 participants will be recruited in order to be able to detect a clinically important between-group difference of a 30% lower rate of falls with 80% power at a two-tailed significance level of 0.05.

METHODS AND DESIGN: Falls after stroke trial (FAST) is a multistate, Phase III randomized trial with concealed allocation, blinded assessment, and intention-to-treat analysis. Ambulatory stroke survivors within five years of stroke who have been discharged from formal rehabilitation to the community and who have no significant language impairment will be randomly allocated to receive habit-forming exercise, home safety, and community mobility training or usual care. STUDY OUTCOMES: The primary outcome is the rate of falls over the previous 12 months. Secondary outcomes are the risk of falling (proportion of fallers), community participation, self-efficacy, balance, mobility, physical activity, depression, and health-related quality of life. Health care utilization will be collected retrospectively at baseline and prospectively to 6 and 12 months.

DISCUSSION: The results of FAST are anticipated to directly influence intervention for stroke survivors in the community.Trial Registration: ANZCTR 12619001114134.

Language: en

Keywords

falls prevention; home safety; Behaviour change; community participation; randomized trial; stroke

Interventions for preventing falls in people post-stroke: a meta-analysis of randomized controlled trials

Yang F, Lees J, Simpkins C, Butler A. Gait Posture 2021; 84: 377-388.

DOI 10.1016/j.gaitpost.2020.12.034 **PMID** unavailable

Abstract

BACKGROUND: Falls are a serious challenge facing individuals post-stroke. In the past decades, various fall prevention interventions have been developed. It remains unknown if any of these interventions are effective in reducing falls in this population. Such a knowledge gap could impede the effort of preventing falls in people post-stroke. RESEARCH QUESTIONS: 1) Are there effective interventions to prevent falls among people in the post-acute and chronic stages of stroke? and 2) How do fall prevention interventions change three key fall risk factors in this population: balance, mobility, and lower limb strength? METHODS: Eleven databases were searched for randomized controlled trials which included falls in people post-stroke as an outcome measure. Information on the participants, training protocol, and outcome measures were collected for each study. The primary outcome is the number of fallers and the explanatory variables included mean difference and standard deviation for fall risk factors. Studies were quality appraised using the Physiotherapy Evidence Database scale and the funnel plot.

RESULTS: Thirteen studies enrolling 1352 participants were identified. Effect size quantified by the odds ratio (OR) for falls and standardized mean difference (SMD) for fall risk factors were calculated. Overall no intervention appears to be significantly more effective in preventing falls than placebo training (OR = 0.88 with a range of [0.23 3.66]; 95 % confidence interval = [0.64 1.21], p = 0.44). All interventions showed little effect in improving the fall risk factors (SMD = -0.01 to 0.06 and p-value = 0.38-0.86), except one (the combined treadmill and overground walking) which significantly improved mobility. SIGNIFICANCE: Currently no program is effective in reducing falls in people post-stroke. Future studies should measure falls as a primary outcome based on a consistent definition of falls and reliable approaches to collect falls data.

Language: en

Keywords

Systematic review; Mobility; Balance; Fall risk factors; Falls prevention; Strength

Effects of multicomponent exercise on cognitive performance and fall risk in older women with mild cognitive impairment

Thaiyanto J, Sittichoke C, Phirom K, Sungkarat S. J. Nutr. Health Aging 2021; 25(2): 160-164.

DOI 10.1007/s12603-020-1458-5 **PMID** unavailable

Abstract

BACKGROUND: Emerging evidence suggests that multicomponent exercise provides greater benefits for physical and cognitive function than single component exercise. However, few studies have been conducted to determine these effects in older adults with mild cognitive impairment (MCI) and findings have been less conclusive. It has been reported that older women have a greater risk of falls and a higher incidence of dementia than men.

OBJECTIVES: To examine the effects of multicomponent exercise on cognitive performance and fall risk in older women with MCI.

DESIGN: An experimental design comparing the exercise and control groups. SETTING AND PARTICIPANTS: Forty community-dwelling older women with MCI were allocated to the exercise (n = 20) and control (n = 20) groups. INTERVENTION: Twelve weeks of multicomponent exercise program (aerobic, resistance, and balance exercise) 60 mins/day, 3 days/week. MEASUREMENT: Cognitive performance including the Alzheimer's Disease Assessment Scale-Cognitive Subscale (ADAS-Cog) and Trail Making Test (TMT) and fall risk including the Timed Up and Go (TUG) single-, dual-task, and Physiological Profile Assessment (PPA) were administered before and after the 12-week exercise program.

RESULTS: At the end of the 12-week training, participants in the exercise group had a significantly greater improvement in TMT part A ($p < 0.05$), TUG dual-task ($p < 0.05$), and PPA composite score ($p < 0.05$) when compared to the control group. The exercise group also demonstrated significant improvement in TUG dual-task, PPA composite score, PPA subcomponents including postural sway and reaction time when compared to baseline ($p < 0.05$). In contrast, at 12-week, the control group showed a decline in TUG dual-task performance as compared to baseline ($p < 0.05$).

CONCLUSION: The 12-week multicomponent exercise improved attention, dual-task ability, and reduced risk of falling in older women with mild cognitive impairment.

Language: en

Keywords

fall risk; cognitive function; Mild cognitive impairment; multicomponent exercise

Comparison of lateral perturbation-induced step training and hip muscle strengthening exercise on balance and falls in community dwelling older adults: a blinded randomized controlled trial

Rogers MW, Creath RA, Gray V, Abarro J, McCombe Waller S, Beamer BA, Sorkin JD. J. Gerontol. A Biol. Sci. Med. Sci. 2021; ePub(ePub): ePub.

DOI 10.1093/gerona/glab017 PMID unavailable

Abstract

BACKGROUND: This factorial, assessor-blinded, randomized, and controlled study compared the effects of perturbation-induced step training (lateral waist-pulls), hip muscle strengthening, and their combination, on balance performance, muscle strength, and prospective falls among older adults.

METHODS: community-dwelling older adults were randomized to four training groups. Induced-step training (IST, n=25) involved 43 progressive perturbations. Hip abduction strengthening (HST, n=25) utilized progressive resistance exercises. Combined training (CMB, n=25) included IST and HST, and the control performed seated flexibility/relaxation exercises (SFR, n=27). Training involved 36 sessions over 12-weeks. The primary outcomes were the number of recovery steps and first step length, and maximum hip abduction torque. Fall frequency during 12 months after training was determined.

RESULTS: Overall, the number of recovery steps was reduced by 31%, and depended upon the first step type. IST and CMB increased the rate of more stable single lateral steps pre-post training than HST and SFR who used more multiple crossover and sequential steps. The improved rate of lateral steps for CMB exceeded the control (CMB/SFR rate ratio 2.68). First step length was unchanged, and HST alone increased hip torque by 25%. Relative to SFR, the fall rate ratios (falls/person/year) [95% confidence interval] were: CMB 0.26 [0.07 to 0.90], IST 0.44 [0.18 to 1.08], HST 0.30 (0.10 to 0.91).

CONCLUSIONS: Balance performance through stepping was best improved by combining perturbation and strength training and not strengthening alone. The interventions reduced future falls by 56% -74% over the control. Lateral balance perturbation training may enhance traditional programs for fall prevention.

Language: en

Keywords

falls; Aging; hip strength; lateral balance; perturbation step training

Exercise interventions with trained home helpers for preventing loss of autonomy and falls in community-dwelling older adults receiving home heath physical therapy T4H: a randomized controlled pilot study

Mézière A, Oubaya N, Michel-Pellegrino V, Boudin B, Neau M, Robert H, Cara I, Salgado Sanchez L, Baloul S, Piette F, Pautas E, Picou Y, Curtis V, Schonheit C, Canouï-Poitrine F, Moreau C. J. Geriatr. Phys. Ther. 2021; ePub(ePub): ePub.

DOI 10.1519/JPT.0000000000000287 **PMID** unavailable

Abstract

BACKGROUND AND PURPOSE: Older adults at risk for falls live independently in the community in their own home and have rehabilitation needs. However, little is known about whether home coaching of older adults can decrease falls at home. We sought to determine whether a novel program for preventing falls and a loss of exercise capacity, the T4H program, in which home helpers act as exercise coaches by using an information technology (IT) device, was acceptable and feasible.

METHODS: Between February 2015 and October 2015, we performed a cluster randomized controlled trial in which home helpers either assisted older adults 75 years and over, to participate in the T4H program, or provided standard home help over 3 months. We assessed levels of acceptability and satisfaction among the older adults and home helpers with regard to the exercise program and the technologies used. To measure efficacy, the main outcome measures for the older adults were the absence of falls requiring medical or paramedical care, unplanned hospitalizations, walking ability in a Timed Up and Go test (TUG), and self-care ability by the Barthel Index at the 3-month follow-up visit.

RESULTS AND DISCUSSION: Overall, 35 older adults were included, aged 89 years and with 68.6% women. Eighty-five percent of the respondents were pleased or very pleased to have participated in the T4H exercise program, 70% were satisfied with the IT devices, and 92% were satisfied with their home helper's level of involvement. Two of the 4 home helper respondents were satisfied or very satisfied with the exercise program, and 2 were moderately satisfied. The proportions of older adult participants with no falls or no unplanned hospitalizations were higher in the T4H group (92.3% and 85.7%, respectively) than in the control group (81.8% and 71.4%, respectively), although these intergroup differences were not statistically significant. The T4H and control groups did not differ significantly with regard to the TUG time (median [IQR]: 27.6 seconds [17.9-58.6] vs 30.7 seconds [19.7-57.2], respectively) or the Barthel Index (median [IQR]: 90 [75-95] and 90 [75-95], respectively).

CONCLUSIONS: The novel T4H home help model was feasible and was associated with a high level of participant satisfaction. We observed a trend toward fewer falls and hospitalizations and better quality of life in the older adults.

Language: en

Effects of dual-task gait treadmill training on gait ability, dual-task interference, and fall efficacy in people with stroke: a randomized controlled trial

Baek CY, Chang WN, Park BY, Lee KB, Kang KY, Choi MR. Phys. Ther. 2021; ePub(ePub): ePub.

DOI 10.1093/ptj/pzab067 **PMID** unavailable

Abstract

OBJECTIVE: This study aimed to investigate the effects of dual-task gait training using a treadmill on gait ability, dual-task interference, and fall efficacy in people with stroke.

METHODS: Patients with chronic stroke (N = 34) were recruited and randomly allocated to the experimental or control group. Both groups underwent gait training on a treadmill and a cognitive task. In the experimental group, gait training was conducted in conjunction with the cognitive task, whereas in the control group, the training and the cognitive task were conducted separately. Each intervention was provided for 60 minutes, twice a week, for a period of 6 weeks for both groups. The primary outcomes were as follows: gait parameters (speed, stride, variability, and cadence) under single-task and dual-task conditions, correct response rate (CRR) under single-task and dual-task conditions, and dual-task cost (DTC) in gait parameters and CRR. The secondary outcome was the fall efficacy scale.

RESULTS: Dual-task gait training using a treadmill improved all gait parameters in the dual-task condition, speed, stride, and variability in the single-task condition, and CRR in both conditions. Difference between the groups was observed in speed, stride, and variability in the dual-task condition. Furthermore, dual-task gait training on a treadmill improved DTC in speed, variability, and cadence along with that in CRR, indicating true improvement of DTC, which led to significant improvement in DTC in speed and variability compared with single-task training.

CONCLUSIONS: Dual-task gait treadmill training was more effective in improving gait ability in dual-task training and DTI than single-task training involving gait and cognitive task separately in people with chronic stroke.

Language: en

Keywords

rehabilitation; stroke; dual-task condition; gait

The (cost-)effectiveness of an implemented fall prevention intervention on falls and fall-related injuries among community-dwelling older adults with an increased risk of falls: protocol for the in balance randomized controlled trial

van Gameren M, Bossen D, Bosmans JE, Visser B, Frazer SWT, Pijnappels M. BMC Geriatr. 2021; 21(1): e381.

DOI 10.1186/s12877-021-02334-3 **PMID** unavailable

Abstract

BACKGROUND: Falls and fall-related injuries among older adults are a serious threat to the quality of life and result in high healthcare and societal costs. Despite evidence that falls can be prevented by fall prevention programmes, practical barriers may challenge the implementation of these programmes. In this study, we will investigate the effectiveness and cost-effectiveness of In Balance, a fourteen-week, low-cost group fall prevention intervention, that is widely implemented in community-dwelling older adults with an increased fall risk in the Netherlands. Moreover, we will be the first to include cost-effectiveness for this intervention. Based on previous evidence of the In Balance intervention in pre-frail older adults, we expect this intervention to be (cost-)effective after implementation-related adjustments on the target population and duration of the intervention.

METHODS: This study is a single-blinded, multicenter randomized controlled trial. The target sample will consist of 256 community-dwelling non-frail and pre-frail adults of 65 years or older with an increased risk of falls. The intervention group receives the In Balance intervention as it is currently widely implemented in Dutch healthcare, which includes an educational component and physical exercises. The physical exercises are based on Tai Chi principles and focus on balance and strength. The control group receives general written physical activity recommendations. Primary outcomes are the number of falls and fall-related injuries over 12 months follow-up. Secondary outcomes consist of physical performance measures, physical activity, confidence, health status, quality of life, process evaluation and societal costs. Mixed model analyses will be conducted for both primary and secondary outcomes and will be stratified for non-frail and pre-frail adults.

DISCUSSION: This trial will provide insight into the clinical and societal impact of an implemented Dutch fall prevention intervention and will have major benefits for older adults, society and health insurance companies. In addition, results of this study will inform healthcare professionals and policy makers about timely and (cost-)effective prevention of falls in older adults. TRIAL REGISTRATION: Netherlands Trial Register: NL9248 (registered February 13, 2021).
Language: en

Keywords
*Accidental falls; *Ageing; *Cost-effectiveness; *Effectiveness; *Elderly; *Fall prevention; *Healthcare utilization; *Intervention studies

Impact of tailored multicomponent exercise for prevent weakness and falls on nursing home residents' functional capacity

Courel-Ibáñez J, Buendía-Romero, Pallarés JG, García-Conesa S, Martínez-Cava A, Izquierdo M. J. Am. Med. Dir. Assoc. 2021; ePub(ePub): ePub.

DOI 10.1016/j.jamda.2021.05.037

PMID unavailable

Abstract

OBJECTIVES: We aimed to determine whether the benefits of long (24 weeks) and short (4 weeks) training programs persisted after short (6 weeks) and long (14 weeks) periods of inactivity in older adult nursing home residents with sarcopenia.

DESIGN: Multicenter randomized trial. INTERVENTION: The Vivifrail tailored, multicomponent exercise program (http://vivifrail.com) was conducted to individually prescribe exercise for frail older adults, depending on their functional capacity. The training included 4 levels combining strength and power, balance, flexibility, and cardiovascular endurance exercises. SETTING AND PARTICIPANTS: Twenty-four institutionalized older adults (87.1 ± 7.1 years, 58.3% women) diagnosed with sarcopenia were allocated into 2 groups: the Long Training-Short Detraining (LT-SD) group completed 24 weeks of supervised Vivifrail training followed by 6 weeks of detraining; the Short Training-Long Detraining (ST-LD) group completed 4 weeks of training and 14 weeks of detraining. MEASURES: Changes in functional capacity and strength were evaluated at baseline, and after short and long training and detraining periods.

RESULTS: Benefits after short and long exercise interventions persisted when compared with baseline. Vivifrail training was highly effective in the short term (4 weeks) in increasing functional and strength performance (effect size = 0.32-1.44, P <.044) with the exception of handgrip strength. Continued training during 24 weeks produced 10% to 20% additional improvements (P <.036). Frailty status was reversed in 36% of participants, with 59% achieving high self-autonomy. Detraining resulted in a 10% to 25% loss of strength and functional capacity even after 24 weeks of training (effects size = 0.24-0.92, P <.039).

CONCLUSIONS AND IMPLICATIONS: Intermittent strategies such as 4 weeks of supervised exercise 3 times yearly with no more than 14 weeks of inactivity between exercise periods appears as an efficient solution to the global challenge of maintaining functional capacity and can even reverse frailty in vulnerable institutionalized older adults.

Language: en

Keywords COVID-19; health; hospital; Confinement; long-term care; physical inactivity

Effect of 12-month supervised, home-based physical exercise on functioning among persons with signs of frailty - randomized controlled trial

Suikkanen S, Soukkio P, Aartolahti E, Kääriä S, Kautiainen H, Hupli MT, Pitkälä K, Sipilä S, Kukkonen-Harjula K. Arch. Phys. Med. Rehabil. 2021; ePub(ePub): ePub.

DOI 10.1016/j.apmr.2021.06.017 **PMID** unavailable

Abstract

OBJECTIVES: To investigate the effects of a 12-month home-based exercise program on functioning and falls among persons with signs of frailty.

DESIGN: A randomized controlled trial with a 1:1 allocation SETTING: Home-based PARTICIPANTS: Home-dwelling persons aged ≥65 years meeting at least one frailty phenotype criteria (n=300). INTERVENTION: 12-month, individually tailored, progressive and physiotherapist-supervised, physical exercise twice a week (n=150) vs. usual care (n=149). MAIN OUTCOME MEASURES: Functional Independence Measure (FIM), Short Physical Performance Battery (SPPB), handgrip strength, instrumental activities of daily living (IADL), and self-reported falls and physical activity (other than intervention). Assessed four times at home over 12 months.

RESULTS: The mean age of the participants was 82.2 (SD 6.3), 75% were women, 61% met 1-2 frailty criteria and 39% ≥3 criteria. FIM deteriorated in both groups over 12 months, -4.1 points (95% CI: -5.6 to -2.5) in the exercise group and -6.9 (-8.4 to -2.3) in the usual care group (group p=0.014, time p<0.001, interaction p=0.56). The mean improvement in SPPB was significantly greater in the exercise group [1.6 (1.3 to 2.0)] than in the usual care group [0.01 (-0.3 to 0.3)] (group p<0.001, time p=0.11, interaction p=0.027). The exercise group reported significantly fewer falls per person-year compared to the usual care group (incidence rate ratio, IRR 0.47 [95% CI 0.40 to 0.55]; p<0.001). There was no significant difference between the groups over 12 months in terms of handgrip strength, IADL function or self-reported physical activity.

CONCLUSIONS: One year of physical exercise improved physical performance and decreased the number of falls among people with signs of frailty. FIM differed between the groups at 12 months, but exercise did not prevent deterioration of FIM, IADL or handgrip strength.

Language: en

Keywords

falls; aging; functional status; physical functional performance; physical therapy

Feasibility and effectiveness of interactive stepping exercise on community-dwelling older adults: a pilot randomized controlled trial

Sow LC, Liu HH, Wang RY, Wei SH, Wu HK, Yang YR. Geriatr. Nurs. 2021; 42(5): 1099-1104.

DOI 10.1016/j.gerinurse.2021.06.021 **PMID** unavailable

Abstract

Recently, the interactive stepping exercise (ISE) was developed on the basis of square stepping exercise. The aim of this study was to examine the feasibility and effectiveness of ISE on executive function and gait variability among community-dwelling older adults. Fourteen participants were recruited and randomly assigned to the experimental group (n=7) or control group (n=7) and received ISE or home exercise program, respectively, three times a week for 12 weeks. The outcomes included retention rate, attendance rate, Trail Making Test, and dual-task walking. The results showed that participants had high retention and attendance rate for the ISE intervention. Moreover, significant improvement in the part A of Trail Making Test and stride length variability during cognitive dual-task walking after 12-week ISE intervention. The current results suggested that ISE is a feasible and effective intervention on executive function and gait variability in community-dwelling older adults.

Language: en

Keywords

Older adults; Gait; Cognitive function; Stepping exercise; Trail Making Test

Effects of a rehabilitation program using a patient-personalized exergame on fear of falling and risk of falls in vulnerable older adults: protocol for a randomized controlled group study

Lapierre N, Um Din N, Igout M, Chevrier J, Belmin J. JMIR Res. Protoc. 2021; 10(8): e24665. (Copyright © 2021, JMIR)
DOI 10.2196/24665 **PMID** unavailable

Abstract

BACKGROUND: Older adults often experience physical, sensory, and cognitive decline. Therefore, they have a high risk of falls, which leads to severe health and psychological consequences and can induce fear of falling. Rehabilitation programs using exergames to prevent falls are being increasingly studied. Medimoov is a movement-based patient-personalized exergame for rehabilitation in older adults. A preliminary study showed that its use may influence functional ability and motivation. Most existing studies that evaluate the use of exergames do not involve an appropriate control group and do not focus on patient-personalized exergames.
OBJECTIVE: This study aims to evaluate the effects of Medimoov on risk of falls and fear of falling in older adults compared with standard psychomotor rehabilitation.
METHODS: This is a serial, comparative, randomized controlled group study. Both groups (n=25 in each) will receive psychomotor rehabilitation care. However, the methods of delivery will be different; one group will be exposed to the Medimoov exergame platform, and the other only to traditional means of psychomotor rehabilitation. The selection criteria will be (1) age of 65 years or older, (2) ability to answer a questionnaire, (3) ability to stand in a bipedal position for at least 1 minute, (4) score of 13 or greater on the Short Fall Efficacy Scale, and (5) stable medical condition. An evaluation will be made prior to starting the intervention, after 4 weeks of intervention, and at the end of the intervention (after 8 weeks), and it will focus on (1) risk of falls, (2) fear of falling, and (3) cognitive evaluations. Physical activity outside the session will also be assessed by actimetry. The outcome assessment will be performed according to intention-to-treat analysis.
RESULTS: The protocol (2019-11-22) has been approved by the Comité de Protection des Personnes Nord-Ouest I-Université de Rouen (2019-A00395-52), which is part of the French national ethical committee. The study received funding in February 2020. As of October 2020 (submission date), and due to the context of the COVID-19 pandemic, a total of 10 participants out of 50 had been enrolled in the study. The projected date for the end of the data collection is December 2021. Data analyses have not been started yet, and publication of the results is expected for Spring 2022.
CONCLUSIONS: The effects of psychomotor rehabilitation using the Medimoov exergame platform on the risk and fear of falls will be evaluated. This pilot study will be the basis for larger trials. TRIAL REGISTRATION: ClinicalTrials.gov NCT04134988; https://clinicaltrials.gov/ct2/show/NCT04134988. INTERNATIONAL REGISTERED REPORT IDENTIFIER (IRRID): DERR1-10.2196/24665.

Language: en
Keywords: elderly; rehabilitation; risk; fear; therapy; fall; fear of falling; exergame; older adult; protocol; psychomotor therapy; randomized controlled trial

Exploring older adults' experiences of a home-based, technology-driven balance training exercise program designed to reduce fall risk: a qualitative research study within a randomized controlled trial

Ambrens M, Stanners M, Valenzuela T, Razee H, Chow J, van Schooten KS, Close JCT, Clemson L, Zijlstra GAR, Lord SR, Tiedemann A, Alley SJ, Vandelanotte C, Delbaere K. J. Geriatr. Phys. Ther. 2021; ePub(ePub): ePub.

DOI 10.1519/JPT.0000000000000321 **PMID** unavailable

Abstract

BACKGROUND AND PURPOSE: With an aging population, falls have become an increasing public health concern. While face-to-face exercise programs have demonstrated efficacy in reducing falls, their effectiveness is hampered by low participation and adherence. Digital technologies are a novel and potentially effective method for delivering tailored fall prevention exercise programs to older adults. In addition, they may increase the reach, uptake, and sustainability of fall prevention programs. Therefore, understanding older adults' experiences of using technology-driven methods is essential. This study explored the user experience of StandingTall, a home-based fall prevention program delivered through a tablet computer.

METHODS: Fifty participants were recruited using purposive sampling, from a larger randomized controlled trial. Participants were selected to ensure maximum variability with respect to age, gender, experience with technology, and adherence to the program. Participants undertook a one-on-one structured interview. We followed an iterative approach to develop themes.

RESULTS AND DISCUSSION: Eight themes were identified. These fall under 2 categories: user experience and program design. Participants found StandingTall enjoyable, and while its flexible delivery facilitated exercise, some participants found the technology challenging. Some participants expressed frustration with technological literacy, but most demonstrated an ability to overcome these challenges, and learn a new skill. Older adults who engaged in a technology-driven fall prevention program found it enjoyable, with the flexibility provided by the online delivery central to this experience. While the overall experience was positive, participants expressed mixed feelings about key design features. The embedded behavior change strategies were not considered motivating by most participants. Furthermore, some older adults associated the program characters with gender-based stereotypes and negative views of aging, which can impact on motivation and preventive behavior.

CONCLUSION: This study found digital technologies are an effective and enjoyable method for delivering a fall prevention program. This study highlights that older adults are interested in learning how to engage successfully with novel technologies.

Language: en

Home-based rehabilitation programs on postural balance, walking, and quality of life in patients with stroke: a single-blind, randomized controlled trial

Lim JH, Lee HS, Song CS. Medicine (Baltimore) 2021; 100(35): e27154.

DOI 10.1097/MD.0000000000027154 **PMID** unavailable

Abstract

BACKGROUND: The most challenging aspect of rehabilitation is the high costs of in-patient rehabilitation programs and poor continuity of care while patients are transferred to home. In this regard, numerous home-based rehabilitation programs have been developed. The purpose of this study was to investigate the effects of home-based rehabilitative programs on postural balance, walking, and quality of life in individuals with chronic hemiparetic stroke.

DESIGN: A CONSORT-compliant randomized controlled trial.

METHODS: Seventeen community-dwelling people diagnosed with a first stroke participated in this study. They randomly divided the home-based rehabilitative program (HBP) group (n=9) and control group (n=8). The HBP group received coordination exercises at home and the control group received clinic-based exercises. This study measured postural balance, walking, and quality of life using four outcome measures: 10-meter walk test, figure of 8 walk test, four-square step test, and 36 item short-form survey.

RESULTS: After analysis, it was found that the HBP improved postural balance, comfortable speed, and fast speed walking, and straight and curved walking for chronic stroke. Second, clinic-based rehabilitation services improved postural balance, comfortable speed, and fast speed walking abilities in patients with chronic stroke.

CONCLUSION: The results of this study suggest that the HBP group received positive benefits with regard to the postural balance and walking abilities of chronic hemiparetic stroke patients compared to the clinical setting exercise program.

Language: en

Perturbation-based balance training using repeated trips on a walkway vs. belt accelerations on a treadmill: a cross-over randomised controlled trial in community-dwelling older adults

Song PYH, Sturnieks DL, Davis MK, Lord SR, Okubo Y. Front. Sports Act. Living 2021; 3: e702320.

DOI 10.3389/fspor.2021.702320 **PMID** 34490425

Abstract

BACKGROUND: Walkway and treadmill induced trips have contrasting advantages, for instance walkway trips have high-ecological validity whereas belt accelerations on a treadmill have high-clinical feasibility for perturbation-based balance training (PBT). This study aimed to (i) compare adaptations to repeated overground trips with repeated treadmill belt accelerations in older adults and (ii) determine if adaptations to repeated treadmill belt accelerations can transfer to an actual trip on the walkway.

METHOD: Thirty-eight healthy community-dwelling older adults underwent one session each of walkway and treadmill PBT in a randomised crossover design on a single day. For both conditions, 11 trips were induced to either leg in pseudo-random locations interspersed with 20 normal walking trials. Dynamic balance (e.g., margin of stability) and gait (e.g., step length) parameters from 3D motion capture were used to examine adaptations in the walkway and treadmill PBT and transfer of adaptation from treadmill PBT to a walkway trip.

RESULTS: No changes were observed in normal (no-trip) gait parameters in both training conditions, except for a small (0.9 cm) increase in minimum toe elevation during walkway walks ($P < 0.01$). An increase in the margin of stability and recovery step length was observed during walkway PBT ($P < 0.05$). During treadmill PBT, an increased MoS, step length and decreased trunk sway range were observed ($P < 0.05$). These adaptations to treadmill PBT did not transfer to a walkway trip.

CONCLUSIONS: This study demonstrated that older adults could learn to improve dynamic stability by repeated exposure to walkway trips as well as treadmill belt accelerations. However, the adaptations to treadmill belt accelerations did not transfer to an actual trip. To enhance the utility of treadmill PBT for overground trip recovery performance, further development of treadmill PBT protocols is recommended to improve ecological authenticity.

Language: en

Keywords

older adults; exercise; gait; perturbation; accidental fall; balance training

Effects of exergame-based dual-task training on executive function and dual-task performance in community-dwelling older people: a randomized-controlled trial

Wang RY, Huang YC, Zhou JH, Cheng SJ, Yang YR. Games Health J. 2021; ePub(ePub): ePub.

DOI 10.1089/g4h.2021.0057 **PMID** unavailable

Abstract

OBJECTIVE: Aging is associated with decline in executive function that may lead to reduced dual-task performance. Regular exercise has been recommended for promoting or maintaining mental and physical health in older adults, yet only a fraction of older adults exercise regularly. Exergame training may have the potential to enhance exercise adherence. Therefore, the aim of this study was to examine the effects of exergame-based dual-task training on executive function and dual-task performance in community-dwelling older adults.

MATERIALS AND METHODS: This was a single-blinded, randomized-controlled trial. Twenty community-dwelling older adults were recruited and randomly assigned to one of two groups. All participants completed 36 trainings, including three 60-minute sessions/week over 12 weeks. Participants in the experimental group received exergame-based dual-task training, while those in the control group received home-based multicomponent exercise training. Measures of executive function, dual-task performance, and community walking ability were assessed before and after the intervention.

RESULTS: Significant group × time interactions ($P = 0.000$-0.027) with large effects were found in all selected outcome measures. Compared with the control group, the experimental group improved significantly in measures of general executive function ($P = 0.014$), inhibitory control ($P = 0.037$), cognitive dual-task performance ($P < 0.001$), and community walking ability ($P = 0.002$). Enhanced general executive function was highly correlated with either improved motor dual-task performance ($r = 0.674$) or improved cognitive dual-task performance ($r = -0.701$).

CONCLUSION: These results suggested that exergame-based dual-task training improved both executive function and dual-task performance in older people. These positive effects could be transferred to enhance community walking ability. Clinical Trial Registration number: ACTRN 12617000095369.

Language: en

Keywords

aging; cognitive function; exergame; dual task; community mobility; exercise intervention

Dancing Against falls iN Community-dwElling older adults (DANCE): a study protocol of a stratified, block-randomised trial

Thomsen MJ, Liston M, Christensen MG, Vestergaard P, Hirata RP. Inj. Prev. 2021; ePub(ePub): ePub.

DOI 10.1136/injuryprev-2021-044224 **PMID** unavailable

Abstract

BACKGROUND: Unintentional falls among older adults are of primary importance due to their impact on quality of life. Falling accounts for 95% of hip fractures, leading to an approximately six times increased risk of death within the first 3 months. Furthermore, physical and cognitive parameters are risk factors for falls. The purpose of this study is to examine the effect of a 6-month salsa dance training intervention, compared with regular fitness circuit training and a control group.

METHODS: This study will include 180 older adults: 90 healthy patients and 90 patients with osteoporosis. Participants will be allocated randomly in either of the groups, stratified according to age. Training groups will receive 2 weekly 1-hour training sessions, continuously through 6 months. Participants will be tested at baseline and 6 and 18 months post baseline. Primary outcome will be number of falls and secondary outcomes include bone mineral density, body composition, pain evaluation, weekly physical activity, single-task and dual-task gait patterns, balance, Fullerton Functional Fitness Test and assessment of the mini-BESTest.

DISCUSSION: This study will investigate the effects of a specially designed dance training programme (Dancing Against falls iN Community-dwElling older adults (DANCE)) to reduce the risk of falling among older adults. The study will investigate the effect against an active and passive comparator, resulting in the possibility to state, if DANCE training should be an alternative to traditional training. TRIAL REGISTRATION NUMBER: NCT03683849.

Language: en

Keywords

fall; older people; sports / leisure facility

Exercise and Risk Factors for Falls

Exercise intervention for the risk of falls in older adults: a protocol for systematic review and meta-analysis

Zhang Q, Liu Y, Li D, Jia Y, Zhang W, Chen B, Wan Z. Medicine (Baltimore) 2021; 100(5): e24548.

DOI 10.1097/MD.0000000000024548 **PMID** unavailable

Abstract

BACKGROUND: Falls can easily lead to serious injury and even death in the older adults. Many exercise interventions, such as balance, flexibility, and endurance training have been shown to reduce the incidence of falls in this population. However, which mode of exercise is most beneficial for them remains unanswered.

METHODS: We will search the following databases as data sources: PUBMED, EMBASE, Cochrane Library, Wanfang, China knowledge Network (CNKI), Clinical Trials Database, and Science Network. Data extraction will be performed by two independent reviewers, who will discuss and resolve any differences, with the consensus of a third author. The RCTs will be selected according to prespecified inclusion criteria. The main outcome is the occurrence of a fall, and the secondary outcomes are the adverse consequences of a fall and a fall risk assessment index. If the heterogeneity test shows slight or no statistical heterogeneity, a fixed effect model will be used for data synthesis; otherwise, a random effect model will be used. We will develop a unified data extraction table including a number of parameters. The Cochrane cooperative bias risk tool will be used to evaluate the methodological quality of the selected RCTs. RevMan Manager v5.3 software and STATA v16.0 software will be used for data analysis. If enough randomized controlled trials (more than 10) are identified and selected.

CONCLUSION: This protocol will be applied to synthesize the existing evidence so as to identify the most effective exercise program to prevent falls in the elderly. INPLASY REGISTRATION NUMBER: INPLASY2020110008.

Language: en

Association between everyday walking activity, objective and perceived risk of falling in older adults

Jansen CP, Klenk J, Nerz C, Todd C, Labudek S, Kramer-Gmeiner F, Becker C, Schwenk M. Age Ageing 2021; ePub(ePub): ePub.

DOI 10.1093/ageing/afab037 **PMID** unavailable

Abstract

BACKGROUND: older persons can be grouped according to their objective risk of falling (ORF) and perceived risk of falling (PRF) into 'vigorous' (low ORF/PRF), 'anxious' (low ORF/high PRF), 'stoic' (high ORF/low PRF) and 'aware' (high ORF/PRF). Sensor-assessed daily walking activity of these four groups has not been investigated, yet.

OBJECTIVE: we examined everyday walking activity in those four groups and its association with ORF and PRF.

DESIGN: cross-sectional. SETTING: community. SUBJECTS: N = 294 participants aged 70 years and older.

METHODS: ORF was determined based on multiple independent risk factors; PRF was determined based on the Short Falls Efficacy Scale-International. Subjects were allocated to the four groups accordingly. Linear regression was used to quantify the associations of these groups with the mean number of accelerometer-assessed steps per day over 1 week as the dependent variable. 'Vigorous' was used as the reference group.

RESULTS: average number of steps per day in the four groups were 6,339 ('vigorous'), 5,781 ('anxious'), 4,555 ('stoic') and 4,528 ('aware'). Compared with the 'vigorous', 'stoic' (-1,482; confidence interval (CI): -2,473; -491) and 'aware' (-1,481; CI: -2,504; -458) participants took significantly less steps, but not the 'anxious' (-580 steps; CI: -1,440; 280).

CONCLUSION: we have integrated a digital mobility outcome into a fall risk categorisation based on ORF and PRF. Steps per day in this sample of community-dwelling older persons were in accordance with their ORF rather than their PRF. Whether this grouping approach can be used for the specification of participants' needs when taking part in programmes to prevent falls and simultaneously promote physical activity remains to be answered in intervention studies.

Language: en

Keywords

older people; digital mobility outcome; objective risk of falling; perceived risk of falling; walking activity

The effect of the group-based Otago exercise program on frailty among nursing home older adults with cognitive impairment

Feng H, Zou Z, Zhang Q, Wang L, Ouyang YQ, Chen Z, Ni Z. Geriatr. Nurs. 2021; 42(2): 479-483.

DOI 10.1016/j.gerinurse.2021.02.012 **PMID** unavailable

Abstract

This study investigated the effect of the group-based Otago exercise program (OEP) on frailty and physical function in older adults with cognitive impairment. We recruited eighteen older adults with cognitive impairment from a nursing-home to perform the OEP three times a week, for a period of three months in a nursing home. The intervention was feasible with attending an average of 21 out of 36 sessions. The frailty score decreased significantly ($p<0.05$). Physical function including Time Up and Go test (TUG), 30 seconds Sit-To-Stand Test (30 s-SST) and Four-Stage Balance Test was significantly positive after intervention (all $p<0.001$). The group-based OEP is a potentially effective strategy for reversing frailty and improving physical function among older adults with cognitive impairment.

Language: en

Keywords

Frailty; Older adults; Cognitive impairment; Physical function; Otago exercise program

The influences of tai chi on balance function and exercise capacity among stroke patients: a meta-analysis

Zheng X, Wu X, Liu Z, Wang J, Wang K, Yin J, Wang X. Evid. Based Complement. Alternat. Med. 2021; 2021: e6636847.

DOI 10.1155/2021/6636847 **PMID** 33708256

Abstract

OBJECTIVE: This study aims to explore the influences of Tai Chi on the balance function and exercise capacity among stroke patients.

METHODS: Databases including PubMed, Embase, WOS (Web of Science), the Cochrane Library, CNKI (China National Knowledge Infrastructure), Wanfang Data, VIP (VIP database), and CBM (China Biology Medicine disc) were retrieved to gather the figures of randomized controlled trials on the balance function and exercise capacity among stroke patients. Then relevant data were input and analyzed in Review Manager 5.3.

RESULTS: Nineteen papers were included and analyzed in this study. According to the combined effect size, the balance function of stroke patients improved significantly: the Berg Balance Function Scale score [MD = 7.67, 95% CI (3.44, 11.90)]; standing and walking test scores [MD = 3.42, 95% CI (4.22, -2.63)]; gravity swing area [MD = 0.79, 95% CI (1.48, 0.10)]; and gravity swing speed [MD = -5.43, 95% CI (-7.79, 3.08)]. In addition, the exercise capacity improved significantly as well: the FMA (Fugl-Meyer Assessment Scale) scale score [MD = 4.15, 95% CI (1.68, 6.63)]. There are no significant influences or changes of other related results.

CONCLUSIONS: Stroke patients are able to improve their balance functions and exercise capacities prominently when they do Tai Chi exercise once or twice a week and ≥5 times/week and >30 ≤ 60 min/time.

Language: en

Effectiveness of walking training on balance, motor functions, activity, participation and quality of life in people with chronic stroke: a systematic review with meta-analysis and meta-regression of recent randomized controlled trials

Nindorera F, Nduwimana I, Thonnard JL, Kossi O. Disabil. Rehabil. 2021; ePub(ePub): ePub.

DOI 10.1080/09638288.2021.1894247 **PMID** unavailable

Abstract

PURPOSE: To review and quantify the effects of walking training for the improvement of various aspects of physical function of people with chronic stroke.

METHODS: We conducted a systematic search and meta-analysis of randomized controlled trials (RCTs) of chronic stroke rehabilitation interventions published from 2008 to 2020 in English or French. Of the 6476-screened articles collated from four databases, 15 RCTs were included and analyzed. We performed a meta-regression with the total training time as dependent variable in order to have a better understanding of how did the training dosage affect the effect sizes.

RESULTS: Treadmill walking training was more effective on balance and motor functions (standardized mean difference (SMD)=0.70[0.02, 1.37], $p = 0.04$) and 0.56[0.15, 0.96], $p = 0.007$ respectively). Overground walking training improved significantly walking endurance (SMD = 0.38[0.16, 0.59], $p < 0.001$), walking speed (MD = 0.12[0.05, 0.18], $p < 0.001$), participation (SMD = 0.35[0.02, 0.68], $p = 0.04$) and quality of life (SMD = 0.46[0.12, 0.80], $p = 0.008$). Aquatic training improved balance (SMD = 2.41[1.20, 3.62], $p < 0.001$). The Meta-regression analysis did not show significant effect of total training time on the effect sizes.

CONCLUSION: Treadmill and overground walking protocols consisting of ≥30 min sessions conducted at least 3 days per week for about 8 weeks are beneficial for improving motor impairments, activity limitations, participation, and quality of life in people with chronic stroke. Implications for rehabilitation: Treadmill walking training is effective for improving balance and motor functions. Overground walking training improved significantly walking endurance, walking speed, participation and quality of life. Treadmill and overground walking protocols consisting of ≥30 min sessions conducted at least 3 days per week for about 8 weeks are beneficial for improving motor impairments, activity limitations, participation, and quality of life in patient with chronic stroke.

Language: en

Keywords

physical activity; stroke; Overground walking; treadmill walking; walking training

Does exercise-based conventional training improve reactive balance control among people with chronic stroke?

Kannan L, Vora J, Varas-Diaz G, Bhatt T, Hughes S. Brain Sci. 2021; 11(1): e2.

DOI 10.3390/brainsci11010002 **PMID** unavailable

Abstract

BACKGROUND: Exercise-based conventional training has predominantly benefited fall-associated volitional balance control domain; however, the effect on reactive balance control is under-examined. Therefore, the purpose of this study was to examine the effect of exercise-based conventional training on reactive balance control.

METHODS: Eleven people with chronic stroke (PwCS) underwent multi-component training for six weeks (20 sessions) in a tapering manner. Training focused on four constructs-stretching, functional strengthening, balance, and endurance. Volitional balance was measured via movement velocity on the Limits of Stability (LOS) test and reactive balance via center of mass (COM) state stability on the Stance Perturbation Test (SPT). Additionally, behavioral outcomes (fall incidence and/or number of steps taken) were recorded.

RESULTS: Movement velocity significantly increased on the LOS test ($p < 0.05$) post-intervention with a significant decrease in fall incidence ($p < 0.05$). However, no significant changes were observed in the COM state stability, fall incidence and number of recovery steps on the SPT post-intervention.

CONCLUSION: Although volitional and reactive balance control may share some neurophysiological and biomechanical components, training based on volitional movements might not significantly improve reactive balance control for recovery from large-magnitude perturbations due to its task-specificity.

Language: en

Keywords

chronic stroke; conventional therapy; exercises; reactive balance control

Effects of combined balance and strength training on measures of balance and muscle strength in older women with a history of falls

Zouita S, Zouhal H, Ferchichi H, Paillard T, Dziri C, Hackney AC, Laher I, Granacher U, Ben Moussa Zouita A. Front. Physiol. 2020; 11: e619016.

DOI 10.3389/fphys.2020.619016 **PMID** 33424642 PMCID

Abstract

OBJECTIVE: We investigated the effects of combined balance and strength training on measures of balance and muscle strength in older women with a history of falls.

Methods: Twenty-seven older women aged 70.4 ± 4.1 years (age range: 65 to 75 years) were randomly allocated to either an intervention (IG, n = 12) or an active control (CG, n = 15) group. The IG completed 8 weeks combined balance and strength training program with three sessions per week including visual biofeedback using force plates. The CG received physical therapy and gait training at a rehabilitation center. Training volumes were similar between the groups. Pre and post training, tests were applied for the assessment of muscle strength (weight-bearing squat [WBS] by measuring the percentage of body mass borne by each leg at different knee flexions [0°, 30°, 60°, and 90°], sit-to-stand test [STS]), and balance. Balance tests used the modified clinical test of sensory interaction (mCTSIB) with eyes closed (EC) and opened (EO), on stable (firm) and unstable (foam) surfaces as well as spatial parameters of gait such as step width and length (cm) and walking speed (cm/s).

Results: Significant group × time interactions were found for different degrees of knee flexion during WBS ($0.0001 < p < 0.013$, $0.441 < d < 0.762$). Post hoc tests revealed significant pre-to-post improvements for both legs and for all degrees of flexion ($0.0001 < p < 0.002$, $0.697 < d < 1.875$) for IG compared to CG. Significant group × time interactions were found for firm EO, foam EO, firm EC, and foam EC ($0.006 < p < 0.029$; $0.302 < d < 0.518$). Post hoc tests showed significant pre-to-post improvements for both legs and for all degrees of oscillations ($0.0001 < p < 0.004$, $0.753 < d < 2.097$) for IG compared to CG. This study indicates that combined balance and strength training improved percentage distribution of body weight between legs at different conditions of knee flexion (0°, 30°, 60°, and 90°) and also decreased the sway oscillation on a firm surface with eyes closed, and on foam surface (with eyes opened or closed) in the IG.

Conclusion: The higher positive effects of training seen in standing balance tests, compared with dynamic tests, suggests that balance training exercises including lateral, forward, and backward exercises improved static balance to a greater extent in older women.

Language: en

Keywords

aging; exercise; force; postural sway; tasks

Risk-of-falling related outcomes improved in community-dwelling older adults after a 6-week sideways walking intervention: a feasibility and pilot study

Skiadopoulos A, Stergiou N. BMC Geriatr. 2021; 21(1): e60.

DOI 10.1186/s12877-021-02010-6 **PMID** unavailable

Abstract

BACKGROUND: Aging increases fall risk and alters gait mechanics and control. Our previous work has identified sideways walking as a potential training regimen to decrease fall risk by improving frontal plane control in older adults' gait. The purposes of this pilot study were to test the feasibility of sideways walking as an exercise intervention and to explore its preliminary effects on risk-of-falling related outcomes.

METHODS: We conducted a 6-week single-arm intervention pilot study. Participants were community-dwelling older adults ≥ 65 years old with walking ability. Key exclusion criteria were neuromusculoskeletal and cardiovascular disorders that affect gait. Because initial recruitment rate through University of Nebraska at Omaha and Omaha community was slower than expected (3 participants·week(- 1)), we expanded the recruitment pool through the Mind & Brain Health Labs registry of the University of Nebraska Medical Center. Individualized sideways walking intervention carried out under close supervision in a 200 m indoor walking track (3 days·week(- 1)). Recruitment and retention capability, safety, and fidelity of intervention delivery were recorded. We also collected (open-label) walking speed, gait variability, self-reported and performance-based functional measures to assess participants' risk-of-falling at baseline and post-intervention: immediate, and 6 weeks after the completion of the intervention.

RESULTS: Over a 7-month period, 42 individuals expressed interest, 21 assessed for eligibility (21/42), and 15 consented to participate (15/21). Most of the potential participants were reluctant to commit to a 6-week intervention. Desired recruitment rate was achieved after revising the recruitment strategy. One participant dropped out (1/15). Remaining participants demonstrated excellent adherence to the protocol. Participants improved on most outcomes and the effects remained at follow-up. No serious adverse events were recorded during the intervention.

CONCLUSIONS: Our 6-week sideways walking training was feasible to deliver and demonstrated strong potential as an exercise intervention to improve risk-of-falling outcomes in community-dwelling older adults. In a future trial, alternative clinical tools should be considered to minimize the presence of ceiling/floor effects. A future large trial is needed to confirm sideways walking as a fall prevention intervention. TRIAL REGISTRATION: ClinicalTrials.gov identifier: NCT04505527. Retrospectively registered 10 August 2020.

Language: en

Keywords Stability; Aging; Balance; Fear of falling; Gait; Lateral stepping; Variability

Efficacy of traditional physical therapy versus Otago-based exercise in fall prevention for ALF-residing older adults

Knott S, Hollis A, Jimenez D, Dawson N, Mabbagu E, Beato M. J. Geriatr. Phys. Ther. 2021; ePub(ePub): ePub.

DOI 10.1519/JPT.0000000000000285 **PMID** unavailable

Abstract

BACKGROUND AND PURPOSE: Falls are a leading cause of morbidity, mortality, loss of independence, and significant functional decline in aging populations. Effective interventions aimed at reducing the risk of falls, and preventing associated disability and functional decline, are needed to promote the health and wellness of older adults. Recent literature has found that an Otago-based exercise program (OBEP), which incorporates strengthening, balance, and walking, may not only decrease falls and fall risk among community-dwelling older adults but may also be effective among older adults residing in assisted living facilities (ALFs). The purpose of this study is to expand upon current research by comparing the outcomes of an OBEP and traditional physical therapy in decreasing falls and the risk of falls among older adults living in an ALF. The authors hypothesized that traditional physical therapy would reduce fall risk and the number of falls in older adults residing in ALFs more than an OBEP.

METHODS: This study conducted a 2-group retrospective chart review of 59 older adults living in an ALF from January 2013 to October 2018 who received either traditional physical therapy (n = 29) or the OBEP (n = 30). Participants were a mean of 87 years old and were classified at risk for falls by the Tinetti Performance-Oriented Mobility Assessment (POMA). Primary variables included the number of falls prior to intervention, during intervention, and 1 year following intervention, as well as pre- and posttreatment Tinetti POMA scores.

RESULTS AND DISCUSSION: Efficacy was examined using multiple linear regression analysis. Group assignment did not significantly predict performance in key outcome measures, namely the number of falls (P =.199) and Tinetti POMA scores (P =.063) following treatment.

CONCLUSIONS: These findings indicated that both an OBEP and traditional physical therapy may be effective interventions for reducing falls and fall risk in the ALF setting.

Language: en

Domains of balance training delivered in rehabilitation programs following hip fracture surgery in older adults: a systematic review

Lima CA, Perracini MR, Funabashi M, Weber S, Beaupre L. J. Geriatr. Phys. Ther. 2021; ePub(ePub): ePub.

DOI 10.1519/JPT.0000000000000286 **PMID** unavailable

Abstract

BACKGROUND AND PURPOSE: The aim of this systematic review was to assess the domains and characteristics of balance training (BT) interventions delivered in rehabilitation programs following hip fracture to identify potential treatment gaps.

METHODS: Manual and electronic searches (Web of Science, Medline, EMBASE, CINAHL, and ProQuest) were conducted. We selected randomized controlled trials with older adults following hip fracture surgery that included either specific BT or gait, mobility, or transfer training. Two independent reviewers extracted data and rated the methodological quality using the Physiotherapy Evidence Database scale. A third reviewer provided consensus. Extracted BT data included balance domain, progression, frequency, duration, intensity, level of supervision, setting, and rehabilitation phase.

RESULTS AND DISCUSSION: We included 17 trials from 19 studies; 11 studies were rated as moderate to high methodological quality, but only 8 were considered to have high-quality BT components. Half of the interventions included only one balance domain, with stability during movement being the most commonly included domain. The primary balance progression utilized was reducing hand support. Dual task, anticipatory postural adjustment, reactive strategies, and perceptual training domains were rarely included. Balance training duration and intensity were poorly described. Although most programs were home-based with minimal levels of supervision, a few extended beyond postacute phase of rehabilitation.

CONCLUSION: Further consideration should be given to include more challenging BT domains with planned progressions to maximize patient recovery through hip fracture rehabilitation programs.

Language: en

A 'case-mix' approach to understand adherence trajectories for a falls prevention exercise intervention: a longitudinal cohort study

Davis JC, Khan K, Mansournia MA, Khosravi A, Rhodes RE, Chan P, Zhao M, Jehu DA, Parmar N, Liu-Ambrose T. Maturitas 2021; 147: 1-6.

DOI 10.1016/j.maturitas.2021.02.004 **PMID** unavailable

Abstract

OBJECTIVE: We identified adherence-based case-mixes from participants' longitudinal adherence to falls prevention exercise interventions over 12 months. Second, we identified modifiable baseline predictors (cognition, mobility and functional status) based on participants' case-mix adherence trajectories. STUDY DESIGN AND OUTCOME MEASURES: This study was a 12-month longitudinal secondary analysis of data from 172 participants who received the Otago Exercise Program (OEP) in a randomized controlled trial. Adherence to the OEP was ascertained monthly via self-report. Case-mixes, groups of individuals who followed similar adherence trajectories, were visually defined using 12-month longitudinal trajectories; we used latent class growth modeling. Baseline predictors of adherence were examined for the following categories: 1) cognition, 2) mobility and 3) functional status.

RESULTS: Four distinct case-mixes were identified. The "non-adherent" case-mix (18 %) was distinguished by a non-adherent and decreasing adherence trajectory over time. The "low adherence" case-mix (45 %) did not have complete adherence or consistent adherence over the 12-month follow-up. The "moderate adherence" case-mix (27 %) was characterized by a stable (i.e., non-variable) adherence trajectory with a slightly increasing pattern at midpoint. The "high adherence" case-mix (10 %) demonstrated consistent and high adherence over the 12-month follow-up. For individuals with "moderate adherence", the Digit Symbol Substitution Test (DSST) significantly predicted adherence (relative risk ratio (RRR) = 1.12 (0.95 CI: 1.0-1.26); p = 0.049). For individuals with "high adherence", the Digits Forward minus Digits Backward (RRR = 0.43 (0.95 CI: 0.23-0.79); p = 0.002) and Instrumental Activities of Daily Living (RRR = 0.36 (0.95 CI: 0.16-0.81); p = 0.01) significantly predicted adherence.

CONCLUSIONS: Cognitive profile and activities of daily living at baseline may predict the longitudinal pattern of adherence.

Language: en

Keywords

Falls; Cognition; Older adults; Adherence; Case-mix; Otago exercise programme

Establishing content validity for a composite activities-specific risk of falls scale: linkage between fear of falling and physical activity

Wang JX, Chen LY, Jiang YN, Ni L, Sheng JM, Shen X. BMC Geriatr. 2021; 21(1): e275.

DOI 10.1186/s12877-021-02211-z **PMID** unavailable

Abstract

BACKGROUND: Fear of falling (FoF) and physical activity (PA) are important psychological and behavioral factors associated with falls. No instrument quantifies the link between these two factors to evaluate the risk of falls. We aimed to design a scale linking FoF with PA (Composite Activities-specific Risk of Falls Scale, CARFS) for people with various disability levels.

METHODS: First, we designed a questionnaire comprising 40 balance-related activities from the International Classification of Functioning, Disability, and Health (ICF) for a pilot survey. Second, participants were interviewed about their activities-specific FoF degree and PA frequency. The participants comprised 30 community-dwelling older adults, hospitalized patients with strokes, and those with spinal cord injuries, each with different disability levels. Third, the content validity of the items was evaluated twice by 12 experienced rehabilitation professionals: one based on experience and the other on the survey responses. Items with a higher than moderate relevance in both evaluations were included in the CARFS. The panel of professionals discussed and voted on the contribution of FoF and PA on the CARF score. Finally, the scale sensitivity in distinguishing disability levels was analyzed to evaluate the population suitability to the CARFS.

RESULTS: The CARFS included 14 activities. A five-point Likert scale was used to quantify degree of FoF (A) and frequency of PA (B). The CARF score (C), which was determined using the eq. $C = A+(4-B) + A \times B/2$, reflected sensitivity to disability levels in most items.

CONCLUSIONS: The CARFS has strong content validity for measuring risk of falls in relation to the FoF and PA of people with various disability levels. It has a potential to provide a guide for designing individualized exercise- and behavior-focused fall prevention programs and enable the precise trtrun 0acking of program effectiveness as a multidimensional outcome measure.

Language: en

Keywords

Risk; Physical activity; Falls; ICF; Content validity; Disability; Fear of falling; Outcomes assessment

Efficacy of exercise on balance, fear of falling, and risk of falls in patients with diabetic peripheral neuropathy: a systematic review and meta-analysis

de Oliveira Lima RA, Piemonte GA, Nogueira CR, Dos Santos Nunes-Nogueira V. Arch. Endocrinol. Metab. 2021; ePub(ePub): ePub.

DOI 10.20945/2359-3997000000337 **PMID** unavailable

Abstract

Diabetic peripheral neuropathy (DPN) is the most common complication of diabetes mellitus. Our objective was to evaluate the efficacy of exercise interventions in DPN patients from randomized controlled trials. The primary outcomes were the risk of falls, fear of falling, balance and quality of life. Two reviewers independently selected studies from Embase, Medline, LILACS, CENTRAL, and PEDro. They assessed the risk of bias and extracted data from the trials. The relative risk (RR) and the differences between means (MD) were calculated with a 95% confidence interval (CI) and used as the effect size. We used a random-effects model to pool results across studies, and the Grading of Recommendations Assessment, Development, and Evaluation system to evaluate the certainty of evidence. Eight trials were included. No clear effect was observed in the risk of falls (RR: 0.93, 95% CI: 0.41 to 2.09, 79 participants, 1 trial, low-certainty evidence). Regarding fear of falling, using the Falls Efficacy Scale, a small difference in favor of the intervention was observed (MD: -2.42, 95%, CI: -4.7 to -0.15, 3 trials, 185 participants, low-certainty evidence). The meta-analysis of balance using the unipedal stance test showed a small difference in favor of the intervention. One study evaluated quality of life, and in the mental score there was a MD in favor of the intervention. In DPN patients, a combination of gait, balance, and functional training improved balance, the fear of falling, quality of life in the mental score, but not the risk of falls.

Language: en

Keywords

systematic review; falls; balance; Diabetic peripheral neuropathy; exercise

Can physical activity levels and relationships with energy expenditure change the clinical aspects of sarcopenia and perceptions of falls among elderly women? Observational cross-sectional study

Kemp VL, Piber LS, Ribeiro AP. Sao Paulo Med. J. 2021; ePub(ePub): ePub.

DOI 10.1590/1516-3180.2020.0602.R1.0402021 **PMID** unavailable

Abstract

BACKGROUND: Physical activity (PA) is an effective strategy for managing sarcopenia in the elderly, but few studies have addressed PA levels regarding age-related changes.

OBJECTIVE: To ascertain the effects of elderly women's PA levels on sarcopenia, physical performance, handgrip strength and perception of the risk of falling, and their relationship with energy expenditure. DESIGN AND SETTING: Observational cross-sectional study conducted in the southern region of the city of São Paulo, Brazil.

METHODS: Forty-seven elderly women were evaluated and divided into three groups: low PA (n = 13); moderate PA (n = 16); and high PA (n = 18). Their PA levels were investigated through the International Physical Activity Questionnaire (IPAQ); sarcopenia index, through dual-energy radiological absorptiometry; physical performance through the Timed Up & Go test; handgrip strength, using a digital dynamometer; and perception of the risk of falling, through the Fall Risk Awareness Questionnaire.

RESULTS: High PA level indicated higher skeletal muscle mass index, physical performance and IPAQ score, compared with low and moderate PA levels. Multiple linear regression analysis showed that higher IPAQ energy expenditure at high and moderate PA levels was a good predictor of higher physical performance and increased perception of the risk of falling.

CONCLUSION: Elderly women classified as having high PA level showed improvements in sarcopenia, handgrip strength, physical performance and perception of the risk of falling. The IPAQ energy expenditure of the elderly women with high and moderate PA levels was a good predictor of physical performance and improved perception of the risk of falling.

Language: en

Does a recumbent lateral stability trainer improve balance scores among older adults within 4 weeks?

Shim A, Prichard S, Newman D, Lara C, Waller M, Hoppe M. Perm. J. 2021; 25.

DOI 10.7812/TPP/20.100 **PMID** unavailable

Abstract

BACKGROUD: Past literature has shown that balance and strength are important in preventing falls, but few studies have focused on developing strength and power in a lateral plane. The purpose of this study was to determine if a lateral pedal recumbent training device can improve balance scores among older adults in 4 weeks.

METHODS: A 2-group experimental-control multivariate design (43 women, 13 men; age, 77.4 ± 3 years; weight, 78.91 ± 0.2 kg; height, 167.13 ± 0.8 cm; body mass index, 28.7 ± 0.5 kg/m) was selected for the study. Participants (n = 56) were divided into 2 groups and were pretested and posttested on a computerized posturography plate to determine center of pressure scores with eyes opened with stable surface (EOSS), with eyes closed with stable surface (ECSS), with eyes open with perturbed surface (EOPS), and with eyes closed with perturbed surface (ECPS). The experimental group used the lateral trainer for 15 minutes, 3 times per week, for 4 consecutive weeks; the control group maintained a sedentary lifestyle. A mixed-effects repeated measures multiple analysis of variance was used to determine significance.

RESULTS: There were statistically significant differences over time for EOPS ($p = 0.047$) and ECPS ($p = 0.047$). Likewise, there were statistically significant differences for each univariate outcome with EOSS ($p = 0.045$), ECSS ($p = 0.033$), EOPS ($p = 0.010$), and ECPS ($p = 0.026$).

CONCLUSION: A recumbent lateral stability device can improve balance scores among older adults within 4 weeks of training.

Language: en

Effects of isometric exercises in reducing fall risk in elderly knee osteoarthritis patients

Aamir M, Rashad A, Suleman TA, Uddin S, Intikhab R, Memon AG, Hussain Z. J. Orthop. Trauma Surg. Relat. Res. 2021; 16(4).

DOI unavailable **PMID** unavailable

Abstract

BACKGROUND: Osteoarthritis is a degenerative joint disease that prompts joint side effects and signs which are related to imperfect joining of articular ligament, related changes in the hidden bones, joint edges, and pain. More than 33.6% affected by age of more than 65 years. This condition is the main reason behind patients' movement restrictions. Most patients cannot perform daily activities.

OBJECTIVES: The objectives of this study were to find out the effects of isometric exercises in reducing fall risk in knee OA in the elderly population and also to find the effectiveness of exercises in improving the quality of life of patients suffering from osteoarthritis.

MATERIALS AND METHODS: The randomized control consisted of 60 patients. The mean age of participants was 65.28 +-7.8. The Experimental group received isometric exercises while the control group was given routine physical therapy treatment. Data analysis was done using SPSS 20 version. An independent t-test was applied for intergroup comparison. Alpha level 0.05 was considered significant.

RESULTS: The results showed significant improvement in Knee Osteoarthritis Outcome Scale and Fall Risk assessment Tool as $p<0.05$. KOOS pain score in Experimental vs. Control was (63.1+-11.5 vs 45.7 +-21.1), Stiffness score (61.20+- 10.8 vs 50.0 +- 18.2), Function (59.9 +-12.3 vs 42.0 +-18.2), Sports (53.17+- 14.4 vs 35.7 +-16.3), Quality of life (65.53 +- 12.3 vs. 48.3 +-15.08). Whereas the fall risk assessment tool score was 14.10 +- 00 vs. 13.90 +-41. Conclusion: The results of the study showed that 6 weeks isometric exercise plan reduces the fall risk in knee Osteoarthritis patients further it also improves pain and other symptoms related to knee Osteoarthritis

Language: en

Keeping adults physically active after Falls Management Exercise (FaME) programmes end: development of a physical activity maintenance intervention

Audsley S, Kendrick D, Logan P, Orton E. Pilot Feasibility Stud. 2021; 7(1): 108.

DOI 10.1186/s40814-021-00844-w **PMID** unavailable

Abstract

BACKGROUND: Falls prevention exercise programmes help to improve muscle strength, balance and physical function, and reduce falling rates in older adults. Improvements in muscle strength, balance and physical function are reversed if older adults do not continue to be physically active after falls prevention exercise programmes end. This paper describes the design process of an intervention that aimed to maintain physical activity in older adults exiting falls prevention exercise programmes.

METHODS: The development of the Keeping Adults Physically Active (KAPA) intervention and its implementation plan was guided by Bartholomew's Intervention Mapping approach. The intervention mapping approach involved (1) performing a needs assessment and developing intervention objectives using previous literature; (2) identifying theory-based intervention strategies from a systematic review and the National Institute of Clinical Excellence guidelines; and (3) designing the KAPA intervention and its implementation plan with the guidance from an expert steering group.

RESULTS: The KAPA intervention comprised of six group sessions of motivational interviewing, delivered monthly by trained and mentor-supported falls prevention practitioners. Intervention sessions lasted up to 90 min and were delivered in community settings over a 6-month duration. Participant manuals, illustrated exercise books, physical activity diaries and pedometers supported the KAPA intervention.

CONCLUSIONS: The intervention development process, consisting of Bartholomew's Intervention Mapping approach and the input from an expert steering group, was successful in creating the evidence-based KAPA intervention ready to be evaluated in a feasibility trial.

Language: en

Keywords

Physical activity; Older adults; Falls prevention; Intervention development

Household physical activity and risk for future falls in community-dwelling older adults

Torres ER, Duck AA, Kassahun-Yimer W. J. Gerontol. Nurs. 2021; 47(6): 13-18.

DOI 10.3928/00989134-20210507-02 **PMID** unavailable

Abstract

Household physical activity is associated with decreased risk for future falls; however, it is not known what components of household physical activity are associated with this decreased risk. In the current study, the frequency of seven household physical activities performed in the previous 12 months was assessed: child or older adult care, meal preparation, major cleaning, routine cleaning, gardening/yardwork, heavy outdoor work, and major home decoration or repair. Berg Balance Scale scores were dichotomized at ≤50, indicating less risk for future falls. Only gardening/yardwork was associated with less risk for future falls (odds ratio = 1.41, p = 0.007) while controlling for age, gender, race, body mass index, and number of medications ($\chi(2) = 18.33$ [6], p = 0.005), explaining 17% to 23% of the variance in risk of future falls in community-dwelling older adults aged 65 to 90 years (N = 99). Clinical nursing implications include considering gardening/yardwork as an intervention to decrease risk of future falls. [Journal of Gerontological Nursing, 47(6), 13-18.].

Language: en

Reliability and validity of a modified version of the Community Balance and Mobility Scale (CBMS-Home) for use in home assessment

Ng YL, Hill KD, Jacques A, Burton E. Phys. Ther. 2021; ePub(ePub): ePub.

DOI 10.1093/ptj/pzab134 **PMID** unavailable

Abstract

OBJECTIVE: The Community Balance and Mobility Scale (CBMS) has been shown to be a valid and reliable outcome measure for evaluating balance and mobility among older adults; however, some items cannot be conducted in all home environments, limiting its use in home-based assessments. The purpose of this study was to evaluate the accuracy and selected measurement properties of a modified 12-item CBMS-Home (8 original items and 4 modified items of the CBMS) feasible for use within the constraints of home assessments for older adults.

METHODS: Fifty-five people (mean age = 77.2 [SD = 6.0] years) were recruited for this validation study. Participants completed the full original CBMS, CBMS-Home (the modified items of the CBMS), the Functional Reach Test (FRT), and Step Test (ST). Principal component analysis, internal consistency, test-retest and intermethod reliability, agreements within and between methods, and criterion validity were calculated.

RESULTS: Principal component analysis of CBMS and CBMS-Home both revealed 3 similar components and loadings. Bland-Altman and weighted kappa analyses revealed that the CBMS-Home demonstrated moderate to almost perfect agreement (weighted kappa = 0.45-0.84) with CBMS. The distribution of scores of CBMS-Home were satisfactory, and other results showed excellent test-retest (intraclass correlation coefficient [ICC] = 0.95) and inter-method reliability (ICC = 0.94) and internal consistency (Cronbach alpha = 0.94). There were no ceiling effects (0%) or floor (1.8%) effects. CBMS-Home demonstrated a low (Spearman ρ = 0.39) and moderate positive (Spearman ρ = 0.63) relationship with the FRT and ST, respectively.

CONCLUSIONS: The CBMS-Home has good psychometric properties and provides a useful multidimensional assessment tool. IMPACT: A modified version of the CBMS (CBMS-Home) can be confidently used to assess older adults-within their own home-who might have mild balance impairments.

Language: en

Keywords

Mobility; Walking; Aging; Geriatric Assessment; Balance

Golf as a physical activity to potentially reduce the risk of falls in older adults with Parkinson's disease

Bliss RR, Church FC. Sports (Basel) 2021; 9(6).

DOI 10.3390/sports9060072 **PMID** unavailable

Abstract

Advanced age is associated with an increased risk for falls in aging adults. Older adults are also more likely to be diagnosed with Parkinson's disease (PD), with advanced age as the most significant risk factor. PD is a neurodegenerative disorder with four Cardinal motor symptoms: rigidity, bradykinesia, postural instability, and tremor. Thus, people (person)-with-Parkinson's disease (PwP) have an even greater risk of falling than non-disorder age-matched peers. Exercise is an activity requiring physical effort, typically carried out to sustain or improve overall health and fitness, and it lowers the risk of falls in the general population. The sport of golf provides a low-impact all-around workout promoting a range of motion, activation of muscles in the upper and lower body, flexibility, and balance. Swinging a golf club offers a unique combination of high amplitude axial rotation, strengthening postural musculature, coordination, and stabilization, demonstrating the potential to impact PD symptoms positively. Golf may be a novel exercise treatment regimen for PD to use in conjunction with traditional medical therapy. We completed a literature review to determine the relationship between the game of golf, PD, and the risk of falls. We concluded that regularly playing golf can lower the risk for falls in community ambulating older adults with PD and demonstrates the potential to improve quality of life for PwP.

Language: en

Keywords

older adults; exercise; Parkinson’s disease; axial mobility; bradykinesia; golf; postural instability; risk of falls

Implementing an online virtual falls prevention intervention during a public health pandemic for older adults with mild cognitive impairment: a feasibility trial

Li F, Harmer P, Voit J, Chou LS. Clin. Interv. Aging 2021; 16: 973-983.

DOI 10.2147/CIA.S306431 **PMID** unavailable

Abstract

PURPOSE: This study evaluates the feasibility of delivering a virtual (online) falls prevention intervention for older adults with mild cognitive impairment (MCI).

METHODS: Community-dwelling older adults with MCI (mean age = 76.2 years, 72% women) were randomized to either a Tai Ji Quan (n = 15) or stretching group (n = 15) and participated in 60-minute virtual exercise sessions, via Zoom, twice weekly for 24 weeks. The primary outcome was the incidence of falls. Secondary outcomes were the number of fallers and changes from baseline in the 4-Stage Balance Test, 30-second chair stands, and Timed Up and Go Test under both single- and dual-task conditions.

RESULTS: The intervention was implemented with good fidelity, an overall attendance rate of 79%, and 13% attrition. Compared with stretching, Tai Ji Quan did not reduce falls (incidence rate ratio = 0.58; 95% confidence interval [CI], 0.32 to 1.03) or the number of fallers (relative risk ratio = 0.75; 95% CI, 0.46 to 1.22) at week 24. The Tai Ji Quan group, however, performed consistently better than the stretching group in balance (between-group difference in change from baseline, 0.68 points; 95% CI, 0.12 to 1.24), 30-second chair stands (1.87 stands; 95% CI, 1.15 to 2.58), and Timed Up and Go under single-task (-1.15 seconds; 95% CI, -1.85 to -0.44) and dual-task (-2.35; 95% CI, -3.06 to -1.64) conditions. No serious intervention-related adverse events were observed.

CONCLUSION: Findings from this study suggest the feasibility, with respect to intervention fidelity, compliance, and potential efficacy, of implementing an at-home, virtual, interactive Tai Ji Quan program, delivered in real-time, as a potential balance training and falls prevention intervention for older adults with MCI. The study provides preliminary data to inform future trials.

Language: en

Keywords

elderly; cognitive function; exercise; dual-task; e-health; incidental falls

On the Move clinic: a fall prevention nurse practitioner-driven model of care

Kanne GE, Sabol VK, Pierson D, Corcoran MW, Silva SG, White HK. Geriatr. Nurs. 2021; 42(4): 850-854.

DOI 10.1016/j.gerinurse.2021.03.019 **PMID** unavailable

Abstract

Falls in older adults are common and interventions to reduce associated morbidity and mortality remain difficult to implement. This quality improvement project evaluated On the Move, a new clinic designed to provide tailored recommendations to reduce falls risk, based on an adaptation of CDC's STEADI: a falls risk screening, assessment and intervention guide. 89 participants were referred by primary care and emergency services. A nurse practitioner assessed modifiable physical, behavioral and environmental risk factors and utilized motivational interviewing and education to guide participants in developing an intervention plan. A physical therapist assessed gait/balance, the need for ongoing PT services and provided brief counseling. Participants received a 6-week phone call and 12-week follow up visit. Measurements, including 30-second chair stands, Timed Up and Go, 4-Item Dynamic Gait Index, and Activities-Specific Balance Confidence Scale all showed significant improvement. Participants made behavioral changes to reduce risk, and plans to continue exercise.

Language: en

Keywords

Older adult; Fall prevention; Inter-professional; Nurse practitioner

Sweat the fall stuff: physical activity moderates the association of white matter hyperintensities with falls risk in older adults

Crockett RA, Falck RS, Dao E, Hsu CL, Tam R, Alkeridy W, Liu-Ambrose T. Front. Hum. Neurosci. 2021; 15: 671464.

DOI 10.3389/fnhum.2021.671464 **PMID** unavailable

Abstract

BACKGROUND: Falls in older adults are a major public health problem. White matter hyperintensities (WMHs) are highly prevalent in older adults and are a risk factor for falls. In the absence of a cure for WMHs, identifying potential strategies to counteract the risk of WMHs on falls are of great importance. Physical activity (PA) is a promising countermeasure to reduce both WMHs and falls risk. However, no study has yet investigated whether PA attenuates the association of WMHs with falls risk. We hypothesized that PA moderates the association between WMHs and falls risk.

METHODS: Seventy-six community-dwelling older adults aged 70-80 years old were included in this cross-sectional study. We indexed PA using the Physical Activity Score for the Elderly (PASE) Questionnaire. Falls risk was assessed using the Physiological Profile Assessment (PPA), and WMH volume (mm(3)) was determined by an experienced radiologist on T2-weighted and PD-weighted MRI scans. We first examined the independent associations of WMH volume and PASE score with PPA. Subsequently, we examined whether PASE moderated the relationship between WMH volume and PPA. We plotted simple slopes to interpret the interaction effects. Age, sex, and Montreal Cognitive Assessment (MoCA) score were included as covariates in all models.

RESULTS: Participants had a mean age of 74 years (SD = 3 years) and 54 (74%) were female. Forty-nine participants (66%) had a Fazekas score of 1, 19 (26%) had a score of 2, and 6 (8%) a score of 3. Both PASE ($\beta = -0.26 \pm 0.11$; $p = 0.022$) and WMH volume ($\beta = 0.23 \pm 0.11$; $p = 0.043$) were each independently associated with PPA score. The interaction model indicated that PASE score moderated the association between WMH volume and PPA ($\beta = -0.27 \pm 0.12$; $p = 0.030$), whereby higher PASE score attenuated the association between WMHs and falls risk.

CONCLUSION: PA is an important moderator of falls risk. Importantly, older adults with WMH can reduce their risk of falls by increasing their PA.

Language: en

Keywords

aging; physical activity; cerebrovascular disease; falls risk; white matter hyperintensities

Effects of gait adaptability training on falls and fall-related fractures in older adults: a systematic review and meta-analysis

Nørgaard JE, Jorgensen MG, Ryg J, Andreasen J, Danielsen MB, Steiner DK, Andersen S. Age Ageing 2021; ePub(ePub): ePub.

DOI 10.1093/ageing/afab105 **PMID** unavailable

Abstract

OBJECTIVE: falls among older adults are common and can have devastating consequences. A novel task-specific exercise modality, gait adaptability training (GAT), has shown promising preventive effects. This systematic review and meta-analysis synthesise the evidence regarding GATs effect on falls and fall-related fractures in community-dwelling older adults.

METHODS: electronic databases (PubMed, EMBASE, CINAHL, CENTRAL) were systematically searched from inception to 18 June 2020. Additional sources include searches of trial registrations, manual screening of reference lists and requests to experts. We included randomised controlled trials (RCTs) evaluating the effect of GAT on falls with at least 6-month follow-up among community-dwelling people aged 60+ years. Two reviewers independently screened studies against eligibility criteria, extracted relevant information and appraised studies for bias. Random-effects meta-analytic models were employed to pool effect estimates.

RESULTS: eleven studies with 1,131 participants were included. A meta-analysis in which an outlier study was excluded showed that GAT reduces fall rates by 42% (incidence rate ratio 0.58, 95% confidence interval [CI] 0.39-0.81, I2 = 0.00%; moderate certainty; seven RCTs). Moreover, proportion with fall-related fractures and proportion of fallers was reduced by 81% (risk ratio [RR] 0.19, 95% CI 0.06-0.56, I2 = 0.00%; very low certainty; two RCTs) and 43% (RR 0.57, 95% CI 0.4-to 0.8, I2 = 47.08%; low certainty; 11 RCTs), respectively.

CONCLUSIONS: our results show that GAT significantly reduces the number of falls and prevents fall-related fractures in older community dwellers. GAT is a promising and feasible exercise modality; however, studies of high quality should be conducted to support a robust conclusion. PROTOCOL REGISTRATION: PROSPERO; CRD42020191051.

Language: en

Keywords

accident prevention; systematic review; exercise; accidental falls; older people; gait adaptability training

Efficacy of exercise-based interventions in preventing falls among community-dwelling older persons with cognitive impairment: is there enough evidence? An updated systematic review and meta-analysis

Li F, Harmer P, Eckstrom E, Ainsworth BE, Fitzgerald K, Voit J, Chou LS, Welker FL, Needham S. Age Ageing 2021; ePub(ePub): ePub.

DOI 10.1093/ageing/afab110 **PMID** unavailable

Abstract

OBJECTIVE: Exercise prevents falls in the general older population, but evidence is inconclusive for older adults living with cognitive impairment. We performed an updated systematic review and meta-analysis to assess the potential effectiveness of interventions for reducing falls in older persons with cognitive impairment.

METHODS: PubMed, EMBASE, CINAHL, Scopus, CENTRAL and PEDro were searched from inception to 10 November 2020. We included randomised controlled trials (RCTs) that evaluated the effects of physical training compared to a control condition (usual care, waitlist, education, placebo control) on reducing falls among community-dwelling older adults with cognitive impairment (i.e. any stage of Alzheimer's disease and related dementias, mild cognitive impairment).

RESULTS: We identified and meta-analysed nine studies, published between 2013 and 2020, that included 12 comparisons (N = 1,411; mean age = 78 years; 56% women). Overall, in comparison to control, interventions produced a statistically significant reduction of approximately 30% in the rate of falls (incidence rate ratio = 0.70; 95% CI, 0.52-0.95). There was significant between-trial heterogeneity (I2 = 74%), with most trials (n = 6 studies [eight comparisons]) showing no reductions on fall rates. Subgroup analyses showed no differences in the fall rates by trial-level characteristics. Exercise-based interventions had no impact on reducing the number of fallers (relative risk = 1.01; 95% CI, 0.90-1.14). Concerns about risk of bias in these RCTs were noted, and the quality of evidence was rated as low.

CONCLUSIONS: The positive statistical findings on reducing fall rate in this meta-analysis were driven by a few studies. Therefore, current evidence is insufficient to inform evidence-based recommendations or treatment decisions for clinical practice.PROSPERO Registration number: CRD42020202094.

Language: en

Keywords

systematic review; cognitive function; fall prevention; incidental falls; older people; exercise training

Exer-gaming reduces fall risk and improves mobility after stroke

Aslam M, Ain QU, Fayyaz P, Malik AN. J. Pak. Med. Assoc. 2021; 71(6): 1673-1675.

DOI 10.47391/JPMA.875 **PMID** unavailable

Abstract

The current study evaluated the effect of virtual reality based balance training in 30 stroke patients recruited via purposive sampling technique for a clinical trial. Sealed envelope method was used to randomly allocate patients into two groups, i.e. Exer-gaming group (EGG) (n=15) and traditional training (TBT) group (n=15). Patients ranging in age from 50 to 60 years were included using Modified Rankin Scale (MRS). Patients with cognitive deficits, severe physical impairments, contractures, inability to perform tasks, complications of the joint that affected movement, history of recent fracture, arthritis and those on drugs that could affect their physical function were excluded. Data was collected using Berg Balance Scale (BBS) and Timed Up & Go Test (TUG). Significant improvement was observed in the exer-gaming training group after completing intervention (P<0.001). Exer-gaming appears to be more effective in improving functional level, mobility and balance in stroke patients. The study also suggests that exer-gaming further provides dynamic environment for stroke patients, thereby improving dynamic balance and mobility.

Language: en

Keywords

Balance training, Exer-gaming, fall, Virtual Reality

Feasibility of a 6-month home-based fall prevention exercise program in older adults with COPD

Beauchamp MK, Ellerton C, Kirkwood R, Brooks D, Richardson J, Goldstein RS, Pugsley S, Hatzoglou D. Int. J. Chron. Obstruct. Pulmon. Dis. 2021; 16: 1569-1579.

DOI 10.2147/COPD.S309537 **PMID** 34113090

Abstract

PURPOSE: Older adults with chronic obstructive pulmonary disease (COPD) have a high risk and rate of falls. Home-based fall prevention exercise programs reduce falls in older adults and may be an alternative approach for people with COPD without access to hospital-based rehabilitation. Therefore, we aimed to determine the feasibility of a home-based fall prevention exercise program in older adults with COPD and to examine the effect of the program on fall-related outcomes at baseline, 3 and 6 months.

PATIENTS AND METHODS: Adults ≥60 years with COPD at risk for falls participated in a single group study. The intervention was a 6-month home-based fall prevention program which included 40 minutes of independent exercise three times per week, four physiotherapist home visits, bimonthly phone calls, and an optional booster session post-exacerbation. An independent assessor collected outcome measures at home at baseline, 3- and 6-months. Primary feasibility criteria were recruitment and retention rates (≥70%) and exercise adherence (≥60%). Functional outcomes included the Berg Balance Scale (BBS), the Balance Evaluation Systems Test (BESTest), the Activities-Specific Balance Confidence (ABC) scale, the repeated chair-stand test, self-reported function, and fall history.

RESULTS: Thirty-six patients (female 63.8%, mean age 74.4 ± 6.1 years; mean FEV(1) 45.0 ± 13.8% predicted) were enrolled. The recruitment rate was 46.8%, participant retention rate was 69.4%, and exercise adherence rate was 73.6%. Repeated measures ANOVA showed improvements at 3- and 6-months compared to baseline in the BBS (p=0.001) and the BESTest total scores and sub-scores (p=0.001).

CONCLUSION: The home-based fall prevention exercise program met one of the three pre-specified feasibility criteria (exercise adherence), and improved balance-related measures of fall risk in older adults with COPD. Our findings highlight important opportunities for refinement of the study design prior to undertaking a full-scale trial.

Language: en

Keywords

exercise; COPD; falls prevention; balance training

Effectiveness of community-based rehabilitation interventions incorporating outdoor mobility on ambulatory ability and falls-related self-efficacy after hip fracture: a systematic review and meta-analysis

Sheehan KJ, Fitzgerald L, Lambe K, Martin FC, Lamb SE, Sackley C. Arch. Osteoporos. 2021; 16(1): 99.

DOI 10.1007/s11657-021-00963-0 **PMID** unavailable

Abstract

There is limited evidence from 11 randomised controlled trials on the effect of rehabilitation interventions which incorporate outdoor mobility on ambulatory ability and/or self-efficacy after hip fracture. Outdoor mobility should be central (not peripheral) to future intervention studies targeting improvements in ambulatory ability.

PURPOSE: Determine the extent to which outdoor mobility is incorporated into rehabilitation interventions after hip fracture. Synthesise the evidence for the effectiveness of these interventions on ambulatory ability and falls-related self-efficacy.

METHODS: Systematic search of MEDLINE, Embase, PsychInfo, CINAHL, PEDro and OpenGrey for published and unpublished randomised controlled trials (RCTs) of community-based rehabilitation interventions incorporating outdoor mobility after hip fracture from database inception to January 2021. Exclusion of protocols, pilot/feasibility studies, secondary analyses of RCTs, nonrandomised and non-English language studies. Duplicate screening for eligibility, risk of bias, and data extraction sample. Random effects meta-analysis. Statistical heterogeneity with inconsistency-value (I(2)).

RESULTS: RCTs (n = 11) provided limited detail on target or achieved outdoor mobility intervention components. There was conflicting evidence from 2 RCTs for the effect on outdoor walking ability at 1-3 months (risk difference 0.19; 95% confidence intervals (CI): 0.21, 0.58; I(2) = 92%), no effect on walking endurance at intervention end (standardised mean difference 0.05; 95% CI: - 0.26, 0.35; I(2) = 36%); and suggestive (CI crosses null) of a small effect on self-efficacy at 1-3 months (standardised mean difference 0.25; 95% CI: - 0.29, 0.78; I(2) = 87%) compared with routine care/sham intervention.

CONCLUSION: It was not possible to attribute any benefit observed to an outdoor mobility intervention component due to poor reporting of target or achieved outdoor mobility and/or quality of the underlying evidence. Given the low proportion of patients recovering outdoor mobility after hip fracture, future research on interventions with outdoor mobility as a central component is warranted. TRIAL REGISTRATION: PROSPERO registration: CRD42021236541.
Language: en

Keywords

Walking; Falls efficacy; Fracture neck of femur; Home-based; Physiotherapy

Is functional fitness performance a useful predictor of risk of falls among community-dwelling older adults?

Ho HH, Fang IY, Yu YC, Huang YP, Kuo IL, Wang LT, Tsai MC, Chang SH, Hsueh MC. Arch. Public Health 2021; 79(1): 108.

DOI 10.1186/s13690-021-00608-1 **PMID** unavailable

Abstract

BACKGROUND: Falls among older adults are a serious public health problem. Many studies indicate that positive functional fitness performance decreases the risk of falls. A limited amount of previous study has investigated the association between broad functional fitness and the fall risk. This study examines the associations between functional fitness and the risk of falling among community-dwelling older adults.

METHODS: Three waves of cross-sectional data were collected from 2017 to 2019 in Taipei City, Taiwan. Six hundred sixty-five participants aged ≥65 years were randomly recruited from 12 districts of Taipei. Eight functional fitness tests (i.e., back scratch, chair-sit and-reach, 8-ft up-and-go, 30-s sit-to-stand, 30-s arm curl, 30-s single-leg stance, 2-min step, and hand grip strength tests) were performed to record the physical performance of older subjects. A Chinese version of the fall-risk questionnaire (FRQ) was used to calculate the fall risk scores. Linear regression and logistic regression were utilized to estimate the relationships of each functional fitness and fall risk.

RESULT: The results showed that 37.45% of older adults had a high risk of falling. It was found for each functional fitness that performance was linearly associated with the risk of falling. Moreover, older adults with low-performance levels in all functional fitness except back-scratching were more likely to have a higher risk of falling.

CONCLUSIONS: Our study indicated that functional fitness performance appears to provide valid predictive guidance for reducing the risk of falling among the older population.

Language: en

Keywords

Elderly; Taiwan; Frailty; Physical function; Physical performance

Development of the better balance program for people with multiple sclerosis: a complex fall-prevention intervention

Comber L, Peterson E, O'Malley N, Galvin R, Finlayson M, Coote S. Int. J. MS Care 2021; 23(3): 119-127.

DOI 10.7224/1537-2073.2019-105 **PMID** 34177384

Abstract

BACKGROUND: Approximately 56% of people with multiple sclerosis (MS) will fall in any 3-month period, with the potential for physical, psychological, and social consequences. Fall-prevention research for people with MS is in its infancy, with a timely need to develop theory-based interventions that reflect the complexity of falls. The clear articulation of the development of any complex intervention is paramount to its future evaluation, usability, and effectiveness. Our aim was to describe how the development of Better Balance, a complex multicomponent fall-prevention intervention for people with MS, was guided by the Medical Research Council framework for the development of complex interventions.

METHODS: Sources of information included existing literature, original research, clinician interviews, and views of people with MS. These sources were synthesized and refined through an iterative process of intervention development involving researchers, clinicians, and people with MS.

RESULTS: The resulting intervention is outlined through a variety of key tasks supplementing the original Medical Research Council framework. Use of this framework resulted in a theoretically based and user-informed complex intervention designed to address the physiological, personal, and behavioral risk factors associated with falls in people with MS.

CONCLUSIONS: The articulation of the systematic process used to develop Better Balance will inform the future evaluation and usability of the intervention.

Language: en

Keywords

Accidental falls; Rehabilitation research; Fall prevention; Multiple sclerosis (MS)

A review of the impact of exercise on fall rates among community-dwelling older adults

Pierson K, Maloney M, Bavuso A, Dowling K, Kunsang T, Wong ME. J. Am. Assoc. Nurse Pract. 2021; ePub(ePub): ePub.

DOI 10.1097/JXX.0000000000000636

PMID unavailable

Abstract

BACKGROUND: The physical decrements of aging predispose older adults to falls and fall-related injuries. Consequences of falling place financial and logistical burdens on the health care system. With an aging population, mitigation of risk and reduction of harm are important objectives. Studies show that exercise can improve balance and build muscle mass. The challenge is prescribing safe and evidence-based exercise regimens to older adults.

OBJECTIVES: The objective of this evidence review was to determine if an exercise program can reduce fall rates and prolong functional independence among older adults living in the community. DATA SOURCES: This review included 14 randomized control trials and one quasi-experimental interventional study, all published between 2014 and 2020.

CONCLUSIONS: The evidence suggests that a home- or community-based exercise program with formal instruction and health care provider involvement can be an effective fall-prevention and harm reduction strategy for community-dwelling older adults.

IMPLICATIONS FOR PRACTICE: The evidence suggests that a home- or community-based exercise program may be an effective fall-prevention strategy for older adults living independently in the community. Health care providers should educate these patients about the benefits of exercise as a fall-prevention measure and assist patients in increasing participation in exercise programs by making referrals and promoting engagement in evidence-based exercise programs.

Language: en

Cost-effectiveness of an exercise programme that provided group or individual training to reduce the fall risk in healthy community-dwelling people aged 65-80: a secondary data analysis

Aranda-Reneo I, Albornos-Muñoz L, Rich-Ruiz M, Cidoncha-Moreno M, Pastor-López, Moreno-Casbas T, Group OPW. Healthcare (Basel) 2021; 9(6): e9060714.

DOI 10.3390/healthcare9060714

PMID unavailable

Abstract

Research has demonstrated that some exercise programs are effective for reducing fall rates in community-dwelling older people; however, the literature is limited in providing clear recommendations of individual or group training as a result of economic evaluation. The objective of this study was to assess the cost-effectiveness of the Otago Exercise Program (OEP) for reducing the fall risk in healthy, non-institutionalized older people. An economic evaluation of a multicenter, blinded, randomized, non-inferiority clinical trial was performed on 498 patients aged over 65 in primary care. Participants were randomly allocated to the treatment or control arms, and group or individual training. The program was delivered in primary healthcare settings and comprised five initial sessions, ongoing encouragement and support to exercise at home, and a reinforcement session after six months. Our hypothesis was that the patients who received the intervention would achieve better health outcomes and therefore need lower healthcare resources during the follow-up, thus, lower healthcare costs. The primary outcome was the incremental cost-effectiveness ratio, which used the timed up and go test results as an effective measure for preventing falls. The secondary outcomes included differently validated tools that assessed the fall risk. The cost per patient was USD 51.28 lower for the group than the individual sessions in the control group, and the fall risk was 10% lower when exercises had a group delivery. The OEP program delivered in a group manner was superior to the individual method. We observed slight differences in the incremental cost estimations when using different tools to assess the risk of fall, but all of them indicated the dominance of the intervention group. The OEP group sessions were more cost-effective than the individual sessions, and the fall risk was 10% lower.

Language: en

Keywords

older adults; cost-effectiveness; randomized controlled trial; direct healthcare costs; Otago Exercise Program; risk fall; short physical performance battery; timed up and go; Tinetti

Evaluation of implementing TOM: a group-based fall prevention programme among community-dwelling older adults in the Netherlands

Frazer SWT, van der Veen R, Baan A, Hermans MEW, Olij BF. Int. J. Environ. Res. Public Health 2021; 18(12): e18126360.

DOI 10.3390/ijerph18126360

PMID unavailable

Abstract

There is strong evidence that effective fall prevention elements exist, but the implementation into society remains difficult. The aim of the current study is to describe and evaluate the implementation of the fall prevention programme "Thuis Onbezorgd Mobiel" (TOM). This novel approach combines effective components into a multidisciplinary group-based programme for adults aged 65 years or older with an increased risk of falling. To investigate the impact on several health-related outcomes such as subjective health, quality of life, physical functioning, and falls, we applied a quasi-experimental pre-post design including a follow-up period. A total of 164 older adults subscribed to the programme: 80 were eligible to start and 73 completed it. The impact analysis revealed a significant improvement in subjective health, physical functioning, and quality of life directly after participating in the programme. The impact on subjective health and quality of life persisted six months after the programme. Important facilitators for the implementation of the programme were social contact and clear communication. Lack of a concrete follow-up was seen as an important barrier. The results of the current research help guide further implementation of effective fall prevention interventions in practice.

Language: en

Keywords

prevention; aged; quality of life; health; implementation science; accidental falls; independent living; physical functioning

Experiences of a home-based fall prevention exercise program among older adults with chronic lung disease

Chauvin S, Durocher E, Richardson J, Beauchamp MK. Disabil. Rehabil. 2021; ePub(ePub): ePub.

DOI 10.1080/09638288.2021.1938246

PMID unavailable

Abstract

BACKGROUND: Individuals with chronic obstructive pulmonary disease (COPD) often have mobility limitations; these may include challenges with balance and being at high risk of falling. Risk of falling can be reduced through exercise programs targeting balance; however, older adults with COPD may experience many barriers to exercise adherence. In this paper we present qualitative findings about the feasibility of a six-month home-based fall-prevention exercise program for older adults with COPD. The aim of the study is to describe the experiences of older adults with COPD who participated in a home-based fall prevention exercise program in order to determine their perceived facilitators and barriers to participation.

METHODS: 15 participants with COPD who had completed the six-month home-based program participated in one-on-one semi-structured interviews over the phone. Interpretive description methodology and thematic analysis were used.

RESULTS: Two major themes emerged with respect to participants' perspectives of the intervention and facilitators and barriers to participation: program personalization based on each individual's characteristics, lifestyles, and preferences; and self-motivation and support from family, friends, and healthcare providers.

CONCLUSIONS: Fall prevention exercise programs that are personalized and focus on providing support for older adults with COPD may help to improve adherence and reduce participants' risk of falling. Implications for rehabilitation. Individuals with COPD often have balance problems and a high risk of falling. Fall prevention programs can improve balance, but adherence is a commonly cited challenge. Patient experiences suggest that fall prevention programs should be personalized and incorporate social support to improve adherence to fall prevention exercises.

Language: en

Keywords

fall; rehabilitation; balance; Qualitative; chronic obstructive pulmonary disease; COPD

The relation between functional performance, falls and previous falls among participants in the Otago Programme: a secondary data analysis

Company-Sancho MC, Alonso-Poncelas E, Rich-Ruiz M, Cidoncha-Moreno M, Gonzalez-Pisano A, Abad-Corpa E, Otago Project Working Group. Int. J. Environ. Res. Public Health 2021; 18(12).

DOI 10.3390/ijerph18126501

PMID unavailable

Abstract

Fall prevention is a key priority in healthcare policies. Multicomponent exercises reduce the risk of falls. The purpose of this study is to describe the relationship between functional performance and falls after following the Otago multicomponent exercise programme and previous falls. A prospective multi-centre intervention study was performed on 498 patients aged over 65 in primary care, with or without a history of previous falls. Sociodemographic, anthropometric and functionality data were collected. The primary outcome was the occurrence of falls; functional performance was measured using the Tinetti, Short Physical Performance Battery and Timed Up and Go tests. Among the patients, 29.7% referred to previous falls. There was a statistically significant ($p < 0.001$) increase in falls at 6 months (10.1%) and at 12 months (7.6%) among participants with previous falls in the baseline assessment compared to those without. In addition, the existence of previous falls could be considered a risk factor at 6 and 12 months (OR =2.37, $p = 0.002$, and OR = 1.76, $p = 0.046$, respectively). With regard to balance and gait, differences between the groups were observed at 6 months in the Tinetti score ($p < 0.001$) and in the baseline assessment Timed Up and Go score ($p < 0.044$). Multicomponent exercises improve the fall rate, balance and gait in older people, although this improvement is less in people with previous falls. Earlier intervention and tailoring of exercises in patients with previous falls could help improve outcomes.

Language: en

Keywords prevention; elderly; falls; community; primary care

Dissemination and implementation of evidence-based falls prevention programs: reach and effectiveness

Brach JS, Juarez G, Perera S, Cameron K, Vincenzo JL, Tripken J. J. Gerontol. A Biol. Sci. Med. Sci. 2021; ePub(ePub): ePub.

DOI 10.1093/gerona/glab197

PMID unavailable

Abstract

BACKGROUND: Using the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework, we describe the implementation of evidence-based falls prevention programs by Administrative for Community Living grantees during 2014-2019.

METHODS: Forty-four grantees contributed to the national data repository. Data components include workshop information, participant information, attendance records, and organizational data. Data were collected before and after implementation of the evidence-based fall prevention programs.

RESULTS: Ten different programs were offered in 35 states with the most common settings being senior centers (25.3%), residential facilities (16.8%), health care organizations (12.5%), and faith-based organizations (11.1%). Individuals who participated in the programs (n=85,848) had an age of 75.5±9.7 years, were primarily female (79.7%) and the majority (86.2%) reported at least some fear of falling. At the post-program assessment, 31.8% reported less fear of falling, 21.6% reported fewer falls, and 10.1% reported fewer injurious falls (all $p<0.0001$).

CONCLUSIONS: Evidence-based fall prevention programs implemented by Administration for Community Living grantees reached over 85,000 older adults. Participation in the evidence-based fall prevention programs resulted in improved confidence, decreased fear of falling, and fewer falls and injurious falls. Future efforts should focus on reaching specific underserved minorities and examining the effectiveness of individual programs.

Language: en

Keywords

falls; intervention; evidence-based programs; implementation

Exergaming to improve balance and decrease the risk of falling in adults with knee osteoarthritis: a mixed-methods feasibility study

Manlapaz DG, Sole G, Jayakaran P, Chapple CM. Physiother. Theory Pract. 2021; ePub(ePub): ePub.

DOI 10.1080/09593985.2021.1952670 **PMID** unavailable

Abstract

BACKGROUND: Exergaming (exercise and gaming) is useful in improving balance in various health conditions, yet there is limited research regarding its application in individuals with knee osteoarthritis (OA).

OBJECTIVES: The primary aim of this study was to investigate the feasibility and acceptability of exergaming using Nintendo Wii Fit™ to improve balance and reduce the risk of falls in individuals with knee OA.

METHODS: A mixed-methods explanatory sequential study design was utilized in this study. Participants with knee OA and history of falling participated in a single-group pre-post experimental study design: eight weeks of usual care followed by eight weeks of an exergaming program. This was followed by semi-structured focus groups to determine the acceptability of the study.

RESULTS: The pre-defined feasibility criteria such as recruitment, retention rate (83%), and compliance (78%) were successfully met. The participants found the frequency and duration of the assessment and intervention sessions acceptable. Participants reported enjoying the exergaming, finding it motivating and interactive despite some barriers with technology. No adverse events were reported. There were encouraging results in the clinical outcome measures such as knee muscle strength, balance, fear of falling, and performance of physical function.

CONCLUSION: The study found that it is feasible and acceptable to use Nintendo Wii Fit™ as an exergaming tool to improve balance and decrease the risk of falling in adults with knee OA.

FINDINGS from this feasibility study are encouraging and support the need to conduct a fully powered randomized controlled trial study.

Language: en

Keywords

falls; balance; Exergaming; feasibility; knee osteoarthritis; mixed methods

Implementation fidelity of the Falls Management Exercise Programme: a mixed methods analysis using a conceptual framework for implementation fidelity

Orton E, Lafond N, Skelton DA, Coupland C, Gladman JRF, Iliffe S, Logan PA, Masud T, Timblin C, Timmons S, Kendrick D. Public Health 2021; 197: 11-18.

DOI 10.1016/j.puhe.2021.05.038 **PMID** unavailable

Abstract

OBJECTIVES: Falls in older adults cause significant morbidity and mortality and incur cost to health and care services. The Falls Management Exercise (FaME) programme is a 24-week intervention for older adults that, in clinical trials, improves balance and functional strength and leads to fewer falls. Similar but more modest outcomes have been found when FaME is delivered in routine practice. Understanding the degree to which the programme is delivered with fidelity is important if 'real-world' delivery of FaME is to achieve the same magnitude of outcome as in clinical trials. The objective of this study was to examine the implementation fidelity of FaME when delivered in the community to inform quality improvement strategies that maximise programme effectiveness. STUDY DESIGN: A mixed methods implementation study of FaME programme delivery.

METHODS: Data from programme registers, expert observations of FaME classes, and semistructured interviews with FaME instructors were triangulated using a conceptual framework for implementation fidelity. Quantitative data were analysed using descriptive statistics. Interviews were transcribed verbatim and analysed using thematic analysis.

RESULTS: In total, 356 participants enrolled on 29 FaME programmes, and 143 (40%) participants completed at least 75% of the classes within a programme. Observations showed that 72%-78% of programme content was delivered, and 80%-84% quality criteria were met. Important content that was most often left out included home exercises, Tai Chi moves, and floor work, whereas quality items most frequently missed out included asking about falls in the previous week, following up attendance absence and explaining the purpose of exercises. Only 24% of class participants made the expected strength training progression. Interviews with FaME instructors helped explain why elements of programme content and quality were not delivered. Strategies for improving FaME delivery were established and helped to maintain quality and fidelity.

CONCLUSIONS: FaME programmes delivered in the 'real world' can be implemented with a high degree of fidelity, although important deviations were found. Facilitation strategies could be used to further improve programme fidelity and maximise participant outcomes. Language: en

Keywords

Falls; Exercise; Intervention; Older adults; Implementation fidelity

Cost-effectiveness of group-based exercise to prevent falls in elderly community-dwelling people

Scheckel B, Stock S, Müller D. BMC Geriatr. 2021; 21(1): e440.

DOI 10.1186/s12877-021-02329-0 **PMID** unavailable

Abstract

BACKGROUND: Clinical studies indicate that strength-balance training for active fall prevention can prevent fractures in older people. The present modelling study evaluates the cost-effectiveness of fall prevention exercise (FPE) provided to independently living older people compared to no intervention in Germany.

METHOD: We designed a Markov model to evaluate the cost-effectiveness of a group-based FPE-program provided to independently living people ≥75 years from the perspective of the German statutory health insurance (SHI). Input data was obtained from public databases, clinical trials and official statistics. The incremental cost-effectiveness ratio (ICER) was presented as costs per avoided hip fracture. Additionally, we performed deterministic and probabilistic sensitivity analyses and, estimated monetary consequences for the SHI in a budget impact analysis (BIA).

RESULTS: For women, the costs per hip fracture avoided amounted to €52,864 (men: €169,805).

RESULTS of deterministic and probabilistic sensitivity analyses confirmed the robustness of the results. According to the BIA, for the reimbursement of FPE additional costs of €3.0 million (women) and €7.8 million (men) are expected for the SHI.

CONCLUSIONS: Group-based FPE appears to be no cost-effective option to prevent fall-related hip fractures in independently living elderly. To allow a more comprehensive statement on the cost effectiveness of FPE fracture types other than hip should be increasingly evaluated in clinical trials.

Language: en

Keywords

Elderly people; Fall prevention; Cost-effectiveness; Hip fracture; Markov model

Effects of virtual reality versus conventional balance training on balance of the elderly

Babadi SY, Daneshmandi H. Exp. Gerontol. 2021; ePub(ePub): ePub.

DOI 10.1016/j.exger.2021.111498 **PMID** unavailable

Abstract

OBJECTIVE: The aging population is growing in the world, and the reduction in physical function caused by this is an important issue that, particularly, causes a disorder of balance and an increased risk of falling. This study aimed at the comparison between the effects of virtual reality training (VRT) and Conventional balance training (CBT) on the balance of the elderly.

METHODS: The present study was conducted on 36 elderly (men and women) who are living in nursing homes. Participants were randomly divided into three groups: virtual reality training (6 males, 6 females; age = 66.5 ± 3.8 years), Conventional balance training (6 males, 6 females; age = 67.5 ± 3.1 years), and control (5 males, 7 females; age = 66.7 ± 3.2 years). Each group participated in a 60-min session, 3 times per week, for 9 weeks. To assess the participants' balance, the balance tests were used on single-leg stance (SLS) with open and closed eyes, Functional reach test (FRT), Timed up and Go Test (TUG), and Fullerton Advance Balance Scale (FABS). Data analysis was done using paired t-test and analysis of covariance by SPSS software version 24 at the significant level (P = 0.05).

RESULTS: In both groups (VRT, CBT), SLS with open and closed eyes, FRT, TUG, and FABS were significantly improved (P<0.05). After the intervention, changes in both groups were similar (P > 0.05), which indicates that neither VRT and CBT training methods were superior to the other.

CONCLUSION: According to the results of this study, it seems that a virtual reality training program can be used as a new training method to improve the elderly's balance in daily programs of nursing homes.

Language: en

Keywords

Aging; Virtual reality; Rehabilitation; Exercise therapy

Strength training to prevent falls in older adults: a systematic review with meta-analysis of randomized controlled trials

Claudino JG, Afonso J, Sarvestan J, Lanza MB, Pennone J, Filho CAC, Serrão JC, Espregueira-Mendes J, Vasconcelos ALV, de Andrade MP, Rocha-Rodrigues S, Andrade R, Ramirez-Campillo R. J. Clin. Med. 2021; 10(14).

DOI 10.3390/jcm10143184 **PMID** unavailable

Abstract

We performed a systematic review with meta-analysis of randomized controlled trials (RCTs) to assess the effects of strength training (ST), as compared to alternative multimodal or unimodal exercise programs, on the number of falls in older adults (≥60 years). Ten databases were consulted (CINAHL, Cochrane Library, EBSCO, EMBASE, PEDro, PubMed, Scielo, Scopus, SPORTDiscus and Web of Science), without limitations on language or publication date. Eligibility criteria were as follows: RCTs with humans ≥60 years of age of any gender with one group performing supervised ST and a group performing another type of exercise training, reporting data pertaining falls. Certainty of evidence was assessed with Grading of Recommendations, Assessment, Development and Evaluation (GRADE). Meta-analysis used a random effects model to calculate the risk ratio (RR) for number of falls. Five RCTs with six trials were included (n = 543, 76% women). There was no difference between ST and alternative exercise interventions for falls (RR = 1.00, 95% CI 0.77-1.30, p = 0.99). The certainty of evidence was very low. No dose-response relationship could be established. In sum, ST showed comparable RR based on number of falls in older adults when compared to other multimodal or unimodal exercise modalities, but evidence is scarce and heterogeneous, and additional research is required for more robust conclusions.

Registration: PROSPERO CRD42020222908.

Language: en

Keywords

elderly; falls; public health; strength training; unimodal exercise programs

The effectiveness of exergames on fear of falling in community-dwelling older adults: a systematic review

Ge L, Su TT, An Y, Mejía ST. Aging Ment. Health 2021; ePub(ePub): ePub.

DOI 10.1080/13607863.2021.1950615 **PMID** unavailable

Abstract

OBJECTIVEs Fear of falling is common among older adults and can increase fall-risk through premature activity restriction. Exergames, an emerging tool in fall prevention, combine exercise with interactive and adaptive game elements. This review examines the extent to which exergame interventions reduce fear of falling among community-dwelling older adults.

METHOD: Guided by the PRISMA methodology, we reviewed peer-reviewed studies that were published in English between 2006 and 2019 and employed a comparative design to test the effect of exergames on fear of falling in community-dwelling older adults. Two reviewers screened the literature and extracted data on the exergame platform, participants, study design, and results. A modified PEDro scale was used to assess study quality. Disagreements were resolved through discussion with the third reviewer.

RESULTS: Our literature search resulted in 23 eligible studies on exergame interventions where fear of falling was the primary or secondary outcome. Most interventions (35%) occurred within hospitals and were delivered via a Wii-based system (61%). Fear of falling was most commonly measured using the Falls Efficacy Scale, the Activities-specific Balance Scale and their modified versions. A total of 15 of the 23 studies reported statistically significant changes in fear of falling. Quality assessment showed 10 studies to be rated as 'good.' Conclusion: This review showed that exergame may have a positive effect in reducing fear of falling in community-dwelling older adults. The finding provides a direction for clinical practice in the research area of intervention on fear of falling in older adults.

Language: en

Keywords

systematic review; older adults; fear of falling; Exergame

Unsupervised assessment of balance and falls risk using a smartphone and machine learning

Greene BR, McManus K, Ader LGM, Caulfield B. Sensors (Basel) 2021; 21(14): s21144770.

DOI 10.3390/s21144770 **PMID** unavailable

Abstract

Assessment of health and physical function using smartphones (mHealth) has enormous potential due to the ubiquity of smartphones and their potential to provide low cost, scalable access to care as well as frequent, objective measurements, outside of clinical environments. Validation of the algorithms and outcome measures used by mHealth apps is of paramount importance, as poorly validated apps have been found to be harmful to patients. Falls are a complex, common and costly problem in the older adult population. Deficits in balance and postural control are strongly associated with falls risk. Assessment of balance and falls risk using a validated smartphone app may lessen the need for clinical assessments which can be expensive, requiring non-portable equipment and specialist expertise. This study reports results for the real-world deployment of a smartphone app for self-directed, unsupervised assessment of balance and falls risk. The app relies on a previously validated algorithm for assessment of balance and falls risk; the outcome measures employed were trained prior to deployment on an independent data set.

RESULTS for a sample of 594 smartphone assessments from 147 unique phones show a strong association between self-reported falls history and the falls risk and balance impairment scores produced by the app, suggesting they may be clinically useful outcome measures. In addition, analysis of the quantitative balance features produced seems to suggest that unsupervised, self-directed assessment of balance in the home is feasible.

Language: en

Keywords

falls; balance; accelerometer; smartphone; gyroscope; inertial sensor; postural sway

A cost-effectiveness evaluation of Dance to Health: a dance-based falls prevention exercise programme in England

Goldsmith S, Kokolakakis T. Public Health 2021; 198: 17-21.

DOI 10.1016/j.puhe.2021.06.020 **PMID** unavailable

Abstract

OBJECTIVES: This study aimed to evaluate whether the falls prevention programme Dance to Health provides the health system with an effective and cost-effective means to address the issue of older people's falls. STUDY DESIGN: This study used a pre-post design; that is, the same assessment measures were used both before and after the programme.

METHODS: Analysis and modelling were conducted using monitoring data (frequencies including session attendance, falls, general practitioner (GP) and hospital visits), comprehensive financial information (including all costs related to the delivery of Dance to Health), and the Public Health England economic model: 'A return on investment tool for falls prevention programmes in older people based in the community'.

RESULTS: Findings from the research show that under the suggested health intervention, there was a 58% reduction in the number of falls. Furthermore, the results also demonstrate that Dance to Health offers a potential cost saving of more than £196m over a 2-year period, of which £158m is a potential cost saving for the NHS.

CONCLUSIONS: The evidence outlines that Dance to Health offers the health system a cost-effective means to address the issue of older people's falls and most importantly a method that produces strong results in terms of falls prevention.

Language: en

Keywords

Falls; Cost savings; Dance programmes; Older people

Older adults' experiences of behavior change support in a digital fall prevention exercise program: qualitative study framed by the self-determination theory

Pettersson B, Janols R, Wiklund M, Lundin-Olsson L, Sandlund M. J. Med. Internet. Res. 2021; 23(7): e26235.

DOI 10.2196/26235 **PMID** unavailable

Abstract

BACKGROUND: Exercise is an effective intervention to prevent falls in older adults; however, long-term adherence is often poor. To increase adherence, additional support for behavior change has been advocated. However, consistency in the reporting of interventions using behavior change techniques is lacking. Recently, a classification system has been developed to increase consistency in studies using behavior change techniques within the self-determination theory.

OBJECTIVE: This study aimed to explore expressions of self-determination among community-dwelling older adults using a self-managed digital fall prevention exercise program comprising behavior change support (the Safe Step program), which was developed in co-creation with intended users.

METHODS: The qualitative study design was based on open-ended responses to questionnaires, and individual and focus group interviews. A deductive qualitative content analysis was applied using the classification system of motivation and behavior change techniques as an analytical matrix, followed by an inductive analysis. Twenty-five participants took part in a feasibility study and exercised in their homes with the Safe Step program for 4 months. The exercise program was available on computers, smartphones, and tablets, and was fully self-managed.

RESULTS: In the deductive analysis, expressions of support were demonstrated for all three basic human psychological needs, namely, autonomy, competence, and relatedness. These expressions were related to 11 of the 21 motivation and behavior change techniques in the classification system. The inductive analysis indicated that autonomy (to be in control) was valued and enabled individual adaptations according to different rationales for realizing exercise goals. However, the experience of autonomy was also two-sided and depended on the participants' competence in exercise and the use of technology. The clarity of the program and exercise videos was seen as key for support in performance and competent choices. Although augmented techniques for social support were requested, support through relatedness was found within the program.

CONCLUSIONS: In this study, the Safe Step program supported the establishment of new exercise routines, as well as the three basic human psychological needs, with autonomy and competence being expressed as central in this context. Based on the participants' experiences, a proposed addition to the classification system used as an analytical matrix has been presented. TRIAL REGISTRATION: ClinicalTrials.gov NCT02916849; https://clinicaltrials.gov/ct2/show/NCT02916849.

Language: en

Keywords: aged; eHealth; qualitative research; exercise; accidental falls; fall prevention; self-management; behavior change; classification of motivation and behavior change techniques; self-determination theory

The effects of the Otago Exercise Programme on actual and perceived balance in older adults: a meta-analysis

Chiu HL, Yeh TT, Lo YT, Liang PJ, Lee SC. PLoS One 2021; 16(8): e0255780.

DOI 10.1371/journal.pone.0255780 **PMID** unavailable

Abstract

OBJECTIVE: Falls are serious issues in older populations. Balance problems are a major cause of falls and may lead to fear of falling and decreased balance confidence. The Otago Exercise Programme (OEP) is an effective fall prevention program that benefits balance function and fear of falling. The primary aim of the meta-analysis was to investigate the effectiveness of the OEP intervention on actual balance performance (i.e., static, dynamic, proactive or reactive balance) and perceived balance ability (i.e., balance confidence or fear of falling) for older adults; the secondary aim was to examine which OEP protocol most improves balance in older adults.

METHODS: A systematic electronic review search was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analysis guidelines to identify randomized controlled trials (RCTs) investigating the effects of the OEP on actual balance performance and perceived balance ability in healthy older adults, and examining which OEP training protocol and intervention format most improves balance.

RESULTS: A total of 12 RCTs were included in the analyses. The OEP exerted significant effects on static balance (Hedges's g = 0.388; 95% confidence interval [CI] = 0.131 to 0.645), dynamic balance (g = -0.228; 95% CI = -0.352 to -0.1.4), proactive balance (g = 0.239; 95% CI = 0.061 to 0.416) and perceived balance (g = -0.184; 95% CI = -0.320 to -0.048) in older adults. Subgroup analysis indicated that the group format for the OEP was more effective for improving static (p = 0.008), dynamic (p = 0.004) and perceived balance (p = 0.004) than was the individual format. Sessions of >30 minutes were more effective in improving static (p = 0.007) and perceived balance (p = 0.014) than were sessions of ≤30 minutes. However, the effects of the OEP on balance were unrelated to the types of control group, training frequency and training period.

DISCUSSION: The OEP is helpful for improving actual balance including static, dynamic, and proactive balance; enhancing confidence in balance control; and reducing fear of falling in older adults. In particular, administrating the OEP in a group setting in >30-minute sessions may be the most appropriate and effective exercise protocol for improving balance.

Language: en

Effective, sustainable, and transferable physical exercise interventions for fall prevention among older people

Campani D, Caristia S, Amariglio A, Piscone S, Ferrara LI, Bortoluzzi S, Faggiano F, Dal Molin A. Public Health Nurs. 2021; ePub(ePub): ePub.

DOI 10.1111/phn.12949 **PMID** unavailable

Abstract

INTRODUCTION: Falls among older people are preventable through exercise-based programs. However, scientific evidence must be translated into practice to support professionals who implement such programs.

AIM: This study aimed to identify physical exercise interventions for fall prevention and to determine the best practice for implementing them in local community-dwelling older adults.

METHOD: We used a narrative synthesis method to produce Effective, Sustainable, and Transferable Preventive Interventions. We reviewed guidelines, systematic reviews, and randomized controlled trials (RCT) to find the best evidence supporting physical exercises to prevent falls, followed by discussing the evidence with clinical experts to evaluate the best strategy for implementing them into the local context. These steps resulted in the development of a user manual.

RESULTS: We included two guidelines, one systematic review with a meta-analysis, and one RCT. The developed draft manual includes activities, methods, infrastructural resources, human capital, stakeholders, frequency, and duration of the intervention, information, and educational materials, and implementation models. Our discussion of the intervention with a panel of experts considered resources, barriers, and similar experiences to ensure effectiveness and economic, social, and time sustainability.

CONCLUSION: The developed manual could be implemented in the local context and adapted to the needs of the population while considering available resources.

Language: en

Keywords

aged; aging; fall prevention; physical exercise

Multisensory exercise improves balance in people with balance disorders: a systematic review

Zhang SL, Liu D, Yu DZ, Zhu YT, Xu WC, Tian E, Guo ZQ, Shi HB, Yin SK, Kong WJ. Curr. Med. Sci. 2021; 41(4): 635-648.

DOI 10.1007/s11596-021-2417-z **PMID** unavailable

Abstract

OBJECTIVE: To examine the effect of multisensory exercise on balance disorders.

METHODS: PubMed, Scopus and Web of Science were searched to identify eligible studies published before January 1, 2020. Eligible studies included randomized control trials (RCTs), non-randomized studies, case-control studies, and cohort studies. The methodological quality of the included studies was evaluated using JBI Critical Appraisal Checklists for RCTs and for Quasi-Experimental Studies by two researchers independently. A narrative synthesis of intervention characteristics and health-related outcomes was performed.

RESULTS: A total of 11 non-randomized studies and 9 RCTs were eligible, including 667 participants. The results supported our assumption that multisensory exercise improved balance in people with balance disorders. All of the 20 studies were believed to be of high or moderate quality.

CONCLUSION: Our study confirmed that multisensory exercise was effective in improving balance in people with balance disorders. Multisensory exercises could lower the risk of fall and enhance confidence level to improve the quality of life. Further research is needed to investigate the optimal strategy of multisensory exercises and explore the underlying neural and molecular mechanisms of balance improvement brought by multisensory exercises.

Language: en

Keywords

systematic review; balance; multisensory exercises; multisensory integration

Proof-of-concept of the virtual reality comprehensive balance assessment and training for sensory organization of dynamic postural control

Moon S, Huang CK, Sadeghi M, Akinwuntan AE, Devos H. Front. Bioeng. Biotechnol. 2021; 9: e678006.

DOI 10.3389/fbioe.2021.678006 **PMID** 34395396

Abstract

Accurate quantification of the impact of visual, somatosensory, and vestibular systems on postural control may inform tailor-made balance intervention strategies. The aim of this proof-of-concept study was to determine the safety, sense of presence, system usability, and face validity of a newly developed Virtual Reality Comprehensive Balance Assessment and Training (VR-ComBAT) in healthy young individuals. The VR-ComBAT included six balance condition: (1) stable surface with fixed virtual reality (VR) surroundings; (2) stable surface with blacked out VR surroundings; (3) stable surface with VR visual conflict; (4) unstable surface with fixed VR surroundings; (5) unstable surface with blacked out VR surroundings; and (6) unstable surface with VR visual conflict. Safety was evaluated using the number of adverse events, including scores on the Simulator Sickness Questionnaire. Sense of presence was evaluated using the igroup Presence Questionnaire (iPQ). System usability was assessed using the Systems Usability Scale (SUS). Friedman analyses with post hoc Wilcoxon Signed Rank tests were employed to demonstrate face validity by quantifying center of pressure (COP) changes in mean distance, mean velocity, and mean frequency in the anteroposterior (AP) and mediolateral (ML) direction across the six conditions. Twenty-three participants (27.4 ± 8.0 years old; 13 women) reported no adverse events. Participants scores on average 44.9 ± 9.6 on the iPQ and 79.7 ± 9.9 on the SUS. Post hoc analyses showed significant changes in COP-based measures when compared to baseline. The mean frequency change of COP showed direction-dependence in which increased frequency change in AP was observed while decreased change in ML was noted. The VR-ComBAT provides a safe, feasible, and cost-effective VR environment that demonstrates consistent sensory re-weighting between visual, somatosensory, and vestibular systems. Future studies should investigate whether VR-ComBAT can be used to inform precision rehabilitation of balance and fall prevention in older adults without and with neurological conditions.

Language: en

Keywords

balance; virtual reality; center of pressure; postural control; sensory organization test

Efficacy of an integrated training device in improving muscle strength, balance, and cognitive ability in older adults

Roh CH, Kim DS, Kim GW, Won YH, Park SH, Seo JH, Ko MH. Ann. Rehabil. Med. 2021; 45(4): 314-324.

DOI 10.5535/arm.21072 **PMID** unavailable

Abstract

OBJECTIVE: To determine the effects of an integrated training device for strength and balance on extremity muscle strength, postural balance, and cognition in older adults using a combination with various rehabilitation training games, in which balance, strength, and cognitive training were configured in a single device.

METHODS: This prospective study included 20 healthy participants aged 65-85 years. Participants trained for 30 minutes daily, 3 days weekly, for 6 weeks with an integrated training device for strength and balance (SBT-120; Man&Tel Inc., Gumi, Korea). Main outcomes were measured using the Korean Mini-Mental State Examination (K-MMSE), Korean version of the Montreal Cognitive Assessment (K-MoCA), Timed Up and Go Test (TUG), Functional Reach Test (FRT), Berg Balance Scale (BBS), and Manual Muscle Test. Measurements were taken at three time points: T0 (pretreatment), T1 (immediately after treatment), and T2 (4 weeks after treatment).

RESULTS: All 20 patients completed the training, and TUG, FRT, and BBS scores significantly improved at T1 and T2 compared to T0. Mean TUG scores decreased by 0.99±2.00 at T1 and 1.05±1.55 at T2 compared to T0. Mean FRT scores increased by 6.13±4.26 at T1 and 6.75±4.79 at T2 compared to T0. BBS scores increased by 0.60±0.94 at T1 and 0.45±1.15 at T2 compared to T0. Moreover, muscle strength and cognition (K-MMSE and K-MoCA scores) increased after training.

CONCLUSION: Our findings suggest that an integrated training device for strength and balance can be a safe and useful tool for older adults.

Language: en

Keywords

Cognition; Muscle strength; Elderly; Integrated training device; Postural balance

Perturbation training for fall-risk reduction in healthy older adults: interference and generalization to opposing novel perturbations post intervention

Bhatt T, Wang Y, Wang S, Kannan L. Front. Sports Act. Living 2021; 3: e697169.

DOI 10.3389/fspor.2021.697169 **PMID** 34490424

Abstract

This study examined the effects of perturbation training on the contextual interference and generalization of encountering a novel opposing perturbation. One hundred and sixty-nine community-dwelling healthy older adults (69.6 ± 6.4 years) were randomly assigned to one of the three groups: slip-perturbation training (St, n = 67) group received 24 slips, trip-perturbation training (Tt, n = 67) group received 24 trips, and control (Ctrl: n = 31) group received only non-perturbed walking trials (ClinicalTrials.gov NCT03199729; https://clinicaltrials.gov/ct2/show/NCT03199729). After training, all groups had 30 min of rest and three post-training non-perturbed walking trials, followed by a reslip and a novel trip trial for St, a retrip and a novel slip trial for Tt, and randomized novel slip and trip trials for Ctrl. The margin of stability (MOS), step length, and toe clearance of post-training walking trials were compared among three groups to examine interferences in proactive adjustment. Falls, MOS at the instant of recovery foot touchdown, and hip height of post-training perturbation trials were investigated to detect interferences and generalization in reactive responses.

RESULTS indicated that prior adaptation to slip perturbation training, resulting in walking with a greater MOS (more anterior) and a shorter step length ($p < 0.01$) than that of the Ctrl group, would be associated with a greater likelihood to forward balance loss if encountered with a trip. The trip adaptation training mainly induced a higher toe clearance during walking ($p < 0.01$) than the Ctrl group, which could lead to reduced effectiveness of the reactive response when encountered with a novel slip. However, there was no difference in the reactive MOS, limb support, and falls between the control group and the slip and trip training groups on their respective opposing novel perturbation post-training (MOS, limb support, and falls for novel slip: Tt = Ctrl; for the novel trip: St = Ctrl, both $p > 0.05$). Current findings suggested that, although perturbation training results in proactive adjustments that could worsen the reactive response (interference) when exposed to an unexpected opposing perturbation, older adults demonstrated the ability to immediately generalize the training-induced adaptive reactive control to maintain MOS, to preserve limb support control, and to reduce fall risk.

Language: en

Keywords

fall; contextual interference; perturbation; SLIP; TRIP

"A manageable and challenging fall prevention intervention with impact on society" - older women's perspectives on participation in the stayBalanced training programme

Halén C, Gripenberg S, Roaldsen KS, Dohrn IM, Halvarsson A. Physiother. Theory Pract. 2021; ePub(ePub): ePub.

DOI 10.1080/09593985.2021.1972498 **PMID** unavailable

Abstract

INTRODUCTION: Efficient and effective evidence-based practice (EBP) strategies for managing fall prevention in primary health care are of great importance. To ensure that EBP methods have the potential to be implemented and maintained in clinical practice, patient perspective must be ensured. Novel programs need to be perceived as meaningful and feasible, and in line with the patients' values, preferences and needs.

PURPOSE: To describe how older women with osteoporosis experience participation in the StayBalanced Programme.

METHODS: Individual semi-structured interviews with 39 women aged 67-86 with osteoporosis, impaired balance and fear of falling. Data were analyzed with thematic analysis.

RESULTS: The analysis resulted in three main themes; "Managing and challenging training through support and enjoyment," "Structured training leads to safety and self-awareness" and "Lack of structured balance training means missed benefits, for both the individual and society." The participants experienced that the increased safety and self-awareness achieved through the challenging and motivating training, were transferred to daily life, thus, leaving them less exposed to falls, fall injuries and fear of falling. They expressed concerns about lack of knowledge translation regarding the positive effects of structured and challenging balance training, which left older adults and society without the benefits of evidence-based intervention.

CONCLUSIONS: The StayBalanced Programme was appreciated and acceptable from the perspective of the participants, and in line with their values and preferences, one of three key components of EPB. The results of this study may support the uptake of the evidence-based StayBalanced Programme for fall prevention in clinical practice.

Language: en

Keywords

physiotherapy; evidence-based practice; Balance training; osteoporosis; thematic analysis

Effects of task-oriented exercises on improving the balance, minimizing the risk of fall in patients with diabetic neuropathy- a comparative study

Patil Y, Singaravelan RM, Borkar TP. Indian J. Public Health Dev. 2021; 12(4): 409-416.

DOI 10.37506/ijphrd.v12i4.16577 **PMID** unavailable

Abstract

BACKGROUND: Diabetic peripheral neuropathy often demonstrates impairments in balance and thus anincreased risk for falls. This affects the both static balance and dynamic balance, but static balance is moreaffected. Balance training is considered to be a very important tool for prevention of falls in older population.It has been shown to produce improvements in different aspects of balance.

OBJECTIVE: To find out the effect of task-oriented exercises on improving the balance and minimizing therisk of fall in patients with diabetic neuropathy- a comparative study.

METHODology: 18 patients meeting the inclusion and exclusion criteria were allocated into 2 groups. GroupA (n=8) received conventional Physiotherapy & Group B (n=10) received task-oriented exercises along withconventional Physiotherapy.

RESULT: Result of this study showed that there is significant difference in pre and post values for both FFABQand BBS scales except for BBS the scores of group A no significant changes. On comparison between GroupA and Group B, the group B showed more improvement in FFABQ and BBS score than group A.

CONCLUSION: This study concluded that the Task-oriented exercises with Conventional Physiotherapy weremore effective in improving balance and reducing the fear of fall than with only conventional physiotherapyin diabetic neuropathy patients after 3 weeks of duration.

Language: en

Keywords

balance.; conventional physiotherapy; diabetic neuropathy; risk of fall; task- oriented exercises

Pilates reducing falls risk factors in healthy older adults: a systematic review and meta-analysis

da Silva LD, Shiel A, McIntosh C. Front. Med. (Lausanne) 2021; 8: e708883.

DOI 10.3389/fmed.2021.708883 **PMID** 34540865

Abstract

BACKGROUND: The main theme of this systematic review and meta-analysis is to synthesize the evidence of randomized controlled trial of evidence of Pilates intervention, in comparison to control groups and other forms of exercise, for falls prevention in healthy older adults.

METHODS: The following electronic databases were searched up to October 2020; EMBASE, Scopus, Google Scholar, MEDLINE (Ovid), Science Direct, Cochrane, and CINAHL. The recommendations of the Preferred Reporting Items of Systematic Reviews and Meta-Analyses were followed. A PICOS approach was adopted as a framework to formulate the research question and set the inclusion and exclusion criteria. Participants were healthy older adults, defined as older adults who have maintained functional ability, including participants of both genders, those with a falls history, non-fallers, and individuals who were considered to be sedentary or active. Randomized controlled trials studies, written in the English language, from the decade, were included if they focused on specific outcome measures to decrease falls risk; functional mobility, mobility, fear of falling, gait, and postural stability. The PEDro scale was used to assess risk of bias.

RESULTS: There were included 12 studies. In total, 702 healthy older adults' participants were included. Pilates showed an effect in mediolateral directions in comparison to control groups (MD = -1.77, 95% CI, -2.84 to -0.70, p = 0.001, heterogeneity: I (2) = 3%), mobility (MD = 9.23, 95% CI, 5.74 to 12.73, p < 0.00001, heterogeneity: I (2) = 75%) and fear of falling (MD = -8.61, 95% CI, -10.16 to -7.07, p < 0.00001, heterogeneity: I (2) = 88%). In relation to other exercises group, Pilates showed positive effects in functional mobility (MD = -1.21, 95% CI, -2.30 to -0.11, p = 0.03, heterogeneity: I (2) = 80%), mobility (MD = 3.25, 95% CI, 1.46 to 5.04, p < 0.0004, heterogeneity: I (2) = 0%). No evidence of an improvement was found between the groups for dynamic gait index (MD = 2.26, 95% CI, -0.05 to 4.56, p = 0.06, heterogeneity: I (2) = 86%), anteroposterior directions of balance (MD = -1.58, 95% CI, -3.74 to -0.59, p = 0.15, heterogeneity: I (2) = 51%) and functional mobility when compared to control groups (no exercise) (MD = -1.24, 95% CI, -2.48 to -0.00, p = 0.05, heterogeneity: I (2) = 87%).

DISCUSSION: Pilates may be effective in decreasing the risk of falls in older adults. Pilates intervention was found to improve functional mobility, mobility, gait, fear of falling and postural stability and therefore there is some evidence to suggest that Pilates reduces certain risk factors for falls in healthy older adults. However, there is an absence of high-quality evidence in regards to the impact of Pilates on reducing falls and further robust RCTs are needed. Systematic Review Registration: [PROSPERO], identifier [CRD42021206134].

Language: en

Keywords

gait; balance; falls prevention; functional mobility; Pilates

The Stroll Safe outdoor fall prevention program: feasibility and future directions

Chippendale T. Am. J. Occup. Ther. 2021; 75(Suppl 2): 7512515371p1.

DOI 10.5014/ajot.2021.75S2-RP371 **PMID** unavailable

Abstract

Using a quasi-experimental design, the feasibility of the Stroll Safe outdoor fall prevention program was examined. Process, scientific, management, and resource assessments were conducted.

RESULTS reveal that the program is feasible to implement among active, community-dwelling older adults. Further study using an efficacy trial is warranted. This study helps to build the body of knowledge in outdoor fall prevention, an area of research and practice that is critical to productive aging.

Language: en

Yoga intervention for fall prevention in rural-dwelling seniors

Oestreich A, Bradfield A, Schmidt J, Toepfer M, Matsoff H, Yingst AM, Pickett K, Doyle K, Mross P. Am. J. Occup. Ther. 2021; 75(Suppl 2): 7512515307p1.

DOI 10.5014/ajot.2021.75S2-PO307 **PMID** unavailable

Abstract

Rural-dwelling older adults experience health care disparities and limited access to physical activity programming. The purpose of this study was to examine fall-related outcomes following a 12-week yoga intervention designed for rural older adults. Significant improvements in the Canadian Occupational Performance Measure and MiniBESTest were observed, suggesting that yoga could be an appropriate and accessible strategy for addressing fall prevention and occupational performance in rural-dwelling older adults.

Language: en