Session 2A Concurrent Falls prevention in the community

Lindy Clemson is an Associate Professor in Ageing, Faculty of Health Sciences and Head of Discipline (occupational therapy) at The University of Sydney. Her specific focus is on the physical environment, functional capacity and adaptation, daily life activity, enabling participation and preventing falls with older people.

Frances Batchelor is a physiotherapist with experience in neurology, rehabilitation and aged care. She has worked in Australia, the UK and Germany. She completed a Masters in Health Studies in 2005 and is currently close to completing PhD studies through the University of Melbourne and the National Ageing Research Institute focusing on falls prevention after stroke

Dr Cath Dean, is a Senior lecturer in the Discipline of Physiotherapy at the University of Sydney. Her research career has focused on rehabilitation, falls prevention and promoting physical activity primarily after stroke.

Michelle Currin is the Team Leader of an allied health team situated in Brisbane. This team delivers a multi-factor intervention for elderly community dwelling fallers. The area of falls prevention continues to be an area of interest for Michelle as her team has recently developed a Parkinson's disease falls program.

Elisabeth Ramsay (Betty) completed a BSc in Physiotherapy in Edinburgh, Scotland. She worked as a physiotherapist in the UK and Australia specialising in community health and older people. In 2007 she joined the Falls and Balance Research Group at NeuRA to further pursue her passion of falls prevention in older people.

Assoc Prof Leigh Hale is the Associate Dean of Research in the School of Physiotherapy and her research interests are in community-based programmes to improve physical function and participation, and prevent falls in older adults and adults with neurological disability.

Dr Cathie Sherrington is an NHMRC Senior Research Fellow at The George Institute for Global Health, The University of Sydney, Australia. Prior to completing her PhD, Cathie was a clinical physiotherapist in aged care and rehabilitation. Her research focuses the prevention and prediction of falls and disability in older people.

EMBEDDING BALANCE AND STRENGTH TRAINING IN DAILY LIFE ACTIVITY: A RANDOMISED TRIAL

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Aim:
The aim of this project was to establish the effectiveness of two different approaches to balance and strength training for improving the capacity of elderly people to avoid falls. One of these was LiFE, a new program that was home based and incorporated balance and strength training embedded into daily life activity. LiFE teaches balance and strength principles using specific strategies with individualised activities that are upgraded over seven sessions.

Methods:
A sample of 317 community-dwelling persons 70 years and over who were at high risk of falling were randomly assigned to one of three groups: the LiFE program, a structured balance and strength exercise program, and a control group, who were given an unsupervised sham-gentle exercise program.

Results:
There was a statistically significant 31% reduction in the risk of falling for the LiFE participants compared with the control gentle exercise group (relative risk (RR) 0.69 (95% CI 0.47 to 0.99), n = 212). There was a reduction in the risk of falling of 19% for the structured exercise program compared with the control gentle exercise group, however, this was not significant (RR 0.81 (95% CI 0.56 to 1.17), n = 210). There were varying outcomes for both the LiFE and the structured program for balance efficacy, strength, balance and other disability measures.

Conclusion:
LiFE provides another choice of a falls prevention program that works. Functional tasks should be a focus for protection from falling.

FALLS PREVENTION AFTER STROKE: RESULTS OF A RANDOMISED CONTROLLED TRIAL

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Aim:
Falls are common after stroke with up to 75% of people falling in the first year after discharge from hospital. To date there have been no published randomised controlled trials (RCTs) evaluating the effects of multifactorial falls prevention programs for people with stroke. The aim of this study was to evaluate the effectiveness of a targeted multifactorial falls prevention program for people with stroke at high risk of falls.

Methods:
People with stroke, returning home after rehabilitation and at high risk of falls (impaired balance, or a fall in hospital) (n = 156) were randomised to receive intervention or usual care. The intervention incorporated targeted falls preventions strategies including referral for risk factor management, a home exercise program based on the Otago Exercise Programme, and education. Falls were monitored prospectively for one year using falls diaries.

Results:
The falls rate in the intervention group was 1.89 falls/person-year and in the control group 1.76 falls/person-year, with no significant difference between the two groups (negative binomial regression, incidence rate ratio (IRR) 1.10, 95% CI 0.63 to1.90). The proportion of fallers (one or more falls) was lower in the intervention group (48%) than in the control group (58%), but this was not significant. The proportion of fallers was significantly higher in those who only partially adhered to the home exercise program compared with those who fully adhered and those who were non-adherent (p = 0.016).

Conclusion:
This study is of one of the first large RCTs evaluating a multifactorial intervention specifically aimed at reducing falls in people with stroke. Falls prevention strategies that are effective in the community-dwelling older population were not effective in this population. Adherence to the home exercise program appears to be a factor in effectiveness. Findings from this study will guide future research into appropriate interventions.

MOBILITY ENHANCEMENT AND FALLS PREVENTION AFTER STROKE: THE STROKE CLUB TRIAL

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Aim:
Falls and poor mobility are major contributors to stroke-related disability. This study, funded by a NSW Health Promotion Research Demonstration Grant, aimed to establish and evaluate community-based sustainable exercise programs utilising the Stroke Recovery Association NSW's Stroke Club network.

Methods:
This was a prospective randomised controlled trial in which 151 community-dwelling stroke survivors, who were able to walk 10 m independently, were allocated to a lower limb exercise group (n = 76) or an upper limb exercise group (n = 75). Both groups received a weekly exercise class plus home program. The exercise classes were delivered at Stroke Clubs. For the lower limb group, the program aimed to prevent falls, improve walking and increase physical activity using the Weight-bearing Exercise for Better Balance (WEBB) program.[1] For the upper limb group, the program aimed to improve upper limb and cognitive function. The primary outcomes measures were walking capacity and walking speed measured before and after the 12 month intervention, and falls measured monthly. Secondary outcome measures included falls risk, physical activity, cognition and upper limb function.
Results:
Exercise classes were established in 11 Stroke Clubs. After 12 months, the lower limb group walked 34.3 m further in 6 min (95% CI 19.0 to 49.6, $p < 0.001$) and 0.07 m/s faster over 10 m (95% CI 0.01 to 0.14, $p = 0.028$) than the upper limb group after controlling for baseline performance. There was no difference in the rate of falls between groups (incidence rate ratio = 0.96, 95% CI 0.59 to 1.57, $p = 0.877$). There were significant between group differences in several of the secondary outcomes.

Conclusion:
The lower limb exercise program delivered through stroke clubs enhanced mobility but did not prevent falls.

Reference:
1. Dean CM, Rissel C, Sharkey M et al. Exercise intervention to prevent falls and enhance mobility in community dwellers after stroke: a protocol for a randomised controlled trial. BMC Neurol 2009;9:38.

FACTORS PROMOTING ADHERENCE TO HOME MODIFICATION: RECOMMENDATIONS FOR FALLS PREVENTION

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Aim:
To identify the level of uptake of occupational therapists' home environmental audit recommendations by elderly people at risk of falling, and the intrinsic and extrinsic factors that contribute to adherence.

Methods:
An environmental audit was conducted by an occupational therapist at the participant's home. A list of recommendations from the audit was compiled according to site of recommendation. Demographic details including income and educational level were collected along with other outcome measures: the Timed Up and Go, the Romberg balance test, psychological distress (K10), level of participation (FAI), quality of life (EQ-5D), body mass index and cognitive functioning (ATMS). Participants were followed up at six months to review the uptake of the recommendations from the initial home visit

Results:
All participants (n = 80) were over 60 years of age. Of the recommendations made 55% were completed by six months. Increasing number of co-morbidities was a significant predictor of adherence with recommendations. Using external suppliers for the provision of recommendations improved the likelihood of the uptake.

Conclusion:
Occupational therapists need to consider a wide range of intrinsic and extrinsic factors which may contribute to adherence with home modifications.

ADHERENCE TO HOME EXERCISE IN OLDER PEOPLE AFTER RECENT HOSPITAL STAYS

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Aim:
We are conducting a randomised trial to assess the effects of a home based exercise program on physical ability and falls in older adults who have recently had hospital stays. This study aimed to assess adherence to the home based exercise intervention being delivered in the trial.

Methods:
Participants in the intervention group receive 10 visits from a physiotherapist in a 12 month period. A home exercise program is prescribed and includes exercises such as balance in standing, sit to stand and step ups onto a block. Dose and frequency of unsupervised home exercise sessions is negotiated with the participants. The data from the first 59 intervention group participants were used for this analysis. The type and dose of exercises prescribed to participants were documented by study physiotherapists. The adherence to exercises and challenges to progression of exercises were reported by both participants and study physiotherapists.

Results:
The average number of exercises prescribed by a physiotherapist at each home visit was 4.7. The average total exercise repetitions prescribed were 73 for each session. Participants agreed to complete an average of 4.2 exercise sessions per week. Study physiotherapists estimated that 67% of these sessions were undertaken and an average of 69% of prescribed exercises were completed. Study physiotherapists reported that exercise progression was limited by pain for 36 people (61%) and by exacerbation of medical conditions for 29 people (49%). Participants reported the most common factors limiting exercises were illness (12 people, 20%) and medical issues made worse by exercise (19 people, 32 %).

Conclusion:
Adherence to a physiotherapist prescribed home exercise program in this clinical trial was found to be acceptable, but adversely influenced by medical issues. Analysis of the randomised trial results will enable assessment of the effectiveness of this program.

AQUA-AEROBICS TO IMPROVE BALANCE IN OLDER ADULTS WITH OSTEOARTHRITIS AND FALLS RISK

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Aim:
Lower extremity osteoarthritis (OA) in older adults is associated with functional losses, reduced daily physical activity and increased falls risk. Public health exercise programmes aimed at reducing falls risk in older adults are provided in New Zealand but are land-based, and potentially aggravate the signs and symptoms associated with arthritis. Aqua-aerobics may be a suitable alternative form of fall prevention exercise. This paper reports the preliminary results of an observer-blinded, randomised controlled trial of the efficacy of an aqua-aerobics programme to improve measures of balance in older adults with OA who are at risk of falling.

Methods:
Thirty-five volunteers (mean age 74 ± 6 years; 9 males, 26 females) with moderate to severe OA (Western Ontario and McMaster Universities OA Index score) and at risk of falling (Falls Risk Assessment Tool) were randomised to either a 12 week, twice weekly aqua-aerobics programme (n = 21) or to a time-matched computer training programme (n = 14). Participants were tested at baseline and post-intervention with the balance sway tests from the short form Physiological Profile Assessment, and the Timed Get Up and Go and Step tests. Student's t-tests were used to compare differences within and between groups post-intervention.

Results:
At 12 weeks post-intervention there were no significant differences between the groups on any test, although both groups significantly improved on all tests ($p < 0.05$).

Conclusion:
Although there were no between group differences, the significant improvement in measures of balance demonstrated by both groups may indicate that participation in community-based programmes that require an individual to mobilise and socialise out of the home may be enough to increase physical function in frail older adults.

EFFECTS OF PHYSICAL ACTIVITY AND TRAINING ON 40-65 YEAR OLDS: A META-ANALYSIS

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Aim:
To establish the effects of physical activity programs on falls and risk of falls for adults aged between 40 and 65 years old.

Methods:
A systematic review with meta-analysis was conducted. Randomised controlled trials testing the effects of physical activity on strength, balance and falls were sought. Included studies had an average participant age of 60 years or younger.

Results:
Twenty-two eligible trials were identified. Data from 17 trials were included in the meta-analysis. The meta-analysis of strength outcomes included 13 studies (17 comparisons as four studies had more than one group) and found a moderate effect of exercise on strength (standardised difference in means 0.51, 95% CI 0.35 to 0.68, $p < 0.001$, random effects meta-analysis, $I^2 = 15\%$). The meta-analysis of balance outcomes included six studies and found a moderate effect of exercise on balance (standardised difference in means 0.43, 95% CI 0.25 to 0.60, $p < 0.001$, random effects meta-analysis, $I^2 = 0\%$). The meta-analysis of endurance outcomes included six studies (eight comparisons as one study had three groups) and found a large effect of exercise on endurance (standardised difference in means 0.85, 95% CI 0.61 to 1.09, $p < 0.001$, random effects meta-analysis, $I^2 = 75\%$). No studies reported effects of physical activity on falls.

Conclusion:
This review found that muscle strength, balance and endurance can clearly be improved by physical activity in people aged 40-65. Studies have not documented an effect of physical activity in people aged 40-65 on falls. Given the importance of strength and balance as risk factors for falls in people aged over 65, it is likely that adoption and maintenance of exercise programs when aged 40-65 would result in falls being prevented in later years.