



**Institute for
Musculoskeletal
Health**

*A research partnership between Sydney Local Health District and the
University of Sydney in musculoskeletal health and physical activity*

Combining physical activity promotion and fall prevention for healthy ageing

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NHMRC Career Development Fellow

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Definitions

Physical activity: *any bodily movement produced by skeletal muscles that results in energy expenditure*



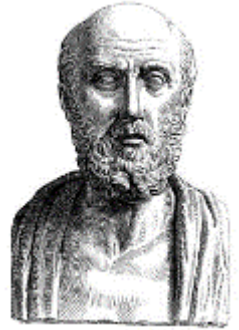
Exercise: *a subset of physical activity that is planned, structured, and repetitive and has an objective of improvement or maintenance of physical fitness*



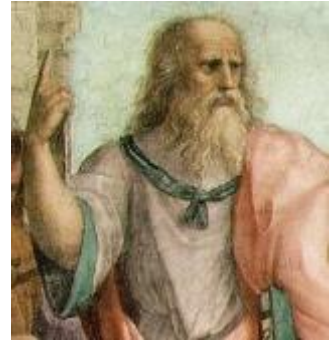
Background

Widely accepted that physical activity promotes health....

“Eating alone will not keep a man well; he must also take exercise”Hippocrates, father of modern medicine, 460-370 BC



“Lack of activity destroys the good condition of every human being while movement and methodical physical exercise save it and preserve it”..... Plato, Greek philosopher, 428-347 BC



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Health benefits of regular physical activity

Exercise is life
Exercise is health
Exercise Is Medicine



Health benefits with regular physical activity



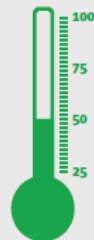
Almost
50%
Reduction in the
incidence of diabetes

**DECREASES
DEPRESSION**

As effectively
as medications
or behavioural
therapy



Almost
50%
Reduction in the
incidence of High
Blood Pressure



ALMOST
50%
REDUCTION IN
**BREAST
CANCER**
MORTALITY AND RISK OF RECURRENCE

Exercise is life
Exercise is health
Exercise Is Medicine



Health benefits with regular physical activity



40%
Reduction in the risk of
Heart Disease

1/3

Reduction in the risk of
developing Alzheimers Disease

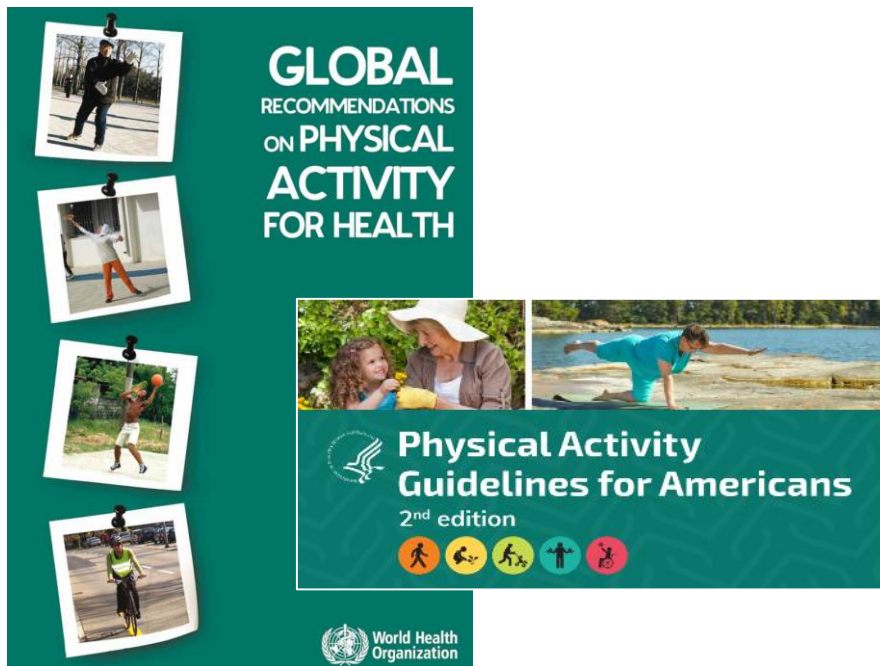


LOWER RISK OF
**COLON
CANCER**



27%
LOWER RISK OF
STROKE

Physical activity guidelines for older adults



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What should you do?

For a healthy
heart and mind

To keep your muscles,
bones and joints strong

To reduce your
chance of falls

**Be
Active**

**Sit
Less**

**Build
Strength**

**Improve
Balance**

VIGOROUS



RUN

MODERATE



WALK



SPORT



STAIRS



CYCLE



SWIM



TV



SOFA



COMPUTER



GYM



YOGA



CARRY BAGS



DANCE



TAI CHI



BOWLS

MINUTES PER WEEK

75 OR 150

VIGOROUS
INTENSITY

(BREATHING FAST
DIFFICULTY TALKING)

MODERATE
INTENSITY

(INCREASED BREATHING
ABLE TO TALK)

OR A COMBINATION OF BOTH

**BREAK UP
SITTING
TIME**



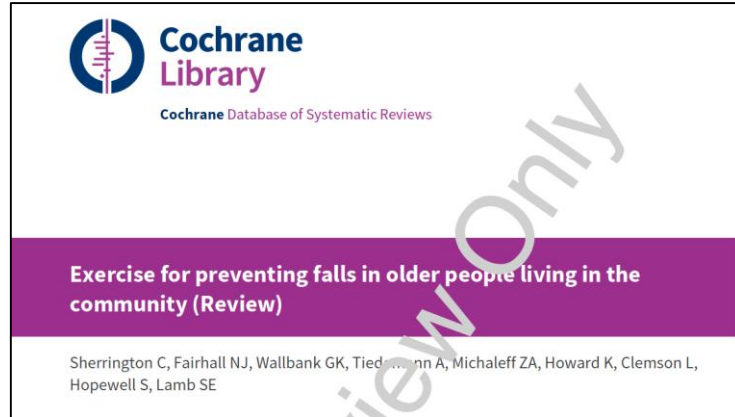
**2 DAYS PER
WEEK**

Something is better than nothing.

Start small and build up gradually:
just 10 minutes at a time provides benefit.

MAKE A START TODAY: it's never too late!

Structured exercise prevents falls



- Exercise can reduce the rate of falls by about 23%
- Exercise that trains balance and strength is most effective
- No evidence that general physical activity prevents falls- some evidence of increased risk

➤ But balance and strength training alone is unlikely to be enough to meet the 150min/ week of MVPA that guidelines recommend for maximising health

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Physical activity in older Australians

In older adults, aged 65+ years....

- Around 25% meet the guidelines for moderate to vigorous intensity physical activity (*ABS 2015*)
- Participation in balance and strength training is even lower:

NSW fall prevention survey of over 5600 people aged 65+ in 2009 showed only 6% of respondents did regular balance training and 12% did strength training (*Merom et al, Preventive Medicine, 2012*)

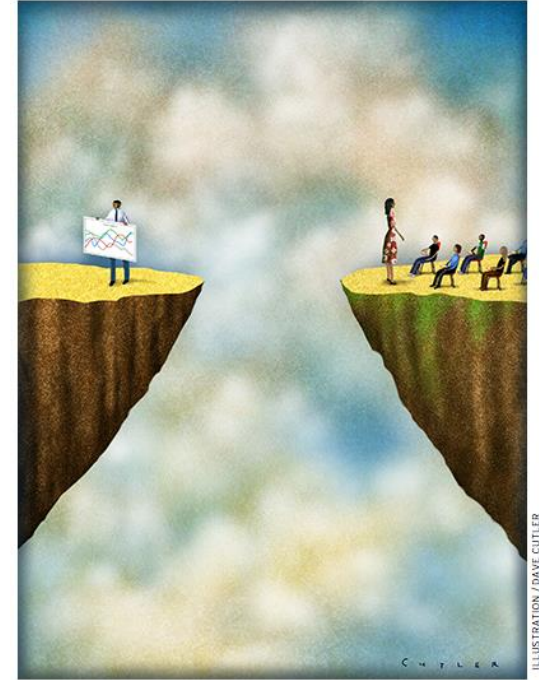


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Evidence to practice gap

Huge disconnect between the compelling evidence of benefit of physical activity on health and wellbeing and the very low rates of participation

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Physical inactivity in the spotlight

THE LANCET

[Online First](#) [Current Issue](#) [All Issues](#) [Special Issues](#) [Multimedia](#) [Information for Authors](#)

2012 **Lancet** series on physical activity:

- **5.3 million deaths/year** due to inactivity
- Physical inactivity of **similar importance** as a modifiable risk factor for chronic disease **as obesity and tobacco**

2016 follow up **Lancet** series on physical activity:

- Physical activity not improving worldwide
- **Evidence** of effective interventions is **growing** but an overall **failure to scale**
- INT\$67.5 billion economic cost of physical inactivity worldwide to the health-care system through health-care expenditure and productivity

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WHO Global Action Plan on Physical Activity

GLOBAL ACTION PLAN ON PHYSICAL ACTIVITY 2018-2030

MORE ACTIVE PEOPLE FOR A HEALTHIER WORLD

GOAL TO REDUCE PHYSICAL INACTIVITY

BY 2025
10%

BY 2030
15%

1 CREATE ACTIVE SOCIETIES

SOCIAL NORMS AND ATTITUDES

Create a paradigm shift in all of society by enhancing knowledge and understanding of, and appreciation for, the multiple benefits of regular physical activity, according to ability and at all ages.



2 CREATE ACTIVE ENVIRONMENTS

SPACES AND PLACES

Create and maintain environments that promote and safeguard the rights of all people, or all ages, to have equitable access to safe places and spaces, in their cities and communities, in which to engage in regular physical activity, according to ability.



3 CREATE ACTIVE PEOPLE

PROGRAMMES AND OPPORTUNITIES

Create and promote access to opportunities and programmes, across multiple settings, to help people of all ages and abilities to engage in regular physical activity as individuals, families and communities.



4 CREATE ACTIVE SYSTEMS

GOVERNANCE AND POLICY ENABLERS

Create and strengthen leadership, governance, multisectoral partnerships, workforce capabilities, advocacy and information systems across sectors to achieve excellence in resource mobilization and implementation of coordinated international, national and subnational action to increase physical activity and reduce sedentary behaviour.



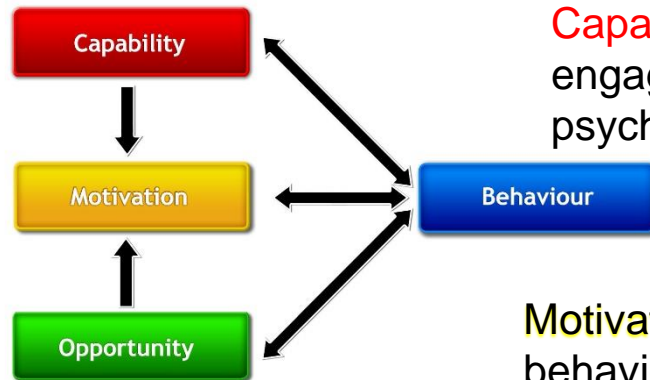
Current research focus

- Education of health professionals regarding falls & physical activity
- Website-based interventions to promote physical activity
- Promoting physical activity in middle age for healthier older age
- Yoga as a fall prevention strategy
- **Pedometers to promote physical activity**
- **Health coaching to support physical activity**
- **Goal setting and behaviour change**
- **Combined approaches to promote healthy ageing**

Behaviour Change Wheel- behaviour system

Michie et al, Implementation Science 2011; 6:42

Behaviour influenced by:



Capability: Capacity of the individual to engage in the behaviour- physical and psychological

Motivation: Brain processes directing the behaviour- reflective and automatic

Opportunity: Factors outside of individual- physical and social

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Health coaching to promote physical activity

Downloaded from <http://bjsm.bmj.com/> on June 13, 2017 - Published by group.bmj.com
BJSM Online First, published on March 20, 2017 as 10.1136/bjsports-2016-096943

Review

What is the effect of health coaching on physical activity participation in people aged 60 years and over? A systematic review of randomised controlled trials

Juliana S Oliveira,¹ Catherine Sherrington,¹ Anita B Amorim,² Amabile B Dario,² Anne Tiedemann¹

- **Aim:** To evaluate the effect of health coaching on physical activity, mobility, quality of life and mood among older people.
- **Design:** Systematic review with meta-analysis

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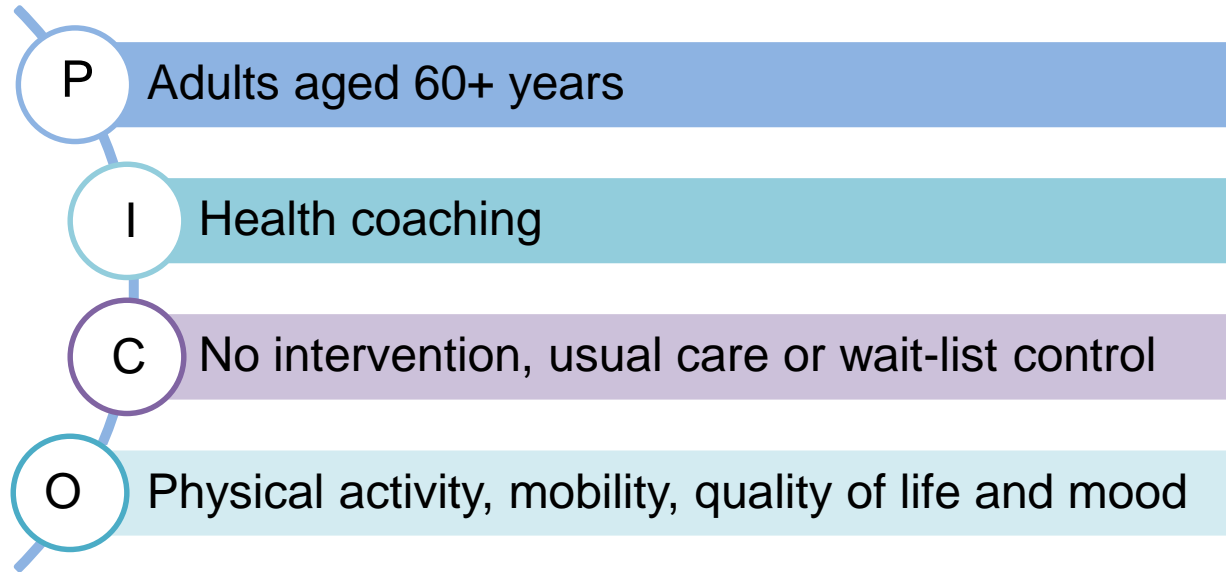
Health coaching

- Health coaching uses a client-centred process to **facilitate** and **empower** the client to achieve **self-determined goals** related to health and wellness
- Includes positive psychology, motivational interviewing, goal setting



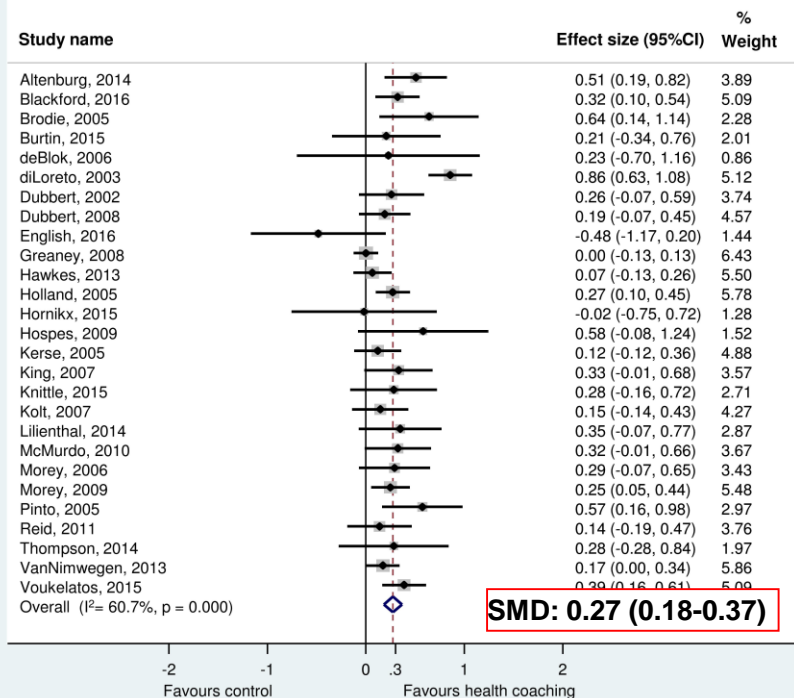
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Methods



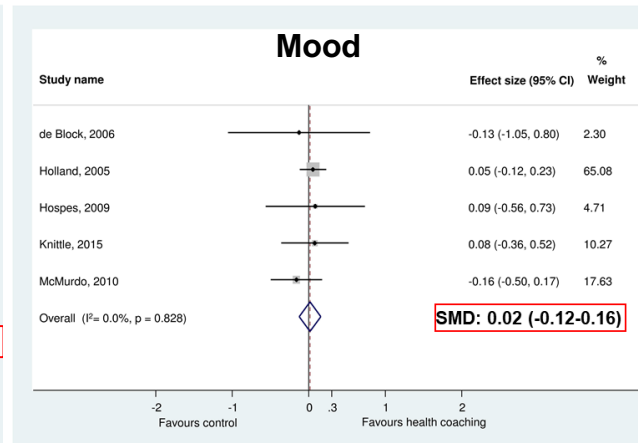
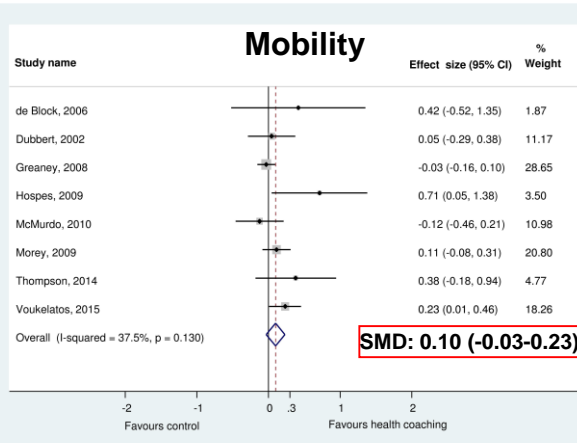
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Results for physical activity primary outcome



- 27 RCTs included (5803 participants)
- Health coaching had a **small, statistically significant effect** on physical activity
- Equally effective in general community dwellers and clinical groups

Results for secondary outcomes



No impact of health coaching on secondary outcomes

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Pedometers to promote physical activity

BMJ Journals

British Journal of
Sports Medicine

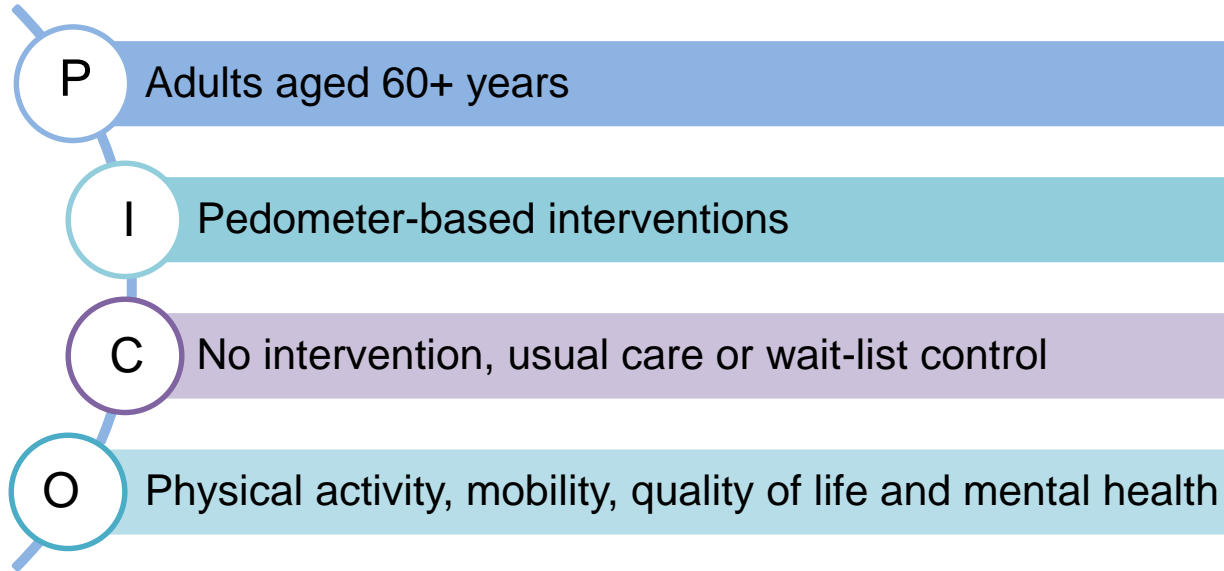
Effect of pedometer-based interventions on physical activity in people aged 60 years and over: a systematic review and meta-analysis

Juliana S Oliveira, Catherine Sherrington, Elizabeth R Y Zheng, Marcia R Franco, Anne Tiedemann

- **Aim:** To investigate the effect of pedometer-based interventions on physical activity, mobility, quality of life and mental health among people aged 60+
- **Design:** Systematic review with meta-analysis

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Methods



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Results for steps/ day primary outcome

- 23 RCTs included (2766 participants)
- Pedometer-based interventions were associated with a **statistically significant** and **clinically important** increase of **1558 steps/ day**

Goal setting to promote physical activity

Journal of Aging and Physical Activity, 2018, 26, 499-505
<https://doi.org/10.1123/japa.2017-0172>
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Human Kinetics
ORIGINAL RESEARCH

Factors Associated With the Setting of Health-Related Goals Among Community-Dwelling Older People

Juliana S. Oliveira, Leanne Hassett, Catherine Sherrington, Elisabeth Ramsay, Catherine Kirkham, Shona Manning, and Anne Tiedemann

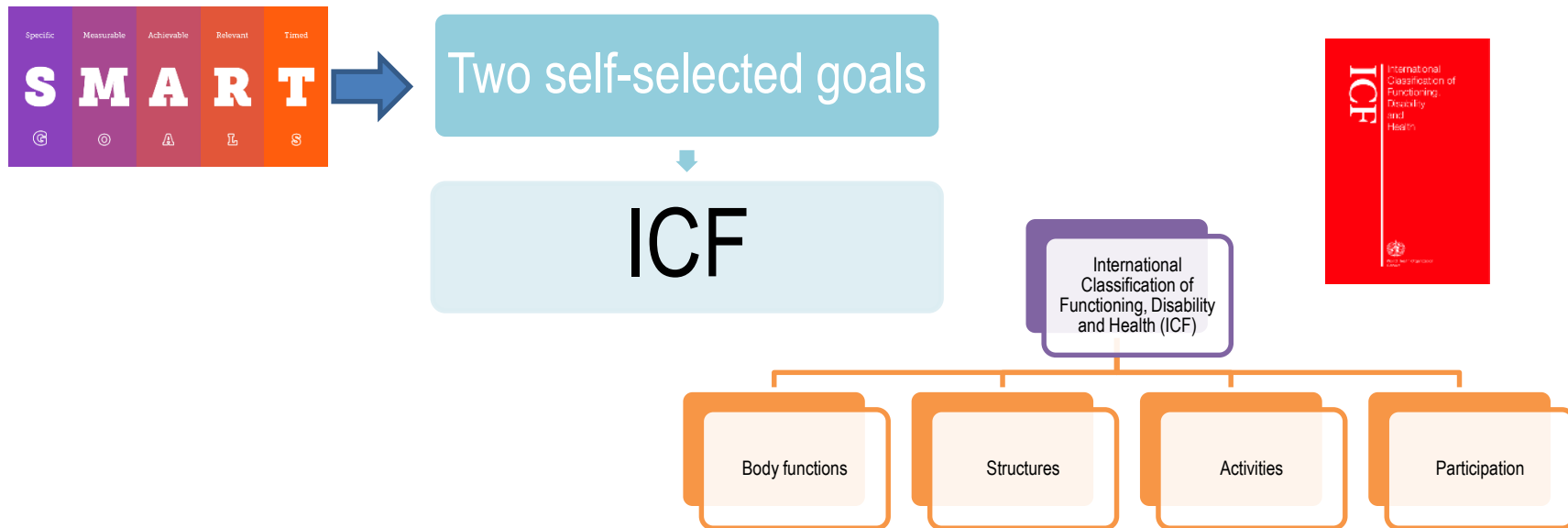
This study aimed to summarize the function-related goals set by older people, and to explore gender differences in goal selection and associations between balance-related goals and fall history, self-rated balance, and fear of falling. We included community-dwelling people aged 60 years and older participating in two randomized controlled trials. Participants nominated two function-related goals, which were summarized into components of the International Classification of Functioning, Disability and Health. Chi-square analyses were used to explore associations between goal types and participant characteristics. Goals related to recreation and leisure and walking were the most common function-related goals selected. Men and women set similar goals. Participants who had poor/fair self-reported balance were more likely to set a balance-related goal than people with good self-rated balance. In contrast, fallers and participants who had a fear of falling were not more likely to select a balance-related goal than nonfallers and participants who had no fear of falling, respectively.

Keywords: aging, balance, fall prevention, motivation, physical activity

Aims: 1) Summarise types of health-related goals set by older community-dwellers
2) Explore association between the setting of balance-related goals and fall history, fear of falling and self-reported balance

Design: Cross sectional study, secondary analysis of baseline data from 2 RCTs

Methods



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Results

408 goals set by
205 participants

20 different ICF
categories

ICF Components	Domain	Health-related goal	Male (n=150)	Female (n=258)	Total (n=408)
Body Functions	b455	Exercise tolerance functions	2 (1)	1 (0.4)	3 (0.7)
	b498	Functions of the cardiovascular, haematological, immunological and respiratory systems, other specified	1 (0.7)	-	1 (0.2)
	b710	Mobility of joint functions	3 (2)	-	3 (0.7)
	b740	Muscle endurance functions	-	4 (2)	4 (1)
	b730	Muscle power functions	-	1 (0.4)	1 (0.2)
	b280	Weight maintenance functions 9%			
	b134				
	b530				
Activities	a410	Changing basic body position	4 (3)	5 (2)	9 (2)
	a445	Hand and arm use	1 (0.7)	2 (0.8)	3 (0.7)
	a430	Lifting and carrying objects	-	1 (0.4)	1 (0.2)
	a415	Maintaining a body position	4 (3)	13 (5)	17 (4)
	a455	Walking 33%			
	a450				
Participation	p650	Caring for household objects	3 (1)	1 (0.4)	4 (1)
	p640	Doing housework	2 (1)	-	2 (0.5)
	p540	Dressing	-	1 (0.4)	1 (0.2)
	p760	Family relationships	-	1 (0.4)	1 (0.2)
	p855	Recreation and leisure 42%			
	p920				

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Results

Only 68 (32%) participants
set balance-related goals



- Participants who had **poor self-rated balance** were significantly **more likely** to set a balance goal than people with good self-rated balance
- Participants who had **fallen** in the past 12 months were **not more likely** to set a balance-related goal than non-fallers
- Participants who had **fear of falling** were **not more likely** to set a balance goal than those who reported no fear of falling

Goal setting clinical implications

- Health professionals could ask older people how they rate their balance as well as about past falls
- Messages that focus on immediate benefits of balance training (such as independence and participation) may be more attractive than an emphasis on falls risk reduction



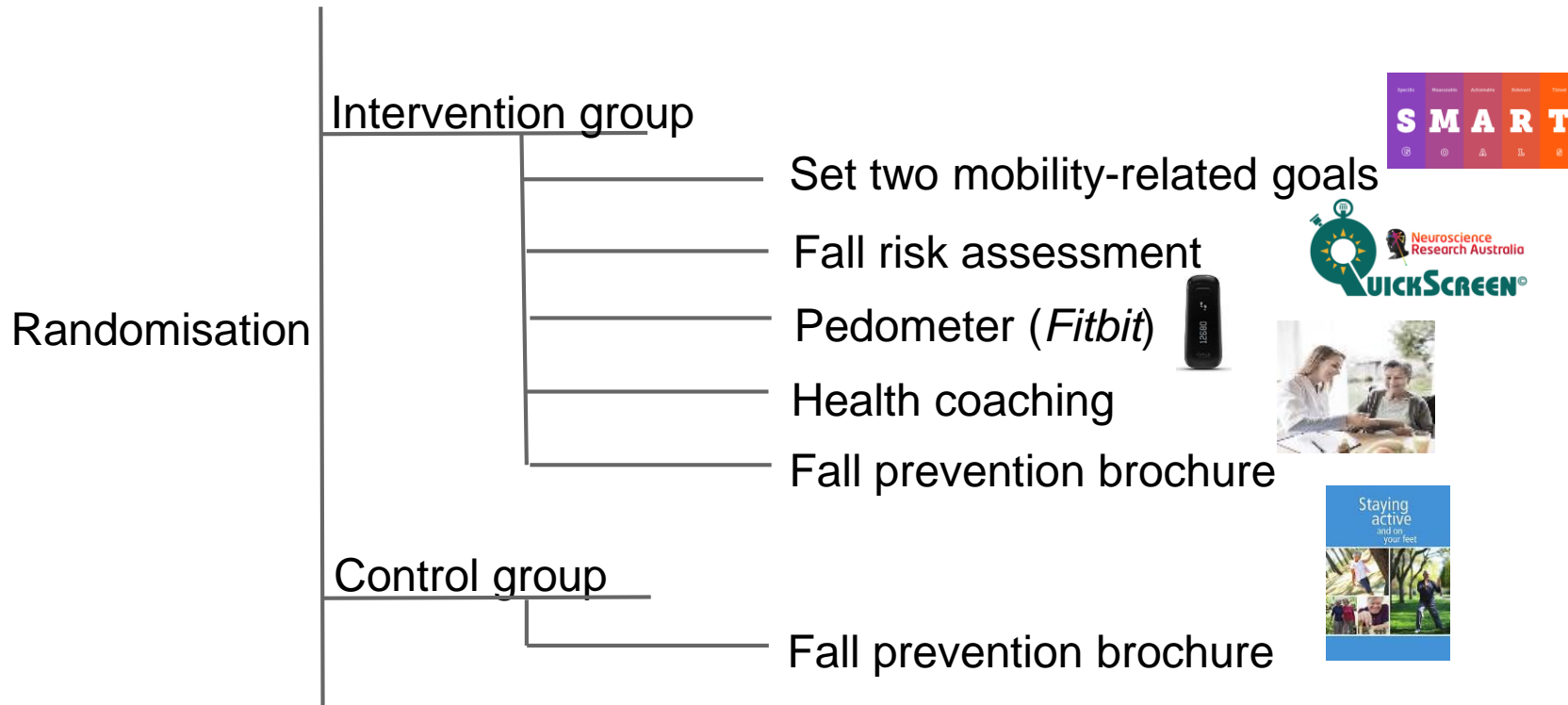
A combined physical activity and fall prevention intervention

Effect of a combined physical activity and fall prevention intervention on older adults' physical activity levels and mobility-related goals: a randomised controlled trial. **Oliveira J**, Sherrington C, Paul S, Ramsay E, Chamberlain K, Kirkham C, O'Rourke SD, Hassett L, Tiedemann A



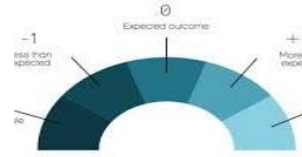
- **Aim:** Pilot trial to test the effectiveness of a combined physical activity and falls prevention intervention on **physical activity** and **mobility-related goals**
- **Design:** Randomised controlled trial, 131 participants, aged 60+ years

Methods



Methods

Primary Outcomes, measured at both 6 and 12 months post-randomisation



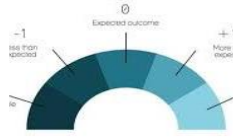
Mobility-related goal attainment using the *Goal Attainment Scale*



Objectively-measured physical activity using an *Actigraph*

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Results



Mobility-related goal attainment -*Goal Attainment Scale*

Intervention group had significantly better mobility goal attainment at 6 months compared to controls (OR 2.0, 95% CI 1.1-3.7)



Objectively-measured physical activity using an *Actigraph*

No impact of the intervention on the primary physical activity outcome

Trends towards greater increases in steps/day in the intervention group compared to control group which requires further investigation with a larger sample

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The Coaching for Healthy AGEing (CHAnGE) trial

Aim: To establish the impact of a physical activity and fall prevention programme compared with a healthy eating programme on **physical activity** and **falls** among people aged 60+ years.

Open Access

Protocol

BMJ Open Health coaching and pedometers to enhance physical activity and prevent falls in community-dwelling people aged 60 years and over: study protocol for the Coaching for Healthy AGEing (CHAnGE) cluster randomised controlled trial

Anne Tiedemann,¹ Chris Rissel,² Kirsten Howard,² Allison Tong,² Dafna Merom,³ Stuart Smith,⁴ James Wickham,⁵ Adrian Bauman,² Stephen R Lord,⁶ Constance Vogler,^{7,8} Richard I Lindley,¹ Judy M Simpson,² Margaret Allman-Farinelli,⁹ Catherine Sherrington¹



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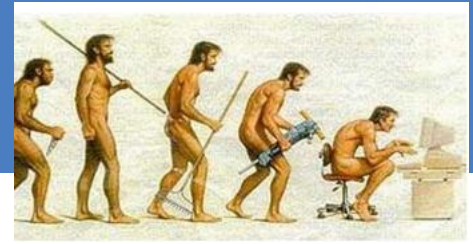


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Summary

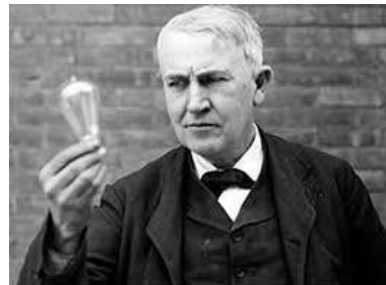


- Physical activity is the “best buy” in public health (*Jerry Morris, epidemiologist, 1994*)
- Health coaching, pedometer-based interventions and goal setting can motivate physical activity behaviour change among older people with a range of health states
- Multiple strategies are needed to impact on the global pandemic of physical inactivity
- Any interaction with an older person could be used to promote physical activity and exercise

Looking forward to a prevention-focussed future...

“The doctor of the future will give no medicine, but instead will interest his patients in the care of the human frame, in diet, and in the cause and prevention of disease”

Thomas Edison, inventor 1903



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Acknowledgements

Co-investigators: Prof Cathie Sherrington, Prof Chris Rissel, Prof Kirsten Howard, A/Prof Allison Tong, A/Prof Dafna Merom, Prof Stuart Smith, Prof Stephen Lord, Prof Richard Lindley, Dr James Wickham, Dr Connie Vogler, Prof Adrian Bauman, Prof Judy Simpson, Prof Margaret Allman-Farinelli

PhD student: Juliana Souza de Oliveira

Study staff: Cath Kirkham, Betty Ramsay, Kate Purcell, Sandra O'Rourke, Linda Roylance, Shona Manning, Kate Sharkey

Project and salary funding: National Health and Medical Research Council, Australia



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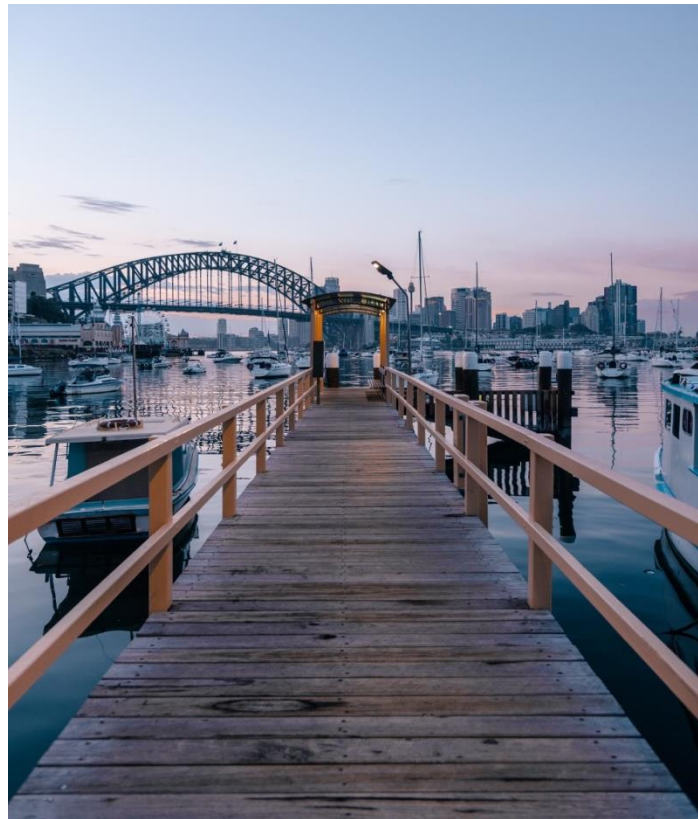
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