Evidence Compass

Evidence Profile

'Stepped-down' Intervention Programs to Promote Self-Managed Physical Activity in Service Veterans and their Dependents

November, 2019

Australian Government
Department of Veterans' Affairs

Abbreviations

BMI	Body Mass Index
CAD	Coronary Artery Disease
CBT	Cognitive Behavioural Therapy
CI	Confidence Interval
COPD	Chronic Obstructive Pulmonary Disease
IRR	Incidence Risk Ratio
M	Mean
MET	Metabolic Equivalent of Task
MI	Motivational Interviewing
PA	Physical Activity
PTSD	Post-Traumatic Stress Disorder
RPE	Rating of Perceived Exertion
SD	Standard Deviation
THR	Target Heart Rate

Introduction

For ease of reference, and to reflect the presentation of results in the data synthesis section of the *Technical Report* that accompanies this *Evidence Profile*, data extraction tables are grouped according to whether the study evaluated a physical activity specific intervention program, or a generic behaviour change program (e.g., focused on changing diet and physical activity). Within these main groupings, the data extraction tables are further categorised according to whether the study evaluated a ‘stepped-down’ intervention (i.e., incorporated a supervised and self-managed component), or a self-management only program. Within these groups, the summary tables are presented chronologically.

Physical Activity Specific Programs

‘Stepped-Down’ Interventions

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Donta et al. (2003)[1] (1)	USA	1,092 Gulf War veterans with symptoms of Gulf War veterans’ illnesses. Age: *M* = 40.7 years; *SD* = 8.7 years. Sex: 85% male. 45% had depression. 43% had PTSD. 35% had anxiety.	Change in physical functioning at 3-, 6- and 12-months. ○ Veterans Short-Form 36-Item Health Survey (V/SF-36) – Physical Component Summary.	Change in mental health at 3- 6- and 12-months. ○ V/SF-36 – Mental Component Summary.	10 (Good)
Study aim	To compare the effectiveness of CBT, exercise, and a combination of both for improving physical functioning and reducing symptoms of Gulf War veterans’ illnesses.				
Intervention strategies					
Intervention group 1 (n = 286): CBT. Weekly sessions for 12-weeks. *Intervention group 2 (n* = 269): Exercise. Weekly sessions for 12-weeks.					

[1] Donta et al. (2003) uses the same dataset as Mori et al. (2006).

Intervention group 3 (n = 266): CBT + Exercise. Weekly sessions for 12-weeks. *Exercise-Specific Strategies (Exercise Intervention Component)* ○ Allowed participants to select the types of exercise and intensity of exercise. ○ Received individualised exercise prescriptions for low-intensity aerobic exercise program. ○ Exercised in presence of exercise therapist (once per week during treatment phase) as well as independently at home (2-3 times per week during treatment phase and follow-up period). ○ Received education about exercise, stretching techniques, and activity selection using RPE, THR and METs for home-based exercises. *Generic Strategies (CBT Intervention Component)* ○ Taught behavioural skills to improve physical functioning. ○ Taught cognitive strategies to problem solve and address barriers to physical functioning.	
Control group	Usual care (*n* = 271).
Key findings	
Physical Functioning (SF-36) ○ The percentage of veterans who experienced a clinically significant improvement in physical function at 12-months was 11.5% with usual care, 11.7% with exercise, 18.4% with CBT + exercise, and 18.% with CBT. Corresponding percentages at 3-months were 9.3%, 12.8%, 16.5% and 15.0%, and at 6-months were 12.2%, 13.6%, 16.2% and 12.9%, respectively. ○ In the intention-to-treat analyses, none of the treatment comparisons were statistically significant after correcting for multiple comparisons. However, CBT tended to perform slightly better than usual care and exercise. ○ Participants who were adherent to the exercise intervention had an odds 2.67 higher to improve than those who did not adhere to the exercise intervention. *Mental Health (SF-36)* ○ Mean changes in mental health scores at 12-months were -1.30 for usual care, 0.97 for CBT, 2.30 for CBT + exercise and 2.33 for exercise. ○ All comparisons with usual care were statistically significant (*p*<.025).	

Donta et al. (2003)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1

3	Allocation concealment at time of consent	0
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	0
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Mori et al. (2006)[2] (2)	USA	531 Gulf War veterans with symptoms of Gulf War veterans’ illnesses. Age: *M* = 40.4 years; *SD* = 8.7 years. Sex: 84.3% male.	Physical activity change during 3-month treatment phase and at 4- and 12-months (maintenance phase). o Adherence.	N/A.	9 (Fair)
Study aim	To investigate the factors predicting exercise compliance among veterans with Gulf War veterans’ illnesses.				
Intervention strategies					

[2] Mori et al. (2006) uses the same dataset as Donta et al. (2003).

Intervention group 1 (n = 265): Exercise. Weekly sessions for 12-weeks. *Intervention group 2 (n* = 266): CBT + Exercise. Weekly sessions for 12-weeks. *Exercise-Specific Strategies (Exercise Intervention Component)* ○ Allowed participants to select the types of exercise and intensity of exercise. ○ Received individualised exercise prescriptions for low-intensity aerobic exercise program. ○ Exercised in presence of exercise therapist (once per week during treatment phase) as well as independently at home (2-3 times per week during treatment phase and follow-up period). ○ Received education about exercise, stretching techniques, and activity selection using RPE, THR and METs. *Generic Strategies (CBT Intervention Component)* ○ Taught behavioural skills to improve physical functioning. ○ Taught cognitive strategies to problem solve and address barriers to physical functioning.	
Control group	No.
Key findings	
Physical Activity (Adherence) ○ Compliance with exercise was nearly 2-times higher during the treatment phase compared with the maintenance phase. ○ Compliance with exercise tended to be higher in both phases for those assigned to the exercise alone condition (45% and 25%) compared to those assigned to exercise + CBT (40% and 21%), but the treatment differences were not significant (*p* =.28 and *p* = .29, respectively).	

Mori et al. (2006)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
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4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	1

6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
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Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Peterson et al. (2007)(3)	USA	81 elderly veterans aged 70 years and older. Age: *M* = 78.4 years; *SD* = 4.9 years. Sex: 100% male. BMI: *M* = 28.0 kg/m^2; *SD* = 4.5 kg/m^2.	Physical activity change at 6-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	N/A.	8 (Fair)
Study aim	To determine if telephone exercise counselling attenuates frailty in order, male veterans through increased PA.				
Intervention strategies					
Exercise-Specific Strategies (Intervention and comparator groups) *Intervention group* (*n* = 39): Received 6-months of PA counselling via telephone. ○ Baseline PA counselling that was tailored to participants' stage of readiness to engage in PA (grounded in the Transtheoretical Model of Behaviour Change.) ○ For those planning to initiate exercise, sessions focused on details pertaining to frequency, intensity and duration of PA, barriers to PA, sources of social support and individually-tailored benefits of PA. ○ For those already engaging in PA, session reviewed their program and provided reinforcement.					

○ Given workbook with long-term PA goal, information on benefits of PA, pedometer, daily pedometer log. ○ Received regular follow-up counselling calls via telephone (every 2 – 4 weeks) which assessed PA, provided support and reinforcement for behaviour changes, discussed barriers and problem-solving to overcome barriers, and created new PA goals. *Combined comparator groups (n* = 42): Also received baseline PA counselling (as described above) plus one of: *Comparator group 1:* Given workbook with health educational materials on topics unrelated to PA. Received counsellor calls on health topics. *Comparator group 2:* Received exercise workbook and listing of services.	
Control group	No.
Key findings	
Physical Activity (CHAMPS) ○ The mean change in PA over the 6-months in the not frail group (*n* = 26) was an increase of 619 kcals/ week, whereas the frail group (*n* = 55) had an average decrease of 124 kcals/ week over 6-months. ○ The regression model predicting change in PA between frailty groups indicated that frail participants randomised to the intervention did not differ from other groups with respect to change in PA over 6-months. ○ Baseline frailty status, regardless of intervention, had a borderline negative association with change in PA (*p* = .07), even after controlling for baseline levels of PA.	

Peterson et al. (2007)		
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8b	Physical activity data reported during intervention period	0
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10a	Between-group statistical comparisons reported for primary outcome of interest	1
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Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Dubbert et al. (2008)(4)	USA	224 older aged veterans with physical function limitations enrolled in primary care clinics. Age: *M* = 72.3 years; *SD* = 5.1 years; range = 60 – 85 years. Sex: 100% male. BMI: *M* = 29.4 kg/m^2; *SD* = 4.5 kg/m^2.	Physical activity change at 5- and 10-months. ○ Accelerometer. ○ Timeline Follow-Back procedure. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire. Physical fitness change at 5- and 10-months. ○ 6-minute walk test (6MWT). ○ 30-second chair stand. ○ 30-second arm curls. ○ 2.4m up-and-go test. ○ Gait speed over 10m.	Healthcare costs.	13 (Good)
Study aim	To evaluate the effects of counselling on adherence to a prescribed walking and strength exercise program, PA, physical performance and quality of life in aging veterans.				
Intervention strategies					
Intervention group (*n* = 120): Counselling for home-based walking and strength exercise with a nurse at baseline, 1-month and 5-months. The intervention was based on Social Cognitive Theory. The walking program goal was 20 minutes or more for 3 to 5 times per week by the 5-month visit.					

Exercise-Specific Strategies

- At baseline, set progressive PA goals for walking, and fixed PA goals for strength and flexibility.
- At the 1-month follow-up visit, interventionists checked progress, negotiated new walking, strength and flexibility goals.
- The 5-month final intervention visit emphasized relapse prevention and using the PA workbook more independently.
- Participants were given 1-page monthly exercise calendar forms for recording walking and strength exercise and dumbbells.
- The nurse initiated 3- to 5-minute problem-solving telephone calls with participants approximately 1 week after intervention visits.
- Received brief automated motivational messages on a random schedule every 3 to 4 weeks.

Comparator group (*n* = 104): Discussion of choice of health education topics with a nurse at baseline, 1-month and 5-months

Generic Strategies

- Participants selected health brochures to discuss with the nurse. If they chose brochure about exercise, advice was limited to the brochure's summary of current health recommendations.

Control group	No.

Key findings

Physical Activity (Accelerometer)

- There were no significant differences between groups for 3-day means of total minutes of PA or total minutes of moderate or higher-intensity PA using accelerometer data at 5-months and 10-months follow-up.
- However, 64% of participants in the intervention group and only 46% of participants in the comparator group averaged at least 30 minutes of moderate to vigorous PA at 10-month follow-up (p = .03).

Physical Activity (Timeline Follow-Back)

- Participants in the intervention group experienced a significant increase in walking time (minutes/ week) from baseline (M = 19.2; SD = 40.4) to 5-months (M = 64.5; SD = 70.9) and 10-months (M = 60.6; SD = 78.6) (p <.001). Participants in the comparator group also experienced a significant increase in walking time (minutes/week) from baseline (M = 32.9; SD = 65.2) to 5-months (M = 50.5; SD = 80.2) and 10-months (M = 45.7; SD = 75.0) (p <.001). The increase in walking time (minutes/week) was significantly greater for participants in the intervention group (p <.001; η^{2}= .04).
- Participants in the intervention group experienced a significant increase in walking frequency (days/ week) from baseline (M = 0.8; SD = 1.7) to 5-months (M = 2.4; SD = 2.3) and 10-months (M = 2.3; SD = 2.4) (p <.001). Participants in the comparator group also experienced a significant increase in walking frequency (days/ week) from baseline (M = 1.3; SD = 2.0) to 5-months (M = 1.8; SD = 2.3) and 10-months (M = 1.7; SD = 2.3) (p <.001). The increase in walking frequency (days/ week) was significantly greater for participants in the intervention group (p <.001; η^{2}= .08).
- Participants in the intervention group experienced a significant increase in strength exercise time (minutes/week) from baseline (M = 9.2; SD = 32.5) to 5-months (M = 44.6; SD = 51.2) and 10-months (M = 41.2; SD = 57.2) (p <.001). Participants in the comparator group also experienced a significant increase in strength exercise time (minutes/week) from baseline (M = 14.7; SD = 53.6) to 5-months (M = 19.8; SD = 59.8) but not at 10-months (M =

14.7; *SD* = 49.7) (*p* <.001). The increase in strength exercise time (minutes/ week) was significantly greater for participants in the intervention group (*p*<.001; $\eta^{2.}$= .11).

- Participants in the intervention group experienced a significant increase in strength exercise frequency (days/ week) from baseline (*M* = 0.6; *SD* = 1.3) to 5-months (*M* = 2.1; *SD* = 2.1) and 10-months (*M* = 2.0; *SD* = 2.1) (*p*<.001), but participants in the comparator group did not ($\eta^{2.}$= .20).

Physical Activity (CHAMPS)

- Similar findings were found using the CHAMPS measures, which indicated that participants in the intervention group increased their total frequency of physical activity at 5-months and 10-months significantly more than participants in the comparator group (*p*=.01; $\eta^{2.}$= .02).

Physical Fitness (all measures)

- Changes in physical fitness at 10-months were significantly greater for the intervention group on the 6MWT (*p* = .03), 30-second chair stand (*p* =.02) and 30-second arm curls (*p* = .09), but did not differ on the up-and-go test (*p* = 35) or 10-minute gait speed (*p* = .89).

Healthcare Costs

- The mean annual health care costs per participant differed by less than $100 (*p* = .79).

Dubbert et al. (2008)		
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Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Morey et al. (2009)(5)	USA	398 older veterans aged 70 years and older. Age: *M* = 77.6 years; *SD* = 4.9 years; range = 70 – 92 years. Sex: 100% male. 73% had hypertension. 65% had arthritis. 47% had heart conditions.	Physical activity change at 3-, 6- and 12-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire. Physical fitness changes at 3-, 6- and 12-months. ○ 8-foot walk test. ○ Short Physical Performance Battery (SPPB). ○ 2-minute walk test. Physical functioning changes at 3-, 6- and 12-months. ○ 36-item Short-Form Health Survey (SF-36) – Physical Function. ○ Late-Life Function (LLF) survey.	N/A	13 (Good)
Study aim	To determine the effects of primary care-based, multicomponent PA counselling on promoting PA guidelines on gait speed and related measures of PA and function in older veterans.				
Intervention strategies					
Intervention group (*n* = 199): The Enhanced Fitness intervention, a 12-month, multi-component, home-based PA counselling intervention, based in Social Cognitive Theory and Transtheoretical Model of Behaviour Change. Designed to help individuals reach long-term goal of engaging in 30 or more minutes of aerobic exercise on 5 or more days per week and 15 minutes of strengthening exercises on 3 non-consecutive days each week. *Exercise-Specific Strategies*					

	○ Designed to enhance self-efficacy for PA through integrating self-monitoring, goal-setting, reinforcement, modelling and cognitive reframing into an ongoing individualised PA counselling program. ○ Each participant given long-term goal of meeting PA objectives. ○ Received in-person baseline PA counselling session where assessed current PA, established 2-week PA plan and set short- and long-term PA goals. ○ Given notebook containing information about health benefits of exercise, tips for exercising safely, poster modelling specific exercises, resistance bands and a pedometer. ○ Received regular telephone counselling (every 2 – 4 weeks) which assessed PA goals, quantified actual PA, offered support and reinforcement, discussed PA barriers, assigned new PA goals and problem-solve. ○ Primary care provider endorsed PA at clinical visit and using monthly automated phone messages. ○ Received quarterly individualised feedback reports that summarised PA goal progress.
Control group	Usual care (*n* = 199).
Key findings	
	Physical Activity (CHAMPS) ○ Significant group differences were observed in PA. The intervention group increased moderate to vigorous PA frequency (from 15.9 times/ week at baseline to 22.4 times/week at 12-months), but there was no change in the control group (*p*<.001). ○ Reported minutes of moderate to vigorous endurance PA increased significantly more in the intervention group (from 37.9 min/week at baseline to 72.3 min/week at 12-months) than the control group (from 35.8 min/week at baseline to 43.7 min/week at 12-months) (*p*<.01). ○ Reported minutes of moderate to vigorous strength PA increased significantly more in the intervention group (from 18.5 min/week at baseline to 54.9 min/week at 12-months) than the control group (from 23.2 min/week at baseline to 25.4 min/week at 12-months (*p*<.001). ○ In the context of meeting the intervention goal of 150 minutes or more of moderate to vigorous PA per week, the proportion of individuals meeting the goal increased significantly from 13% at baseline to 32% at 12-months in the intervention group (*p*<.001), in contrast to the control group, which stayed relatively stable throughout (from 14% to 16%; *p* = .38). *Physical Fitness (8-foot walk test)* ○ Usual gait speed increased significantly in both groups over time (p<.001). It increased from 1.03 ± 0.24 m/s to 1.15 ± 0.28 m/s in the intervention group and from 1.03 ± 0.24 m/s to 1.12 ± 0.25 m/s in the control group. However, after adjusting for baseline gait speed and other covariates, the difference in change in usual gait speed between groups was not significant (*p* = .47). ○ Rapid gait speed increased significantly over time in the intervention group (from 1.56 ± 0.41 m/s to 1.68 ± 0.44 m/s) in the intervention group, but not in the control group (*p* = .04). *Physical Fitness (SPPB)* ○ Both groups improved their physical performance at 12-months, with participants allocated to usual care experiencing significantly better results at 12-months than patients allocated to intervention (*p* =.03).

Physical Functioning (2-minute walk test)

- Both groups improved their performance on the 2-minute walk test, with patients allocated to intervention walking a slightly greater distance than those who received usual care (p = .08).

Physical Functioning (SF-36)

- Change in self-rated physical functioning did not differ between groups (p =.35) and remained fairly stable for both groups.

Physical Functioning (LLF)

- Change in self-rated physical functioning did not differ between groups (p =.84) and within group changes were negligible

Morey et al. (2009)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	1
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6c	Behavioural change theory in which intervention strategies are based is identified	1
7	Objective measure of physical activity used	0
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8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1

11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Huffman et al. (2010)[3] (6)	USA	347 elderly veterans aged 70 to 92 years. Age: *M* = 77.6 years; *SD* = 4.9 years. Sex: 99.8% male. 24.5% no arthritis or diabetes. 51.3% had arthritis. 24.2% had arthritis and diabetes.	Physical activity change 3-, 6- and 12-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	N/A.	9 (Fair)
Study aim	To explore whether veterans with arthritis alone or veterans with both arthritis and diabetes could improve amounts of PA with a home-based PA counselling intervention.				
Intervention strategies					
Intervention group: The Enhanced Fitness intervention, a 12-month, multi-component, home-based PA counselling intervention, based in Social Cognitive Theory and Transtheoretical Model of Behaviour Change. Designed to help individuals reach long-term goal of engaging in 30 or more minutes of aerobic exercise on 5 or more days per week and 15 minutes of strengthening exercises on 3 non-consecutive days each week. *Exercise-Specific Strategies* ○ Designed to enhance self-efficacy for PA through integrating self-monitoring, goal-setting, reinforcement, modelling and cognitive reframing into an ongoing individualised PA counselling program. ○ Each participant given long-term goal of meeting PA objectives. ○ Received in-person baseline PA counselling session where assessed current PA, established 2-week PA plan and set short- and long-term PA goals. ○ Given notebook containing information about health benefits of exercise, tips for exercising safely, poster modelling specific exercises, resistance bands and a pedometer. ○ Received regular telephone counselling (every 2-4 weeks) which assessed PA goals, quantified actual PA, offered support and reinforcement, discussed PA barriers, assigned new PA goals and problem-solve. ○ Primary care provider endorsed PA at clinical visit and using monthly automated phone messages. ○ Received quarterly individualised feedback reports that summarised PA goal progress.				

[3] Huffman et al. (2010) uses the same dataset as Hall et al. (2011), Hall et al., (2016), Morey et al., (2009) and Peterson et al. (2015).

Control group	Usual care.

Key findings

Physical Activity (CHAMPS)

- Baseline minutes per week of endurance PA were not significantly different between those with no arthritis (n = 85), those with arthritis (n = 178) and those with arthritis and diabetes (n = 84) (p =.87).
- Compared to persons with no arthritis, those with both arthritis and diabetes reported fewer baseline minutes of strength PA per week (p = .03).
- Independent of arthritis or diabetes status, the PA intervention was effective in increasing minutes of PA per week for both endurance PA (Treatment x Time interaction: p = .04; Time: p<.001) and strength PA (Treatment x Time interaction: p<.001; Time: p<.001).
- Individuals with arthritis only increased their endurance and strength PA by 146% and 164%, respectively, and individuals with both arthritis and diabetes increased their strength and endurance PA by 53% and 241%, respectively.
- There was no arthritis/diabetes group by time interaction.
- There were no overall changes in endurance PA (p = .17) or strength PA (p = .51) over time for the three groups assigned to the control condition

Huffman et al. (2010)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
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11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Hall et al. (2011)[4] (7)	USA	238 older veterans aged 70 years and older. Age: *M* = 77 years; range = 70 – 92 years. Sex: 100% male.	Physical activity change at 12 months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	N/A.	8 (Fair)
Study aim	To assess the sustained effect of a PA counselling intervention on PA one year after intervention and predictors of sustained PA participation.				
Intervention strategies					
Intervention group (*n* = 123): The Enhanced Fitness intervention, a 12-month, multi-component, home-based PA counselling intervention, based in Social Cognitive Theory and Transtheoretical Model of Behaviour Change. Designed to help individuals reach long-term goal of engaging in 30 or more minutes of aerobic exercise on 5 or more days per week and 15 minutes of strengthening exercises on 3 non-consecutive days each week. *Exercise-Specific Strategies* ○ Designed to enhance self-efficacy for PA through integrating self-monitoring, goal-setting, reinforcement, modelling and cognitive reframing into an ongoing individualised PA counselling program. ○ Each participant given long-term goal of meeting PA objectives. ○ Received in-person baseline PA counselling session where assessed current PA, established 2-week PA plan and set short- and long-term PA goals. ○ Given notebook containing information about health benefits of exercise, tips for exercising safely, poster modelling specific exercises, resistance bands and a pedometer. ○ Received regular telephone counselling (every 2-4 weeks) which assessed PA goals, quantified actual PA, offered support and reinforcement, discussed PA barriers, assigned new PA goals and problem-solve.				

[4] Hall et al. (2011) uses the same dataset as Hall et al. (2016), Morey et al. (2009), Huffman et al. (2010) and Peterson et al. (2015).

○ Primary care provider endorsed PA at clinical visit and using monthly automated phone messages. ○ Received quarterly individualised feedback reports that summarised PA goal progress.	
Control group	Usual care (*n* = 114).
Key findings	
Physical Activity (CHAMPS) ○ Participants in the intervention group reported more minutes of moderate-intensity endurance PA (*M* = 74.6; *SD* = 10.3) and moderate-intensity strength PA (*M* = 55.8; *SD* = 5.5) at post-intervention compared to the comparator group (Endurance PA: *M* = 44.7; *SD* = 10.7; Strength PA: *M* =.29.5; *SD* = 5.7). ○ Minutes of moderate-intensity strength PA and endurance PA declined for both the intervention group (Endurance PA: *M* = 52.4; *SD* = 9.2; Strength PA: *M* = 37.3; *SD* = 6.2) and the comparator group (Endurance PA: *M* = 43.2; *SD* = 9.6; Strength PA: *M* = 33.8; *SD* = 6.3) at 12-months follow-up. ○ The declines in endurance PA at 12-months were greater for the intervention group (M_{Change} = 22.2) than the control group (M_{Change} = 1.5), although this difference was non-significant (*p* = .22). ○ The declines in strength PA at 12-months was significantly greater for the intervention group (M_{change} = -18.5) than the comparator group (M_{change} = -4.3) (*p* = .01). ○ Despite these declines over the last 12-months in the intervention group, they still had higher minutes of endurance PA and strength PA at 12-months follow-up in comparison to the comparator group.	

Hall et al. (2011)		
TESTEX Criterion		**Score**
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3	Allocation concealment at time of consent	0
4	Groups similar at baseline	0
5	Blinding of assessor (for at least one key outcome)	0
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	0
6c	Behavioural change theory in which intervention strategies are based is identified	1
7	Objective measure of physical activity used	1

8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Morey et al. (2012)(8)	USA	302 older, overweight veterans aged 60 to 89 years with impaired glucose tolerance. Age: *M* = 67 years; *SD* = 6.3 years. Sex: 96.8% male. BMI: *M* = 31.2 kg/m^2; *SD* = 3.6 kg/m^2.	Change in physical activity at 3- and 12-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire. Change in physical fitness at 3- and 12-months. ○ 6-minute walk test (6MWT). Change in physical functioning at 3- and 12-months. ○ 36-item Short-Form Health Survey (SF-36) – Physical Function.	N/A	12 (Good)
Study aim	To determine whether a home-based multicomponent PA counselling intervention is effective in reducing glycaemic measures and enhancing PA in older outpatients with prediabetes mellitus.				
Intervention strategies					
Intervention group (*n* = 180): The Enhanced Fitness intervention, a 12-month, multi-component, home-based PA counselling intervention, based in Social Cognitive Theory and Transtheoretical Model of Behaviour Change. Designed to help individuals reach long-term goal of engaging in 30 or more minutes of aerobic exercise on 5 or more days per week and 15 minutes of strengthening exercises on 3 non-consecutive days each week. *Exercise-Specific Strategies*					

○ Designed to enhance self-efficacy for PA through integrating self-monitoring, goal-setting, reinforcement, modelling and cognitive reframing into an ongoing individualised PA counselling program. ○ Each participant given long-term goal of meeting PA objectives. ○ Received in-person baseline PA counselling session where assessed current PA, established 2-week PA plan and set short- and long-term PA goals. ○ Given notebook containing information about health benefits of exercise, tips for exercising safely, poster modelling specific exercises, resistance bands and a pedometer. ○ Received regular telephone counselling (every 2-4 weeks) which assessed PA goals, quantified actual PA, offered support and reinforcement, discussed PA barriers, assigned new PA goals and problem-solve. ○ Primary care provider endorsed PA at clinical visit and using monthly automated phone messages. ○ Received quarterly individualised feedback reports that summarised PA goal progress.	
Control group	Usual care (*n* = 122).
Key findings	
Physical Activity (CHAMPS) ○ Walking and other endurance PA increased significantly over time for the intervention group, from an average 73 minutes/week at baseline to an average 133 minutes per week at 12-months (+82%), in comparison with the control group, whose endurance PA remained constant, from 115 minutes/ week at baseline to 112 minutes/ week at 12-months (*p*<.001). ○ Strength PA increased from 19 minutes/ week at baseline to 28 minutes/week at 12-months in the intervention group, and from 25 minutes at baseline to 40 minutes at 12-months in the control group. However, there was no main effect of time, and no between-group difference (*p* = .11). ○ The prevalence of individuals meeting the goal of 150 minutes of endurance exercise increased in the intervention group over time from 16% at baseline to 42% at 12-months, in contrast to the control group, whose prevalence of individuals meeting the 150 min/week marker was stable over time (31%; OR = 1.65, 95% CI = 1.08 – 2.53). *Physical Fitness (6MWT)* ○ Performance on the 6MWT was stable throughout the intervention period for both groups, and there were no between-group differences (*p* = .81). *Physical Functioning (SF-36)* ○ Self-reports of physical function were stable throughout the intervention period for both groups, and there were no between-group differences (*p* = .09).	

Morey et al. (2012)	
TESTEX Criterion	**Score**
1 Eligibility criteria specified	1

2	Randomisation method specified	0
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Peterson et al. (2015)[5] (9)	USA	392 elderly veterans aged 70 years and older. Age: *M* = 77.5 years; *SD* = 5.0 years. Sex: 100% male. BMI: *M* = 29.1 kg/m^2; *SD* = 4.7 kg/m^2.	Physical activity change at 12-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	N/A.	10 (Good)

[5] Peterson et al. (2015) uses the same dataset as Hall et al. (2011), Hall et al. (2016), Morey et al. (2009) and Huffman et al. (2010).

Study aim	To compare baseline differences and changes in PA between truly physically inactive men and low active men enrolled in a twelve-month, home-based PA intervention.
Intervention strategies	
Intervention group (*n* = 172): The Enhanced Fitness intervention, a 12-month, multi-component, home-based PA counselling intervention, based in Social Cognitive Theory and Transtheoretical Model of Behaviour Change. Designed to help individuals reach long-term goal of engaging in 30 or more minutes of aerobic exercise on 5 or more days per week and 15 minutes of strengthening exercises on 3 non-consecutive days each week. *Exercise-Specific Strategies* ○ Designed to enhance self-efficacy for PA through integrating self-monitoring, goal-setting, reinforcement, modelling and cognitive reframing into an ongoing individualised PA counselling program. ○ Each participant given long-term goal of meeting PA objectives. ○ Received in-person baseline PA counselling session where assessed current PA, established 2-week PA plan and set short- and long-term PA goals. ○ Given notebook containing information about health benefits of exercise, tips for exercising safely, poster modelling specific exercises, resistance bands and a pedometer. ○ Received regular telephone counselling (every 2 – 4 weeks) which assessed PA goals, quantified actual PA, offered support and reinforcement, discussed PA barriers, assigned new PA goals and problem-solve. ○ Primary care provider endorsed PA at clinical visit and using monthly automated phone messages. ○ Received quarterly individualised feedback reports that summarised PA goal progress.	
Control group	Usual care (*n* = 173).
Key findings	
Physical Activity (CHAMPS) ○ In physically inactive individuals randomised to intervention (*n* = 49), the weekly PA levels went from 0 at baseline to 73 ± 88 mins/ week at 12-months (*p*<.001). ○ In physically inactive individuals randomised to control group (*n* = 79), the mean 12-month change in weekly PA levels was also significant (from 0 to 19±50 mins/ week*; p* <.001). ○ Low active individuals randomised to either the intervention (*n* = 123) or control group (*n* = 94) had no significant changes in weekly PA at 12-months, with their physical activity levels remaining relatively stable. Low active individuals allocated to intervention reported baseline PA levels of 140.9 ± 134.9 mins/week and 12-month PA levels of 149.9 ± 155.8 mins/week (*p* = .60). Low active individuals allocated to control reported baseline PA levels of 104.5 ± 94.1 mins/week and 12-month PA levels of 107.6 ± 133.5 min/s week (*p* = .83). ○ After controlling for various covariates, physically inactive individuals in the control group had significantly increased odds (OR = 7.8; 95% CI = 3.4 – 17.9) of reporting sustained inactivity (0 minutes of weekly PA) at 12-months, compared to inactive individuals receiving the intervention.	

Peterson et al. (2015)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	0
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	0
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Allen et al. (2016b)(10)	USA	320 veterans with symptomatic knee osteoarthritis. Age: *M* = 60.0 years; SD = 9.8 years. Sex: 88% male.	Change in physical activity at 12- and 24-weeks. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	N/A	13 (Good)

		BMI: *M* = 33.4 kg/m^2; *SD* = 6.9 kg/m^2.	Change in physical functioning at 12-weeks. ○ Short Physical Performance Battery (SPPB). ○ 6-minute walk test (6MWT). ○ Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (also assessed at 24-weeks).		

Study aim	To compare the effectiveness of group-based versus individual physical therapy interventions for management of knee osteoarthritis.

Intervention strategies

Intervention group 1 (n = 159): Group physical therapy consisting of 6x 1-hour sessions.

Intervention group 2 (n = 161): Individual physical therapy consisting of 2x 1-hour sessions.

Exercise Specific Strategies (Both Intervention Groups)

- Received instruction in an appropriate home exercise program, advice on progression of home exercise and instruction in strategies for pacing daily activities and protecting joints.
- Encouraged to engage in aerobic exercise.
- Given written instructions and photographs to illustrate home exercises, logs to record home exercise and therapy bands.
- Physical therapist reviewed patient's progress with home exercises and provided recommendations for appropriate modifications.

Control group	No.

Key findings

Physical Activity (CHAMPS)

- The frequency and duration of all PA did not differ between groups at 12- or 24-weeks.
- There was no difference in frequency or duration of moderate-to-intense PA between groups at 12- or 24-weeks.
- Across both groups, the estimated frequency of all PA per week increased by 24% at 12-weeks (IRR = 1.24; p<.001) and moderate-to-intense PA increased by 31% (IRR = 1.31; p<.001).
- Duration of all PA increased by 16% across both groups at 12-weeks (IRR = 1.16; p = .02), but there was no increase in duration of moderate-to intense PA (p = .09).

Physical Functioning (SPPB)

- Physical performance objectively assessed using the SPPB did not differ between groups at 12-weeks (p = .53).
- There was a non-significant change in SPPB scores between baseline and 12-weeks for individuals in both groups.

Physical Functioning (6MWT)

- There was a statistically significant difference between groups in 6MWT distance (p = .02). Mean 6MWT distance decreased by 3.2 metres for the individual physical therapy group (p = .53) and increased by 14.3 metres in the group physical therapy condition (p <.01) at 12-weeks.

Physical Functioning (WOMAC)

- There were no significant differences between groups in WOMAC physical function scores at 12- or 24-weeks.
- WOMAC function scores were improved at 12-weeks in both the individual physical therapy group (M_{change} = -3.1; p<.001) and group physical therapy group (M_{change} = -5.1; p<.001). There was some sustained improvement at 24-weeks for individual physical therapy (M_{change} = -1.8; p = .06) and group physical therapy (M_{change} = -2.7; p = <.01).

Allen et al. (2016b)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	1
8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1

11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Gao et al. (2016)(11)	USA	232 overweight or obese veterans receiving routine care in primary care setting. Age: *M* = 63.2 years; *SD* = 12.9 years. Sex: 82.8% male. BMI: *M* =31.7 kg/m^2; *SD* = 4.9 kg/m^2. 71.1% had hypertension. 53.5% had arthritis. 31.9% had diabetes. 33.6% had depression or anxiety.	Physical activity change at 6- and 12-months. ○ Accelerometer. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	N/A	11 (Good)
Study aim	To evaluate the effectiveness of a 12-month, expert system-based, print-delivered physical activity intervention in achieving recommended PA targets among a primary care, overweight/obese veteran population.				
Intervention strategies					
Intervention group (*n* = 116)*:* Project STRIDE print intervention, consisting of a once off individually tailored PA counselling based on medical conditions identified in patient's medical records and 12-months of expert system feedback. *Exercise-Specific Strategies* ○ Baseline PA counselling session included guided goal setting to gradually increase moderate-intensity aerobic physical activity. ○ Participants received 12 months of expert system feedback counselling, delivered via postal mail, in parallel with 12-months of routine primary care. ○ Printed feedback reports were mailed back to participants, along with PA self-help booklets matched to the Veteran's stage of motivational readiness and newsletters with suggestions for increasing PA. 14 feedback mailings were sent to participants. ○ The individualized feedback reports generated by the expert system included pre-planned counselling messages that targeted deficiencies and reinforced successful efforts. The messages provided three types of feedback: (1) motivational feedback regarding the participant's current stage of readiness for PA adoption; (2) normative feedback that included assessments of (a) self-efficacy or confidence in their ability to engage in PA, (b) decisional balance				

	or the pros and cons of PA, (c) behavioral and cognitive processes associated with PA, and (d) the Veteran's profile compared to those who had successfully adopted and sustained PA; and (3) ipsative feedback, or feedback on progress made since the last feedback report.
Control group	Usual care (*n* = 116).

Key findings

Physical Activity (Accelerometer)

- The proportion of veterans in the intervention group who met PA recommendations remained relatively stable over time, while PA in the comparator group decreased over time.
- Compared to the comparator group, the intervention group had significantly higher odds of meeting the recommended ≥ 150mins/week of at least moderate-intensity aerobic PA at 6-months (OR = 6.26; *p* = .03) and approached significance at 12-months (OR = 4.73; *p* = .053)

Physical Activity (CHAMPS)

- The study found consistent increases in the proportion of veterans in the intervention group meeting PA recommendations at 6- and 12-months, and improvements at 6-months that are not sustained at 12-months in the comparator group.
- Participants in the intervention group had significantly higher odds of meeting the recommended ≥ 150mins/week of at least moderate-intensity aerobic PA at 12-months (OR = 2.86, *p* = .04) but not at 6 months (OR = 1.54; *p* = 0.40) when compared to the comparator group.

Gao et al. (2016)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	0
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	1

8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Hall et al. (2016)[6] (12)	USA	67 overweight, older veterans aged 60 years and older with impaired glucose tolerance and PTSD. Age: *M* = 63 years; *SD* = 3.9 years; range = 60 -70 years. Sex: 97% male. BMI: *M* = 31.3 kg/m^2; *SD* = 3.7 kg/m^2. 59.1% had depression.	Physical activity change at 3- and 12-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire. Physical fitness change at 3- and 12-months. ○ 6-minute walk test (6MWT). Physical functioning change at 3- and 12-months. ○ 36-item Short-Form Health Survey (SF-36) – Physical Function subscale.	Mental health change at 3- and 12-months. ○ 36-item Short-Form Health Survey (SF-36) – Mental Health Component.	12 (Good)
Study aim	To explore the impact of PA counselling on PA and psychological health among overweight veterans with PTSD.				
Intervention strategies					
Intervention group (n = 39): The Enhanced Fitness intervention, a 12-month, multi-component, home-based PA counselling intervention, based in Social Cognitive Theory and Transtheoretical Model of Behaviour Change. Designed to help individuals reach long-term goal of engaging in 30 or more minutes of aerobic exercise on 5 or more days per week and 15 minutes of strengthening exercises on 3 non-consecutive days each week.					

[6] Hall et al. (2016) utilises the same dataset as Hall et al. (2011), Morey et al. (2009), Huffman et al. (2010) and Peterson et al. (2015).

Exercise-Specific Strategies

- Designed to enhance self-efficacy for PA through integrating self-monitoring, goal-setting, reinforcement, modelling and cognitive reframing into an ongoing individualised PA counselling program.
- Each participant given long-term goal of meeting PA objectives.
- Received in-person baseline PA counselling session where assessed current PA, established 2-week PA plan and set short- and long-term PA goals.
- Given notebook containing information about health benefits of exercise, tips for exercising safely, poster modelling specific exercises, resistance bands and a pedometer.
- Received regular telephone counselling (every 2-4 weeks) which assessed PA goals, quantified actual PA, offered support and reinforcement, discussed PA barriers, assigned new PA goals and problem-solve.
- Primary care provider endorsed PA at clinical visit and using monthly automated phone messages.
- Received quarterly individualised feedback reports that summarised PA goal progress.

Control group	Usual care *(n* = 28).

Key findings

Physical Activity (CHAMPS)

- Average minutes of PA per week increased significantly for the intervention group from baseline (M = 79.7; SD = 99.6) to 12-months (*M* = 161.0; *SD* = 147.1) (*p*<.01; *d* = 0.82).
- The average minutes of PA per week did not change for the comparator group from baseline (*M* = 103.8; *SD* = 159.5) to 12-months (*M* = 121.5; *SD* = 167.7).
- The change in average minutes of PA per week was significantly greater for the intervention group (*p* = .01; *d* = 0.35).

Physical Fitness (6MWT)

- There was a significant improvement in 6MWT distance at 12-months for participants in the intervention group from an average distance of 1684 feet at baseline to an average of 1836 feet at 12-months (*p*<.001; *d* = 0.42).
- The 6MWT distance of the comparator group did not improve at 12-months.
- The change in 6MWT distance at 12-months was significantly greater for the intervention group (*p*<.001; *d* = 0.56).

Physical Functioning (SF-36)

- There was a significant improvement in self-rated physical function for the intervention group from baseline (*M* = 63.2; *SD* = 25.3) to 12-months (*M* = 68.6; *SD* = 26.4) (p<.10; *d* = 0.21).
- The comparator group experienced a non-significant decline in self-rated physical function at 12-months.
- There was a non-significant difference between groups on change in self-rated physical function at 12-months (*p* = 0.10; *d* = 0.29).

Mental Health (SF-36)

- There was a significant improvement in self-rated mental health for the intervention group from baseline (*M* = 38.9; *SD* = 12.0) to 12-months (*M* = 41.2; *SD* = 12.9) (*p*<.10; *d* = 0.19).
- There was no change in self-rated mental health reported by the comparator group at 12-months.
- There was a non-significant group difference on change in self-rated mental health at 12-months (*p* = 0.15; *d* = 0.31).

Hall et al. (2016)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
3	Allocation concealment at time of consent	0
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	1
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Richardson et al. (2016)(13)	USA	255 overweight / obese, sedentary veterans with cardiovascular risk factors. Age: *M* = 56.3 years; *SD* = 10.0 years. Sex: 100% male. BMI: *M* = 36.3 kg/m^2; *SD* = 5.3 kg/m^2. 43% had diabetes. 30% had CAD. 58% had depression or anxiety.	Change in physical activity at 6-months. ○ Accelerometer.	N/A	12 (Good)
Study aim	To determine whether a 6-month Internet-based walking program using Web-enhanced pedometers results in more weight loss and grater PA than walking programs based on time or simple pedometer step count goals in adults with or at risk for CVD.				
Intervention strategies					
Exercise-Specific Strategies (All intervention groups) *Intervention group 1* (*n* = 85)*:* Time-based walking goals. ○ Participants set progressive time-based walking goals. ○ During nutritional counselling sessions, participants reviewed their walking logs and set new walking goals. *Intervention group 2 (n* = 86)*:* Simple pedometer-based program with manual step count logging. ○ Participants given a pedometer ○ During nutritional counselling sessions, participants reviewed their step logs and used this information to set new progressive step count goals. *Intervention group 3* (*n* = 84): Internet-enhanced pedometer program with automated step count logging and feedback. ○ Participants were given a pedometer and could upload step data to website. ○ Website enabled participants to set individualised step goals, provided motivational messages, produced individualised feedback reports on goal progress, and hosted an online community for social support. ○ During nutritional counselling sessions, participants reviewed their step count data and used this information to set new progressive step count goals.				
Control group	No.				

Key findings
Physical Activity (Accelerometer) ○ The time-based walking goals group were the only group to see a modest but statistically significant increase in average daily minutes of moderate-to-vigorous PA from baseline to 6 months (M_{change} = 6.9 mins; 95% CI: 2.6 – 11.1; p<.001). The simple pedometer group increased their average daily minutes of PA by 2.7 minutes (95% CI: -1.6 – 6.9) at 6-months, and the internet-enhanced pedometer group enhanced their average daily minutes of PA by 4.1 minutes (95% CI: -0.1 – 8.4) at 6-months. ○ There was no significant difference between change in moderate-to-vigorous PA at 6-months for the internet-enhanced pedometer group when compared to the time-based walking goals group (p = .23) and the simple pedometer group (p = .52). ○ Participants in the time-based goals group tended to have higher levels of moderate-to-vigorous PA at 6-months that those in the simple pedometer group (p = .07).

Richardson et al. (2016)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	0
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	1
7	Objective measure of physical activity used	1
8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1

10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Goode et al. (2018)(14)	USA	60 older, sedentary veterans with chronic low back pain. Age: *M* = 70.3 years; *SD* = 4.9 years. Sex: 93% male.	Change in physical functioning at 12-weeks. ○ Timed Up & Go (TUG) test. ○ PROMIS Health Assessment Questionnaire.	N/A	10 (Good)
Study aim	To evaluate the effectiveness of PA only and PA plus CBT for pain among older adult veterans with chronic low back pain.				
Intervention strategies					
Intervention group 1 (*n* = 20): PA. *Intervention group 2* (*n* = 20) PA + CBT for pain. *Exercise Specific Strategies (PA Component)* ○ Received written instructions, pictures of exercises and an exercise video. ○ Physical therapist provided personalised exercise recommendations for home-based exercise program, guided by baseline assessments. ○ Received follow-up telephone calls from exercise counsellor to foster PA participation. Used MI techniques, reviewed PA progress, set action plans for achieving PA goals and addressed barriers for PA.					
Control group	Wait-list control (*n* = 20).				
Key findings					
Physical Functioning (TUG) ○ At 12-weeks, estimated mean TUG scores for the PA group (-2.94; 95% CI = -6.94 - 0.35) and PA + CBT group (-3.26; 95% CI = -6.69 – 0.18) were improved compared with those in the wait-list control group, with the point estimates and CIs exceeding clinically relevant improvements. ○ Effect sizes were in the small to medium range for both the PA group (*d* = -0.28) and the PA + CBT group (*d* = -0.31). *Physical Functioning (PROMIS)*					

- At 12-weeks, estimated mean PROMIS scores for the PA group (-6.11; 95% CI = -12.85 – 0.64) and the PA + CBT group (-4.10; 95% CI = -6.85 - -1.34) were improved compared to those in the wait-list control group.
- The effect size for the PA group was medium (*d* = -0.64) and for the PA + CBT group it was in the small to medium range (*d* = -0.43).
- When the PA group was compared with the PA + CBT group, the difference in treatment effect favoured the PA group (*d* = -0.23).

Goode et al. (2018)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	0
4	Groups similar at baseline	0
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	0
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	1
8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Self-Management Only

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Krein et al. (2013)[7] (15)	USA	229 sedentary veterans with non-specific chronic back pain. Age: *M* = 51.6 years; *SD* = 12.7 years. Sex: 87.5% male. BMI: *M* = 31.1 kg/m^2; *SD* = 5.6 kg/m^2.	Physical activity change at 6- and 12-months. ○ Pedometer.	N/A.	14 (Good)
Study aim	To determine whether a pedometer-based, Internet-mediated intervention can reduce chronic back pain-related disability and enhance PA.				
Intervention strategies					
Intervention group (n = 111): Stepping Up to Health program, a pedometer-based, Internet-mediated intervention to promote walking as a form of exercise. *Exercise-Specific Strategies* ○ Received an uploading pedometer. ○ Individualised graduated step count goals, emailed to participants weekly. ○ Feedback on progress towards meeting step count goals, provided through website. ○ Targeted educational and motivational messages provided through website. ○ Social support provided through an e-community on website.					
Control group	Usual care *(n = 118)*.				
Key findings					
Physical Activity (Pedometer) ○ Average daily step count increased from baseline (*M* = 4492.9; *SD* = 2749.9) to 6-months (*M* = 5370.0; *SD* = 3180.8) for the intervention group. At 12-months, the average daily step count dropped to 4681.8 (*SD* = 3000.6) for the intervention group. ○ For the comparator group, average daily step count increased slightly from baseline (*M* = 4321.9; *SD* = 2285.4) to 6-months (*M* = 4682.5; *SD* = 2925.0) and 12-months (*M* = 4758.1; *SD* = 2991.1). ○ There was no difference between groups at 6-months (*p* = .12) or 12-months (*p* = .75) on average daily step count.					

[7] Krein et al. (2013) uses the same dataset as Krein et al. (2016).

Krein et al. (2013)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	1
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	1
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

<table>
<tr><th>Author (year)</th><th>Location</th><th>Sample characteristics</th><th>Outcomes and measures</th><th>Other variables of interest</th><th>Quality score</th></tr>
<tr><td>Moy et al. (2015)[8] (16)</td><td>USA</td><td>239 veterans aged 40 years and older with COPD, emphysema or chronic bronchitis.
Age: M = 66.8 years; SD = 8.8 years.
Sex: 93.7% male.</td><td>Change in physical activity at 4-months.
o Pedometer.</td><td>N/A.</td><td>12 (Good)</td></tr>
<tr><td>Study aim</td><td colspan="5">To test the efficacy of an Internet-mediated, pedometer-based exercise intervention on health-related quality of life and PA in veterans with COPD.</td></tr>
<tr><td colspan="6">Intervention strategies</td></tr>
<tr><td colspan="6">Intervention group (n = 155): Taking Healthy Steps (THS), a 12-month Internet-mediated, pedometer-based exercise intervention that was designed to increase PA in patients with COPD.
Exercise- Specific Strategies
o Set weekly step-count goals that were fixed or progressive.
o Received access to the website which included: iterative step-count feedback allowing self-monitoring and individualised weekly goal setting.
o Given a pedometer.
Generic Strategies
o The website posted educational and motivational content to enhance COPD disease self-management and self-efficacy (including information about PA).
o Website hosted an online community forum to provide social support.</td></tr>
<tr><td>Control group</td><td colspan="5">Wait-list control (n = 84).</td></tr>
<tr><td colspan="6">Key findings</td></tr>
<tr><td colspan="6">Physical Activity (Pedometer)
o Compared to control subjects, intervention participants walked 779 more steps per day at 4-months, adjusting for baseline daily step count, dyspnea score and urban vs. rural residence (p<.01).
o Intervention group participants increased their mean daily step count by 447 steps at 4-months (p<.01), an increase of 13% from baseline.
o Control group participants had a non-significant decrease of 346 daily steps at 4-months (p = .15).</td></tr>
</table>

[8] Moy et al. (2015) uses the same dataset as Moy et al. (2016).

Moy et al. (2015)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
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11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Krein et al. (2016)[9] (17)	USA	221 sedentary veterans with non-specific chronic back pain. Age: *M* = 51.5 years; *SD* = 12.3 years. Sex: 87.5% male. BMI: *M* = 31.1 kg/m^2; *SD* = 5.6 kg/m^2. 43.2% opioid users.	Physical activity change at 6- and 12-months. ○ Pedometer.	N/A.	10 (Good)
Study aim	To assess whether veterans with chronic back pain, and particularly those who report opioid use, are willing to engage in PA by examining the effect of a walking intervention on objectively measured step counts.				
Intervention strategies					
Intervention group (n = 108): Stepping Up to Health program, a pedometer-based, Internet-mediated intervention to promote walking as a form of exercise. *Exercise-Specific Strategies* ○ Received an uploading pedometer. ○ Individualised graduated step count goals, emailed to participants weekly. ○ Feedback on progress towards meeting step count goals, provided through website. ○ Targeted educational and motivational messages provided through website. ○ Social support provided through an e-community on website.					
Control group	Usual care *(n* = 113).				
Key findings					

[9] Krein et al. (2016) uses the same dataset as Krein et al. (2013).

Physical Activity (Pedometer)

- Average daily step counts were significantly lower for opioid users (*n* = 99) compared with non-users *(n* = 122) at baseline (4005.4 vs 4811.3, *p* = .02).
- Average daily step counts remained lower at 6-months (4823.0 vs. 5252.2, *p* = .42) and 12-months (4599.3 vs 4811.1, *p* = .59) for those participants who reported using opioid medications at baseline compared to those who did not.
- After taking into account study group, changes in average daily step counts were substantially greater at 6- and 12-months among those who reported opioid use at baseline and were assigned to the intervention. At 6-months, step counts for opioid users increased by 1,478.9 steps from baseline, compared with a decrease of 153.5 steps in those assigned to comparator group (*p* = .03).
- At 12-months, average step count among baseline opioid users in the intervention group (*n* = 44) were 1,087.4 steps higher than at baseline. For opioid users in the comparator group (*n* = 55), they reduced their step count by 218 steps at 12-months compared to baseline.
- In the non-opioid group, both intervention (*n* = 64) and comparator groups (*n* = 58) had relatively modest increases in their step counts at 6-months (an increase of 400.2 steps in intervention group and 91.7 steps in comparator group), and there was no difference between groups on change in step count (*p* = .68).
- Similarly, at 12-months there was no difference between groups on change in step count among non-opioid users (*p* = .31), with participants in the intervention group reducing their average step count by 359 steps and the comparator group increasing their step count by 154.3 steps.

Krein et al. (2016)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
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11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Moy et al. (2016)[10] (18)	USA	238 veterans aged 40 years and older with COPD, emphysema or chronic bronchitis. Age: *M* = 66.8 years; *SD* = 8.8 years. Sex: 93.7% male.	Change in physical activity at 12-months. ○ Pedometer.	N/A.	12 (Good)
Study aim	To assess the efficacy of an Internet-mediated, pedometer-based exercise intervention on health-related quality of life and walking behaviour change at 12-months, and assess long-term engagement with the PA intervention.				
Intervention strategies					
Intervention group (*n* = 154): Taking Healthy Steps (THS), a 12-month Internet-mediated, pedometer-based exercise intervention that was designed to increase PA in patients with COPD. *Exercise- Specific Strategies* ○ Set weekly step-count goals that were fixed or progressive. ○ Received access to the website which included: iterative step-count feedback allowing self-monitoring and individualised weekly goal setting. ○ Given a pedometer. *Generic Strategies* ○ The website posted educational and motivational content to enhance COPD disease self-management and self-efficacy (including information about PA). ○ Website hosted an online community forum to provide social support.					

[10] Moy et al. (2016) uses the same dataset as Moy et al. (2015).

Control group	Wait-list control (*n* = 84).

Key findings

Physical Activity (Pedometer)

- There was no significant difference between groups in daily step count at 12-months (p = .73).
- There was no significant change in daily step count for the intervention participants (p = .14) or in the control group (p = .52) at 12-months, compared to baseline. Intervention participants increased their daily step count by 270 steps at 12-months, and control participants increased their daily step count by 163 steps.
- Examination of daily step count by month of intervention showed that differences in daily step counts in the intervention group compared to the control group were maximal and statistically significant at 4-months, but approached 0 in months 8 – 12.
- Within the intervention group, although daily step counts peaked at 2-months and then declined over the course of the study, daily step counts continued to be higher than baseline values in all months of the study.

Moy et al. (2016)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
3	Allocation concealment at time of consent	1
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Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Wan et al. (2017)[11] (19)	USA	109 veterans aged 40 years and older with COPD, emphysema or chronic bronchitis and a history of smoking. Age: *M* = 68.6 years; *SD* = 8.3 years. Sex: 98.2% male. BMI: *M* = 29.3 kg/m^2; *SD* = 5.6 kg/m^2. 57.8% had hypertension. 37.6% had depression. 35.8% had arthritis. 25.6% had diabetes. 21.1% had CAD.	Physical activity change at 13-weeks. ○ Pedometer. ○ Adherence. Physical fitness change at 3-months. ○ 6-minute walk test (6MWT).	Change in mental health at 3-months. ○ Beck Depression Inventory-II. Change in social support at 3-months. ○ Medical Outcome Study Social Support survey.	15 (Good)
Study aim	To assess the effects of combining a pedometer plus web-based intervention on daily step count and physiological and psychosocial variables when compared to pedometer alone.				
Intervention strategies					
Intervention group (n = 57): Every Step Counts (ESC), an Internet-mediated, pedometer-based exercise intervention for patients with COPD. Based in Social Cognitive Theory. *Exercise-Specific Strategies* ○ Given pedometer.					

[11] Wan et al. (2017) uses the same dataset as Robinson et al. (2019).

- Access to website with individualised step-count goals each week and individualised, iterative feedback on step-count goal progress.

Generic Strategies

- Website provided educational content to enhance motivation, self-efficacy, COPD disease knowledge and self-management.
- Website hosted an online community to foster social support.
- Motivational messages posted on website specific to COPD.

Comparator group (n = 52).

Exercise-Specific Strategies

- Given pedometer and educational materials about exercise.

Control group	No.

Key findings

Physical Activity (Pedometer)

- At week 13, participants in the intervention group had an average change from baseline that was 804 steps per day greater than the change observed in the comparator group (p = .02).
- Participants in the intervention group showed a significant increase in daily step from baseline (M = 3148.6; SD = 2469.0) starting in week 3 (M_{change} = 523.1; SD = 232.3; p = .02), which was sustained until week 13 (M_{change} = 581.3; SD = 240.4; p = .02).
- Subjects in the comparator group had daily step counts that did not differ significantly from baseline for the duration of the study.
- There were no significant differences between groups in absolute daily steps at 3-months. Subjects in the intervention group had an average absolute daily step count of 3589 (± 2423) at 3-months, while subjects in the comparison group averaged 3664 (±2507) steps per day (p = .95).

Physical Activity (Adherence)

- Compliance with pedometer use (a surrogate for exercise adherence) was high, with an overall percent of pedometer wear days of 86% for the cohort over the period of the study (87% in the comparator group and 85.8% in the intervention group).
- There was a decrease in percent of wear days by month 3, but there were no differences between groups.

Physical Fitness (6MWT)

- There was no significant between-group differences with respect to change in 6MWT distance (p = .72).
- There were also no significant within-group differences in 6MWT distance.

Mental Health (Beck Depression Inventory)

- There was no significant between-group differences on change in depression scores (p = .71).
- There were also no significant within-group differences in depression scores.

Social Support (Medical Outcome Study Social Support)

- There was no significant between-group differences on change in social support scores (p = .17).
- There were also no significant within-group differences in social support scores.

Wan et al. (2017)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
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11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Robinson et al. (2019)[12] (20)	USA	112 veterans aged 40 years and older with COPD, emphysema or chronic bronchitis and a history of smoking. Age: *M* = 68.8 years; *SD* = 8.4 years. Sex: majority male.	Physical activity change at 13-weeks. ○ Pedometer. Physical fitness change at 3-months. ○ 6-minute walk test (6MWT). Physical functioning change at 3-months. ○ Veterans RAND 36-Item Health Survey (VR-36) – Physical Component Score (PCS).	N/A	6 (Fair)
Study aim	To examine the influence of an internet-delivered intervention on the relationship between exercise self-efficacy and changes in PA, health and exercise capacity in COPD.				
Intervention strategies					
Intervention group (n = 59): Every Step Counts (ESC), an Internet-mediated, pedometer-based exercise intervention for patients with COPD. Based in Social Cognitive Theory. *Exercise-Specific Strategies* ○ Given pedometer. ○ Access to website with individualised step-count goals each week and individualised feedback on step-count goal progress. *Generic Strategies* ○ Website provided educational content to enhance motivation, self-efficacy, COPD disease knowledge and self-management. ○ Website hosted an online community to foster social support. ○ Motivational messages posted on website specific to COPD. *Comparator group (n* = 53). *Exercise- Specific Strategies* ○ Given pedometer and educational materials about exercise.					

[12] Robinson et al. (2019) uses the same dataset as Wan et al. (2017).

Control group	No.

Key findings

Physical Activity (Pedometer)

- The intervention group increased their steps significantly more (440 steps ± 1820 steps) compared to the comparison group (- 66 steps ± 2088 steps) at 13-weeks (β = .83, *p* <.01).
- The relationship between baseline exercise self-efficacy and change in daily step count was not significant in the intervention group (β = -4.84, *p* = .65).
- In the comparison group, there was a significant positive association between higher baseline exercise self-efficacy and greater change in daily step count (β = 36.11, *p* <.01).

Physical Fitness (6MWT)

- There was no significant difference between the intervention group and comparison group for change in 6MWT test at 3-months (β = .46, *p* = .10). Performance on the 6MWT was relatively stable for both the intervention group (M_{change} = -0.63 meters) and comparison group (M_{change} = 1.02 meters).
- There was a significant association between higher baseline refusal self-efficacy and greater changes in performance on 6MWT for the comparison group (β = .96, *p* <.01), but not for the intervention group (*p* = .46).

Physical Functioning (VR-36 PCS)

- The intervention group showed significantly greater improvement in PCS (1.40) compared to the comparison group (0.01) (β = .76, *p* =.01)
- There was a significant relationship between higher baseline self-efficacy and greater change in PCS in the comparison group (β = .13, *p* =.01) but not for the intervention group (*p* = .60).

Robinson et al. (2019)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
3	Allocation concealment at time of consent	0
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	0
6a	Physical activity intervention parameters reported	0

6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	1
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8b	Physical activity data reported during intervention period	0
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
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11	Point estimates and measures of variability reported for all outcome measures	0

Generic Behavioural Programs

'Stepped-Down' Interventions

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Cohen et al. (2011)(21)	USA	99 veterans with Type 2 diabetes, high blood pressure and high cholesterol. Age: *M* = 68.5 years; *SD* = 10.1 years. Sex: 98% male. 47.5% had coronary heart disease.	Physical activity change at 6-months. ○ Summary of Diabetes Self-Care Activities questionnaire.	N/A	8 (Fair)
Study aim	To assess whether VA MEDIC-E, a pharmacist-led shared medical appointments program, could improve attainment of target goals for hypertension, hyperglycaemia, hyperlipidaemia, diabetes self-care behaviour (including exercise) and tobacco use in patients with Type 2 diabetes when compared to standard primary care after 6-months of intervention.				
Intervention strategies					

Intervention group (n = 50): The VA MEDIC-E intervention consisted of 4 weekly group sessions of diabetes-specific healthy lifestyle education and health behaviour intervention, followed by 5 monthly booster group sessions. *Exercise- Specific Strategies* ○ Participants set goals to increase daily exercise with self-monitoring through the use of pedometer and step function. ○ Exercise prescriptions were given to each patient, reviewed and adjusted. *Generic Strategies* ○ Education about diabetes-specific health behaviours (including exercise). ○ Sources of social support encouraged to participate in sessions. ○ Behaviour change was targeted through enhancement of self-efficacy, peer support through the group, and monitoring and reinforcement to target each participant's individual risk factor control. ○ Open discussions about risk factor control, obstacles and solutions. ○ Self-monitoring of health behaviours.	
Control group	Standard primary care (*n* = 49).
Key findings	
Physical Activity (Summary of Diabetes Self-Care Activities) ○ There was a significance increase in the numbers of days per week that patients complied with exercise recommendations from baseline (*M* = 2.98; *SD* = 2.01) to 6-months (M_{Change} = 0.83) for the intervention group (95% CI = 0.21 to 1.44). ○ The change in compliance to exercise recommendations for the control group from baseline (*M* = 2.34; *SD* = 2.30) to 6-months (M_{Change} = 0.44) was not statistically significant (95% CI = -0.32 to 1.21).	

Cohen et al. (2011)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
3	Allocation concealment at time of consent	0
4	Groups similar at baseline	0
5	Blinding of assessor (for at least one key outcome)	0

6a	Physical activity intervention parameters reported	1
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Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Damush et al. (2011)(22)	USA	63 veterans who were hospitalised with a primary diagnosis of ischemic stroke. Age: *M* = 65.7 years; *SD* = 10.4 years; range = 64.9 – 86.9 years. Sex: 98.5% male.	Physical activity change at 3-months and 6-months. ○ Self-Management Behaviour Frequency questionnaire.	N/A	14 (Good)
Study aim	To pilot test a 12-week, stroke-specific, self-management intervention, determine its feasibility and estimate its effects on functioning, quality of life and stroke self-management behaviours (including exercise).				
Intervention strategies					

Intervention group (*n* = 30): The stroke self-management program, based in Social Learning Theory, targeted outcomes of stroke self-management and self-efficacy through 6 biweekly telephone sessions delivered over 12-weeks. *Exercise- Specific Strategies* ○ Education about exercise. *Generic Strategies* ○ Each session targeted building self-efficacy using goal setting and behavioural contracting. ○ Received individualized feedback about their progress toward their selected goal(s) and were encouraged to continue to work on the chosen behaviour or to add a new behaviour goal.	
Control group	Attention placebo control (*n* = 33).
Key findings	
Physical Activity (Self-Management Behaviour Frequency) ○ The intervention group reported a mean increase in minutes of PA performed each week of 47.6 minutes from baseline (*M* = 78.5) to 3-months (*M* = 126.1). ○ The control group maintained their PA levels from baseline to 3-months, and reported a mean decrease in minutes of PA performed each week of 3.0 minutes from baseline (*M* = 107.4) to 3-months (*M* = 104.4). ○ There was no significant difference between groups on change in PA at 3-months (*p* = .13). ○ The effect of the stroke self-management intervention on PA was sustained at 6-months, with the intervention group increasing their PA by 24.4 minutes/week, and the control group increasing their PA by 4-minutes per week, although the difference between groups was non-significant (*p*<.50).	

Damush et al. (2011)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
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5	Blinding of assessor (for at least one key outcome)	1
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Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Goldberg et al. (2013)(23)	USA	109 overweight or obese veterans with severe mental illness. Age: *M* = 52 years; *SD* = 9.1 years. Sex: 81% male. 95% had co-occurring medical condition.	Physical activity change at 6-months. ○ MOVE!23 questionnaire.	Mental health change at 6-months. ○ 12-item Short Form (SF-12) - Mental Health Composite.	9 (Fair)
Study aim	To evaluate the effectiveness of the MOVE! weight management program for veterans with serious mental illness on weight loss, metabolic syndrome criteria, PA and dietary management.				
Intervention strategies					
Intervention group (*n* = 53): The 6-month MOVE! weight management program consisting of individual and group sessions focusing on behaviourally-based dietary and PA self-management support. *Generic Strategies* ○ Psychoeducation focusing on diet and PA. ○ Incorporated behavioural and motivational weight self-management strategies, including weekly goal setting, regular weigh-ins and instruction in problem-solving.					

Comparator group (*n* = 56): Enhanced usual care. *Generic Strategies* ○ Offered brochures and handouts about diet and exercise.	
Control group	No.
Key findings	
Physical Activity (MOVE!23) ○ There were no significant differences between the intervention group and comparator group on changes in days per week of moderate PA (*p* = .40) or vigorous PA (*p* = .49) from baseline to 6-months follow-up. ○ The intervention group increased their days per week of moderate intensity PA from 2.7 (± 2.2) at baseline to 3.6 (± 2.7) at 6-month follow-up. ○ The comparator group increased their days per week of moderate intensity PA from 3.3 (± 2.3) at baseline to 3.9 (± 2.7) at 6-months follow-up. *Mental Health (SF-12)* ○ There was no significant difference between the intervention group and comparator group on changes in mental health at 6-months (*p* = .13).	

Goldberg et al. (2013)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	0
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	0
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Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Voils et al. (2013)[13] (24)	USA	255 married veterans with LDL-C > 76mg/dL Age: *M* = 61.3 years; *SD* = 12.3 years. Sex: 94.9% male.	Physical activity change at 11-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	Healthcare services utilisation.	9 (Fair)
Study aim	To evaluate the effectiveness of a telephone-delivered, spouse-assisted lifestyle intervention to reduce patient LDL-C and increase health behaviours (including PA).				
Intervention and strategies					
Intervention group (n = 127): Couples Partnering for Lipid Enhancing Strategies (CouPLES), a telephone-delivered, spouse-assisted lifestyle intervention to reduce patient LDL-C. Based in Social Cognitive Theory. Program involved 9 monthly goal-setting telephone calls to patients and support planning to their spouses. *Generic Strategies* ○ Patients and spouses received information about hypercholesterolemia and self-management principles (including PA). ○ Spouses taught strategies to support patient goal achievement, including provision of support and praise, offering help and rewarding desired health behaviours. ○ Patients created behavioural goals and action plans, most often in relation to diet or PA. ○ Patients regularly reviewed goal progress.				

[13] Voils et al. (2013) uses the same dataset as King et al. (2014).

○ Spouses generated a behaviour plan to support patient goal achievement.	
Control group	Usual care *(n* = 128).
Key findings	
Physical Activity (CHAMPS) ○ The estimated rate of frequency and duration of PA was 20% higher (*p* = .06) and 10% higher (*p* =.37), respectively, for the intervention group than the control group at 11-months. *Healthcare Services Utilisation* ○ There was a median number of 2 primary care visits over 11-months in both groups (*p* =.08). ○ There was no difference in proportion of emergency or urgent clinical visits over 11-months between groups (18% vs 20%; *p* = .66).	

Voils et al. (2013)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	0
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	0
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	0

10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
King et al. (2014)[14] (25)	USA	251 spouses of veterans with elevated low-density lipoprotein cholesterol. Age: *M* = 58.8 years; *SD* = 12 years. Sex: 94% female.	Physical activity change at 6- and 11-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire.	N/A.	10 (Good)
Study aim	To evaluate spouse health behaviour outcomes (including PA) from a randomised controlled trial of a spouse-assisted lifestyle intervention for veterans.				
Intervention strategies					
Intervention group (n = 124): Couples Partnering for Lipid Enhancing Strategies (CouPLES), a spouse-assisted lifestyle intervention to reduce low-density lipoprotein cholesterol and improve health behaviours. Program involved 9 monthly goal-setting telephone calls to patients and support planning to their spouses. *Generic Strategies* ○ Patients and spouses received information about hypercholesterolemia and self-management principles (including PA). ○ Spouses taught strategies to support patient goal achievement, including provision of support and praise, offering help and rewarding desired health behaviours. ○ Patients created behavioural goals and action plans, most often in relation to diet or PA. ○ Patients regularly reviewed goal progress. ○ Spouses generated a plan to support patient goal achievement.				

[14] King et al. (2014) uses the same dataset as Voils et al. (2013).

Control group	Usual care (*n* = 127).
Key findings	
Physical Activity (CHAMPS) ○ At 11-months, there were no overall time effects for spouse self-reported moderate intensity PA (Frequency: *p* = .56; Duration: *p* = .41). The estimated baseline rate of 6.5 times a week of moderate intensity PA within an estimated duration of 4.6 hours per week was similar across all time points and in both groups. ○ The estimated rate of frequency and duration of moderate intensity PA did not differ between the intervention and control group at 6- or 11-months.	

King et al. (2014)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	0
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	0
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	1
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1

11	Point estimates and measures of variability reported for all outcome measures	0

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Allen et al. (2016a)(26)	USA	300 veterans with symptomatic hip and/or knee osteoarthritis. Age: *M* = 61.1 years; *SD* = 9.2 years. Sex: 90.7% male. BMI: *M* = 33.8 kg/m^2; *SD* = 5.8 kg/m^2.	Change in physical activity at 12-months. ○ Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire. Change in physical functioning at 12-months. ○ Short Physical Performance Battery (SPPB). ○ Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).	Change in mental health at 12-months. ○ Patient Health Questionnaire-8 (PHQ-8).	12 (Good)
Study aim	To examine the effectiveness of an intervention for self-managing osteoarthritis in primary care.				
Intervention strategies					
Intervention group (n = 151): A 12-month osteoarthritis self-management intervention focusing on PA, weight management and CBT pain management strategies. *Exercise- Specific Strategies* ○ Given an exercise video for patients with osteoarthritis. *Generic Strategies* ○ Received regular telephone calls which comprised of MI strategies, goal-setting and action-planning. ○ Given educational materials relating to intervention topics and a CD of relaxation exercises.					
Control group	Usual care (*n* = 149).				
Key findings					

Physical Activity (CHAMPS)

- The intervention group had a significantly greater improvement in the frequency (p <.01) and duration (p<.01) of all PA at 12-months compared to the control group.
- Participants allocated to intervention group increased their weekly frequency of all PA by 3.0 points at 12-months, while control group participants reduced their weekly frequency of all PA by 0.3 points.
- Participants allocated to the intervention group increased their weekly duration of all PA by 3.9 points at 12-months, while control group participants increased their duration of all PA by 0.2 points.
- The intervention group had a significantly greater improvement in the frequency (p =.04) and duration (p = .02) of moderate-to-intense PA at 12-months compared to the control group.

Physical Functioning (SPPB)

- At 12-months, there was no significant difference between groups on objective physical function measures (p = .38).

Physical Functioning (WOMAC)

- At 12-months, the mean WOMAC physical function score for intervention group participants was 3.3 points lower (indicating an improvement in physical functioning) than control group participants (p <.01).

Mental Health (PHQ-8)

- There was no significant difference between groups on depressive symptom scores at 12-months (p = .16).

Allen et al. (2016a)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	0
6b	Physical activity intervention strategies described	1

6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	1
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	0
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Erickson et al. (2017)(27)	USA	121 overweight veterans aged 18 to 70 years with severe mental illness and requiring ongoing antipsychotic therapy. Age: *M* = 51.2 years; *SD* = 9.2 years. Sex: 80% male.	Physical activity change at 8-, 26-, 38-, and 52-weeks. ○ Lifestyle Habits Questionnaire.	Mental health change at 8-, 26-, and 52-weeks. ○ Brief Psychiatric Rating Scale. ○ Clinical Global Inventory. ○ Hamilton Depression Scale. ○ Beck Anxiety Scale.	9 (Fair)
Study aim	To investigate behavioural weight management interventions for veterans with mental illness.				
Intervention strategies					
Intervention group (*n* = 62)*:* The Lifestyle Balance intervention consisted of 8-weeks of educational classes and nutrition counselling led by dietitians, followed by 10-months of monthly booster sessions. *Exercise-Specific Strategies* ○ Dietitians promoted walking groups. *Generic Strategies* ○ Educational group classes covered health topics (including PA).					

○ Individualised nutrition counselling addressed each participant's nutrition-related concerns and helped them set and accomplish short- and long-term goals. ○ Received a comprehensive nutrition assessment at the first session and dietitians reviewed their medical records, PA, stage of change and cognitive ability. A discussion followed about specific food and PA goals to initiate behaviour change. ○ Dietitians used CBT techniques, MI and accountability tools, including food and PA journals. Dietitians reviewed these journals during appointments. ○ Dietitians encouraged behaviour change using positive affirmation and praise. ○ To enhance motivation and adherence to the program, participants received rewards for meeting goals.	
Control group	Usual care (*n* = 42).
Key findings	
Physical Activity (Lifestyle Habits Questionnaire) ○ There was no significant change over time in the number of hours participants exercised per week (*p* = .20). ○ There was no significant difference in the range of change between groups (*p* =.41). ○ The intervention group reported an increase of an estimated 33 minutes of exercise per week, while the control group increased their exercise by an estimated 9 minutes per week. *Mental Health (all measures)* ○ Clinical scores on validated scales of depression, anxiety and psychosis decreased over time for both groups (*p*s<.001), but there was no difference between groups.	

Erickson et al. (2017)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	0
4	Groups similar at baseline	0
5	Blinding of assessor (for at least one key outcome)	1
6a	Physical activity intervention parameters reported	0
6b	Physical activity intervention strategies described	1

6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	0
8b	Physical activity data reported during intervention period	1
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

Author (year)	Location	Sample characteristics	Outcomes and measures	Other variables of interest	Quality score
Viglione et al. (2019)(28)	USA	45 overweight / obese veterans aged 18 to 69 years. Age: *M* = 54.5 years; *SD* = 10.5 years. Sex: 67.5% male. BMI: *M* = 32.0 kg/m^2; *SD* = 4.5 kg/m^2. 28% had hyperlipidemia. 39.5% had hypertension.	Change in physical activity at 3, 6- and 12-months. ○ Physical Activity Questionnaire.	N/A	10 (Good)
Study aim	To test the impact of a technology-assisted, health coaching intervention on weight, diet and PA when compared to enhanced usual care.				
Intervention strategies					

Intervention group (n = 22): Goals for Eating and Moving (GEM), a 12-month technology-assisted, telephone health coaching intervention focused on improving weight management. *Exercise-Specific Strategies* ○ Self-monitoring of PA using a pedometer and PA diary. ○ Health coaches used motivational interviewing at baseline visit to explore participants' motivation and barriers for increasing PA. ○ Received coaching calls with reminders to use pedometers. *Generic Strategies* ○ Tablet tool generated tailored educational materials, a personalised care plan for patients and an individualised summary report. ○ Given goal worksheets. ○ Primary care providers discussed health behaviour goals and addressed barriers. *Comparator group (n* = 23): Enhanced usual care. *Generic Strategies* ○ Given educational handouts that covered health topics (including exercise). Handouts encouraged participants to set goals and discuss them with primary care providers.
Control group No.
Key findings
Physical Activity (Physical Activity Questionnaire) ○ There was no statistically significant differences in PA changes between the intervention and comparison group.

Viglione et al. (2019)		
TESTEX Criterion		**Score**
1	Eligibility criteria specified	1
2	Randomisation method specified	1
3	Allocation concealment at time of consent	1
4	Groups similar at baseline	1

5	Blinding of assessor (for at least one key outcome)	0
6a	Physical activity intervention parameters reported	0
6b	Physical activity intervention strategies described	1
6c	Behavioural change theory in which intervention strategies are based is identified	0
7	Objective measure of physical activity used	0
8a	Outcome measures assessed in 85% of participants	1
8b	Physical activity data reported during intervention period	0
9	Intention to treat analysis performed	1
10a	Between-group statistical comparisons reported for primary outcome of interest	1
10b	Between-group statistical comparisons reported for at least one secondary outcome of interest	1
11	Point estimates and measures of variability reported for all outcome measures	1

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