**Supplementary Material**

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## Search strategies

### 1. MEDLINE

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### 2. EMBASE

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### 3. EMCARE

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### 4.AMED

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### 5. CINAHL

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Description automatically generated

A table of information

Description automatically generated with medium confidence

A table of information

Description automatically generated with medium confidenceA table with text on it

Description automatically generated

### 6. COCHRANE

ID Search Hits

#1 ("Frail\*"):ti,ab,kw (Word variations have been searched) 2459

#2 ("elder\*"):ti,ab,kw (Word variations have been searched) 95390

#3 ("aged"):ti,ab,kw (Word variations have been searched) 696422

#4 ("older adult"):ti,ab,kw (Word variations have been searched) 13112

#5 ("aging"):ti,ab,kw (Word variations have been searched) 696418

#6 ("ageing"):ti,ab,kw (Word variations have been searched) 696418

#7 ("later life"):ti,ab,kw (Word variations have been searched) 463

#8 ("geriatric"):ti,ab,kw (Word variations have been searched) 8504

#9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 714999

#10 ("multi-morbid\*"):ti,ab,kw (Word variations have been searched) 93

#11 ("multimorbid\*"):ti,ab,kw (Word variations have been searched) 413

#12 ("multiple condition\*"):ti,ab,kw (Word variations have been searched) 56

#13 ("complex condition\*"):ti,ab,kw (Word variations have been searched) 110

#14 ("co-morbid\*"):ti,ab,kw (Word variations have been searched) 4040

#15 ("comorbid\*"):ti,ab,kw (Word variations have been searched) 20743

#16 ("complex need\*"):ti,ab,kw (Word variations have been searched) 92

#17 ("long term condition\*"):ti,ab,kw (Word variations have been searched) 219

#18 ("long-term condition\*"):ti,ab,kw (Word variations have been searched) 219

#19 ("chronic condition\*"):ti,ab,kw (Word variations have been searched) 1920

#20 ("long term health condition\*"):ti,ab,kw (Word variations have been searched) 28

#21 ("long term illness\*"):ti,ab,kw (Word variations have been searched) 55

#22 #10 or #11 or #12 or #13 or #14 or #15 or #16 or 17 or #18 or #19 or #20 or #21 206987

#23 ("exercis\*"):ti,ab,kw (Word variations have been searched) 26

#24 ("physical"):ti,ab,kw (Word variations have been searched) 118018

#25 ("train\*"):ti,ab,kw (Word variations have been searched) 105200

#26 ("rehabilitat\*"):ti,ab,kw (Word variations have been searched) 2

#27 ("activities of daily living"):ti,ab,kw (Word variations have been searched) 10960

#28 #23 or #24 or #25 or #26 or #27 202750

#29 #9 and #22 and #28 17560

#30 #29 in Trials, Clinical Answers 16865

### 7. WEB OF SCIENCE

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## Supplementary Table 2: Two component studies

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **AUTHORS &**  **ACRONYM** | **YEAR &**  **COUNTRY** | **DESIGN &**  **TYPE** | **SAMPLE SIZE**  **(n)** | **MEAN AGE**  **(YEARS)** | **SPECIFIC DISEASE TARGETED** | **COMORBIDITIES**  **(MEAN)** | **COMORBIDITY MEASURE (SCORE & NAME)** | **BASELINE PERCENTAGES OF CONCURRENT CHRONIC CONDITIONS SUGGEST MM** | **ARM NAME** | **INTERVENTION COMPONENT AEROBIC** | **INTERVENTION COMPONENT RESISTENCE** | **INTERVENTION COMPONENT OTHER** | **NON-EXERCISE COMPONENTS** | **BASIS OF PRESCRIPTION** | **TITRATION** | **LOCATION OF INTERVENTION** | **DURATION OF INTERVENTION (DAYS)** | **DELIVERER OF INTERVENTION** | **NAME OF CONTROL OR COMPARISON** | **TYPE OF CONTROL OR COMPARATOR** | **CONTROL EXERCISE COMPONENTS (n)** | **NON-EXERCISE COMPONENTS** | **AUTHORS' CONCLUSIONS** |
| Bourne  et al.27 | 2017 | RCT | 90 | 69.7 | COPD | NS | NS | ✓ | MY-PR | ✓ | ✓ | NA | EDU | RPE | YES | HOME | 42 | PT | NORMAL PR | ACTIVE CONTROL | 3 | EDU | Online PR using the my-PR MHealth platform is non-inferior to usual care. |
| MY-PR | UK | PARALLEL |
| Budui  et al.28 | 2019 | QUASI-EX | 259 | 69.3 | OBESITY | NS | NS | ✓ | REHAB (OLD) | ✓ | ✓ | NA | NUT & PSY | CPET | YES | CENTRE | 21 | MDT | REHAB (YOUNG) | ACTIVE CONTROL | 2 | NUT & PSY | Beneficial clinical and functional outcomes observed following a 3-week multidimensional therapeutic program. |
| No acronym | ITALY | PRE-TEST-POST-TEST |
| Dimori  et al.29 | 2018 | QUASI-EX | 39 | 86.5 | SARCO | NS | 4.7  CIRS | NA | MDT  REHAB | ✓ | ✓ | NA | NUT | NC | NC | HOME | 365 | NC | NUT | ACTIVE CONTROL | 0 | NUT | Sarcopenia could be improved if tailored nutritional and multidisciplinary intervention programs are considered according to the patient’s clinical characteristics. |
| No acronym | ITALY | PRE-TEST-POST-TEST |
| Hassan  et al. 30 | 2016 | QUASI-EX | 40 | 60.3 | COPD | NS | NS | ✓ | PR COMORBID | ✓ | ✓ | NA | EDU | MHR | YES | CENTRE | 56 | NC | PR NOT COMORBID | ACTIVE CONTROL | 2 | EDU | Patients with comorbidities demonstrate better response to exercise training in the context of PR when compared with patients without comorbidities. |
| No acronym | EGYPT | PRE-TEST-POST-TEST |
| Higashimoto et al. 31 | 2016 | QUASI-EX | 70 | 71.8 | COPD | NS | 2.3 CCI | NA | REHAB COMPLETE | ✓ | 🗶 | RESP | NA | NC | NC | CENTRE | 56 | NC | REHAB NON-COMPLETE | ACTIVE CONTROL | 2 | NC | PR is equally effective in elderly and younger patients with COPD, with efficacy influenced by body mass index and anxiety. |
| No acronym | JAPAN | PRE-TEST-POST-TEST |
| Marzolini  et al. 32 | 2016 | QUASI-EX | 53 | 67.5 | TIA | NS | NS | ✓ | REHAB | ✓ | ✓ | NA | EDU | CPET | YES | CENTRE & HOME | 182 | MDT | NO CONTROL | NONE | 0 | NA | Study observed clinically important improvements in parameters of cardiovascular, anthropometric, and psychosocial health with acceptable adherence and completion rates. |
| No acronym | CANADA | PRE-TEST-POST-TEST |
| Allen  et al. 33 | 2018 | RCT | 107 | 76 | REDUCED FUNCTION | NS | NS | ✓ | PRIME + AER & RES | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 84 | PT | AER & RES | ACTIVE CONTROL | 2 | NA | Four weeks of PRIME training compared to initial aerobic training, followed by 8 weeks of recommended aerobic and resistance training results in greater increases in physical fitness and physical function measures. |
| PRIME & Fit for Life trial | USA | PARALLE |
| Chen  et al. 34 | 2016 | RCT | 127 | 79.4 | WHEEL CHAIR USER | 2.1 | NS | NA | WSEB | ✓ | 🗶 | FLEX | NA | NC | NC | CARE HOME | 365 | VOL | USUAL CARE | USUAL CARE | 0 | NA | WSEB exercise program improved the functional fitness, activities of living and sleep quality of nursing home older adults in wheelchairs with multiple morbidities, and the volunteer-led modality followed by the DVD-guided modality was a feasible. |
| WSEB | TAIWAN | CLUSTER |
| Gine-Garriga et al. 35 | 2009 | RCT | 362 | 67.7 | SEDENT | NS | NS | ✓ | PHYSICAL ACTIVITY PROGRAM | ✓ | ✓ | NA | NA | RPE | YES | CENTRE | 91 | ET | USUAL CARE | USUAL CARE | 0 | NA | A 3-month physical activity program linked to community resources is a short duration, effective and sustainable intervention in inactive patients to decrease rates of primary healthcare use and improve self-reported quality of life. |
| PPAF | SPAIN | PARALELL |
| Hellberg,  et al. 36 | 2018 | RCT | 151 | 66 | CKD | NS | NS | ✓ | AEROBIC & STRENGTH | ✓ | ✓ | NA | NA | RPE | YES | HOME | 121 | SELF | AEROBIC & BALANCE | ACTIVE CONTROL | 2 | NA | Two different exercise training programs, consisting of endurance in combination with either strength or balance exercise training, improved or maintained overall endurance, muscular strength, balance and fine motor skills in non-dialysis dependent CKD population, regardless of age and comorbidity. |
| RENEXC-A | SWEDEN | PARALLEL |
| Hoffman et al. 37 | 2014 | QUASI-EX | 7 | 64.6 | CANCER | 5.9 | NS | NA | EXERCISE | ✓ | 🗶 | BAL | SYM | NC | YES | HOME | 42 | NUR | NA | NONE | 0 | NA | This practical, home-based exercise program shows promising efficacy as an adjunct to surgical treatment for NSCLC. |
| No acronym | USA | PRE-TEST-POST-TEST |
| Johansen  et al. 38 | 2012 | QUASI-EX | 302 | 80.5 | REHAB REFERRAL | NS | NS | ✓ | MODEL 1 | 🗶 | ✓ | FCT | NA | NC | YES | HOSPITAL | NC | MDT | MODEL 2 | ACTIVE CONTROL | 2 | OPT | Results suggest rehabilitation of older, multi-morbid and disabled patients in a district inpatient rehab centre improves independency to a higher degree and within a shorter time period, as compared to standard community rehabilitation in short-term beds in nursing homes. |
| No acronym | NORWAY | PRE-TEST-POST-TEST |
| Peiris  et al. 39 | 2018 | QUASI-EX | 58 | 60 | MET SYN | 3.2 | NS | NA | EXERCISE GROUP | ✓ | ✓ | NA | EDU | RPE | YES | HOME | 56 | PT | CASE CONTROL | USUAL CARE | 0 | NA | There is preliminary evidence that participation in a lifestyle intervention program (aimed at improving patient health self-management skills) is associated with fewer emergency department presentations, including potentially avoidable emergency department presentations. |
| TAKE ACTION NOW | AUSTRALIA | PRE-TEST-POST-TEST |
| Sajatovic  et al. 40 | 2017 | RCT | 30 | 70 | PD | NS | 2.6 CCI | NA | EXCEED | ✓ | ✓ | NA | EDU | NC | NC | CENTRE | 84 | NUR | SELF-GUIDED EXERCISE | ACTIVE CONTROL | 0 | NA | A care approach that combines exercise plus chronic disease self-management elements may be associated with reduced depressive symptoms in people with Parkinson’s disease and depression. |
| EXCEED | USA | PARALLEL |
| Zgibor  et al. 41 | 2017 | RCT | 462 | 72.7 | ARTHRITIS & MULTI-MORBIDITY | NS | NS | ✓ | AFEP + 10 KEYS | 🗶 | ✓ | FLEX | BC | NC | NC | CENTRE | 70 | CHW | AFEP  ONLY | ACTIVE CONTROL | 2 | NA | In spite of efforts to promote better function, reduce symptoms, and promote preventive health behaviours via an enhanced program (Arthritis Foundation Exercise Program [AFEP] plus 10 keys); improvements were not significantly different from the control. |
| No acronym | USA | CLUSTER |
| Boxall  et al. 42 | 2005 | RCT | 46 | 76.7 | COPD | NS | NS | ✓ | HOME BASED PR | ✓ | ✓ | NA | EDU | RPE & 6MWT | YES | HOME | 84 | PT | CONTROL | USUAL CARE | 0 | NA | This research has demonstrated that pulmonary rehabilitation can be offered safely and effectively in the home environment, bringing improvements in functional capacity and QOL for housebound COPD patients. |
| No acronym | AUSTRALIA | PARALLEL |
| Morey  et al. 43 | 2003 | RCT | 134 | 71.9 | SEDENT | 3.8 | NS | NA | AEROBIC +/- SPINAL FLEXIBILITY EXERCISE | ✓ | 🗶 | FLEX | NA | CPET | YES | HOME | 182 | NC | AEROBIC ONLY | ACTIVE CONTROL | 1 | NA | The data provide further evidence that moderate exercise is associated with gains in physical functioning that are accompanied by gains in overall quality of life and reduced symptoms. |
| No acronym | USA | PARALLEL |
| Serra-Rexach  et al. 44 | 2011 | RCT | 40 | 92 | OLDEST OLD | NS | NS | ✓ | EXERCISE | ✓ | ✓ | NA | NA | RPE | YES | CENTRE | 56 | PT | USUAL CARE | USUAL CARE | 0 | NA | A relatively short-term exercise intervention with a special emphasis on leg muscle strength training of light to moderate intensity induced significant, specific gains in muscle strength in the oldest old (>90). |
| STRONG | SPAIN | PARALLEL |
| Hetherington et al. 45 | 2018 | RCT | 245 | 78.7 | CARE HOME RESIDENT | 5 | NS | NA | RESIS & BALANCE | 🗶 | ✓ | BAL | NA | NC | YES | CENTRE | 168 | PT | WAIT LIST CONTROL | USUAL CARE | 0 | EDU | A progressive resistance plus balance training program, has been shown to be both efficacious and cost-effective. It represents a good value proposition for organizations wanting to implement an exercise programs to assist older adults experiencing functional decline requiring in-home care services. |
| Muscling Up Against Disability | AUSTRALIA | STEP WEDGE |
| Caminiti  et al. 46 | 2011 | RCT | 21 | 68 | HEART FAILURE | NS | NS | ✓ | HYDRO & AEROBIC | ✓ | ✓ | NA | NA | NC | YES | CENTRE | 168 | MDT | AEROBIC ONLY | ACTIVE CONTROL | 1 | NA | This study demonstrated that hydrotherapy plus exercise therapy is more effective than exercise therapy alone on improving both hemodynamic profile and exercise tolerance of male patients with moderate chronic heart failure. |
| No acronym | ITALY | PARALLEL |
| Chen  et al. 47. | 2015 | RCT | 54 | 66 | CHRONIC ILLNESS | NS | NS | ✓ | AEROBIC & RESIS | ✓ | ✓ | NA | NA | NC | NC | CENTRE | 84 | MDT | SIMPLE HOME-EXERCISE CONTROL | ACTIVE CONTROL | 0 | NA | Regular exercise regimens such as aerobic, resistance, and combination exercise training enhance gait function and postural stability in elderly and chronically ill patients. |
| No acronym | TAIWAN | PARALLEL |
| Erbs  et al. 48 | 2010 | RCT | 37 | 61 | ADVANCED HEART FAILURE | NS | NS | ✓ | EXERCISE TRAINING | ✓ | ✓ | NA | NA | CPET | YES | HOME & CENTRE | 84 | NC | USUAL CARE | USUAL CARE | 0 | NA | Patients with advanced CHF still benefit from a regular aerobic exercise training program. The severity of dyspnoea improved in all patients after exercise training, and VO2max increased by 16% after only 12 weeks of regular training. |
| No acronym | GERMANY | PARALLEL |
| Garcia Diaz  et al. 49 | 2019 | QUASI-EX | 55 | 77.3 | DIABETES | NS | NS | ✓ | AEROBIC & RES | ✓ | ✓ | NA | NA | NC | NC | HOME | 182 | RES | NA | NONE | 0 | NA | Resistance and aerobic training reduces the prevalence of frailty in diabetic patients over 70 years of age. The probability of improving frailty decreases in the presence of coronary disease and increases with adherence to the aerobic exercises. |
| No acronym | SPAIN | PRE-TEST-POST-TEST |
| Gielen  et al. 50 | 2012 | RCT | 30 | 72 | HEART FAILURE | NS | NS | ✓ | TRAINING | ✓ | ✓ | NA | NA | CPET | NC | CENTRE | 28 | NC | NON-HF CONTROL | USUAL CARE | 0 | NA | Four weeks of endurance training were effective in reducing the catabolic TNF- and MuRF-1 expression while increasing IGF-I levels. Myostatin and MAFbx expression were unchanged by training. |
| LEICA | GERMANY | PARALLEL |
| Hegbom  et al. 51 | 2006 | RCT | 30 | 63.6 | AF | NS | NS | ✓ | SHORT-TERM EXERCISE TRAINING | ✓ | ✓ | NA | NA | MHR | NC | CENTRE & HOME | 60 | NC | WAIT LIST CONTROL | USUAL CARE | 0 | NA | This study demonstrates a significant improvement in exercise capacity after a 2-month of training in a selected group of patients with chronic AF. |
| No acronym | NORWAY | PARALLEL |
| Miche  et al. 52 | 2006 | QUASI-EX | 42 | 67.5 | HEART FAILURE & DIABETES | NS | NS | ✓ | CHF & DIABETES | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 28 | NC | CHF & NO-DIABETES | ACTIVE CONTROL | 2 | NA | In this study, endothelial dysfunction could not be positively influenced by physical exercise. |
| No acronym | GERMANY | PRE-TEST-POST-TEST |
| Miche  et al. 53 | 2003 | QUASI-EX | 75 | 65 | HEART FAILURE | NS | NS | ✓ | 4-WEEK TRAINING | ✓ | ✓ | NA | EDU | CPET | YES | CENTRE | 28 | NC | NA | NONE | 0 | NA | Our data provide evidence of the effectiveness of a rehabilitation clinic model for patients with chronic heart failure and should serve as inspiration for the establishing of a team management program which also includes out-patient care. |
| No acronym | GERMANY | PRE-TEST-POST-TEST |
| Miche  et al. 54 | 2008 | QUASI-EX | 285 | 67.2 | HEART FAILURE | NS | NS | ✓ | COMBINED TRAINING WOMEN | ✓ | ✓ | NA | EDU | CPET | YES | CENTRE | 28 | MDT | COMBINED TRAINING - MEN | ACTIVE CONTROL | 2 | EDU | The results of this study confirm the feasibility of a combined endurance and resistance program, especially for women. |
| No acronym | GERMANY | PRE-TEST-POST-TEST |
| Padberg  et al. 55 | 2004 | RCT | 30 | 70 | CHRONIC VENOUS PROBLEMS | NS | NS | ✓ | EXERCISE PROGRAM | ✓ | ✓ | NA | OPT | NC | NC | CENTRE & HOME | 182 | PT | WAIT LIST CONTROL | USUAL CARE | 0 | OPT | Exercise improved calf pump haemodynamics and calf muscle strength. These data support further consideration of structured exercise as additional treatment for management of severe chronic venous problems. |
| No acronym | USA | PARALLEL |
| Thompson  et al. 56 | 1988 | RCT | 35 | 73.3 | MULTI-MORBIDITY | NS | NS | ✓ | EXERCISE GROUP | ✓ | ✓ | NA | NA | MHR | YES | CENTRE | 112 | PT | CONTROL | USUAL CARE | 0 | NA | This study supports the feasibility and safety of exercise programs even for those who are very elderly with health problems and functional limitations. |
| No acronym | USA | PARALLEL |
| Yu  et al. 57 | 2007 | RCT | 153 | 75.4 | HEART FAILURE | 2.7 | NS | NA | EXERCISE | ✓ | ✓ | NA | NA | RPE | YES | CENTRE & HOME | 84 | NC | CONTROL | PSEUDO-ACTIVE CONTROL | 0 | ATT | This study indicates that relaxation therapy and exercise training are acceptable, safe and feasible interventions that have, in general, medium effects in improving the psychological status and symptoms of older patients with heart failure. |
| No acronym | CHINA | PARALLEL |
| Barker  et al. 58 | 2018 | RCT | 17 | 69.3 | REQUIRING REHAB | 4 | NA | NA | MULTI-MORBIDITY REHAB | ✓ | ✓ | NA | EDU | MHR | YES | CENTRE | 56 | MDT | DISEASE-SPECIFIC REHAB | ACTIVE CONTROL | 2 | EDU | It was feasible to conduct multimorbidity rehabilitation programs in people with chronic diseases. |
| No acronym | AUSTRALIA | PARALLEL |
| Narlon  et al. 59 | 2018 | RCT | 127 | 67.4 | SELF-REPORTED COGNITIVE PROBLEM | NS | NS | ✓ | M4 | ✓ | ✓ | NA | OPT | MHR | YES | CENTRE | 168 | MDT | M2 | ACTIVE CONTROL | 3 | NA | Our results suggest that the addition of a mind-motor component to the standardized multiple-modality exercise intervention does not seem to promote additional benefits on cardiovascular outcomes in comparison to multiple-modality exercise alone |
| The Multiple-Modality, Mind-Motor Study | CANADA | PARALLEL |
| Borland  et al. 60 | 2020 | RCT | 97 | 74 | AF | NS | NS | ✓ | CARDIAC REHAB | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 91 | PT | WALKING PROGRAM | ACTIVE CONTROL | 1 | NA | This study demonstrates that cardiac rehabilitation if beneficial and safe in AF patients of relatively advanced age with several co-morbidities |
| No acronym | SWEDEN | PARALLEL |
| Brinkmann  et al 61 | 2019 | RCT | 30 | 60 | DIABETES | NS | NS | ✓ | FASTED | ✓ | ✓ | NA | NUT | MHR | YES | CENTRE | 56 | ET | FED | ACTIVE CONTROL | 2 | NUT | The study data do not provide any evidence that the nutritional state (overnight‐fasted or fed) in regular physical training plays a significant role for training‐induced adaptations in patients with type 2 diabetes. |
| No acronym | GERMANY | PARALLEL |
| Callisaya  et al. 62 | 2017 | RCT | 50 | 66.2 | DIABETES | NS | NS | ✓ | MULTI-MODAL | ✓ | ✓ | NA | MOT & SAFE | RPE | YES | CENTRE & HOME | 182 | ET & PT | GENTLE EXERCISE | ACTIVE CONTROL | 1 | MOT & SAFE | The present pilot study demonstrates strong feasibility of the Cognition and Diabetes in Older Tasmanians – CDOT-X intervention in terms of design, recruitment, screening, adherence, safety and retention to a multimodal exercise program. |
| CDOT-X | AUSTRALIA | PARALLEL |
| Canning  et al. 63 | 2015 | RCT | 231 | 70.6 | PD + FALL HISTORY OR RISK OF FALL | NS | NS | ✓ | EXERCISE | 🗶 | ✓ | BAL | FP | NC | YES | CENTRE & HOME | 182 | ET | USUAL CARE | USUAL CARE | 0 | FP | This randomized controlled trial of a 6-month, Parkinson’s Disease Weight-bearing Exercise for Better Balance programme did not reduce falls, proportion of fallers, or serious fall-related injuries in community-dwelling people with PD. |
| PD-WEBB | AUSTRALIA | PARALLEL |
| Christensen et al. 64 | 2019 | QUASI-EX | 50 | 64.8 | CANCER | NS | NS | ✓ | PERI-OPERATIVE EXERCISE TRAINING | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 168 | ET | USUAL CARE | USUAL CARE | 0 | NA | Pre-operative exercise training should be examined with the objective of improving treatment tolerability and lowering the risk of treatment failure in patients with GOJ cancer in a definitive RCT. |
| PRESET | DENMARK | FEASIBILITY STUDY |
| Christle  et al.65 | 2018 | RCT | 70 | 69.9 | REQUIRING CARDIAC REHAB | NS | NS | ✓ | COMBINED TRAINING | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 182 | PT | CARDIAC MAINTENANCE PROGRAM | ACTIVE CONTROL | 2 | EDU & BC | Six months of weekly combined training significantly improved submaximal exercise performance and strength in patients with cardiac disease and low exercise capacity more than a cardiac maintenance program. |
| DOPPELHERZ | GERMANY | PARALLEL |
| Englund  et al. 66 | 2018 | RCT | 149 | 77.4 | MOBILITY LIMITED OLDER ADULTS | 2.8 | NS | NA | VIVE2 + NUTRITION | ✓ | ✓ | NA | NUT | RPE | YES | CENTRE | 182 | ET | CONTROL | ACTIVE CONTROL | 2 | NA | A multi-nutrient high protein nutritional supplement had no additional benefits on the exercise-induced improvements in physical function in mobility limited older adults with vitamin D insufficiency. |
| VIVE2 | SWEDEN & USA | PARALLEL |
| Fabri  et al. 67 | 2019 | RCT | 28 | 63.5 | HEART FAILURE | NS | NS | ✓ | TRAINED | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 84 | PT | NON TRAINED | USUAL CARE | 0 | NA | In patients with heart failure, supervised exercise plays an important role in improving exercise tolerance and quality of life compared with the unsupervised regular exercise prescribed in routine medical consultations. |
| No acronym | BRAZIL | PARALLEL |
| Ferrer-García et al. 68 | 2011 | RCT | 84 | 66.6 | DIABETES | NS | NS | ✓ | HOME EXERCISE PROGRAM | ✓ | ✓ | NA | NUT | PRIOR ASSESS | NC | CENTRE | 182 | ET | CONTROL | USUAL CARE | 0 | NA | This study showed that a home-based physical exercise program improves quality of life, blood glucose control, and weight in elderly patients with type 2 diabetes. |
| No acronym | SPAIN | PARALLEL |
| Karjalainen  et al.69 | 2012 | RCT | 83 | 62 | CAD | NS | NS | ✓ | CAD | ✓ | ✓ | NA | NA | CPET | YES | HOME | 182 | PT &  ET | CAD + T2D | ACTIVE CONTROL | 2 | NA | The Innovation to Reduce Cardiovascular Complications of Diabetes at the Intersection (Artemis) study showed that a controlled 6-month exercise prescription is an effective way to increase objectively measured high-intensity PA among CAD patients with and without T2D. |
| ARTEMIS | FINLAND | PARALLEL |
| Kolbe-Alexander  et al. 70 | 2006 | QUASI-EX | 81 | 67.5 | OLDER INACTIVE FEMALES | NS | NS | ✓ | EX1 & EX2 | ✓ | ✓ | NA | NA | NC | YES | CENTRE | 140 | RT | CONTROL | PSEUDO-ACTIVE CONTROL | 0 | SS | The Community Health Intervention Programmes (CHIP) has been shown to be effective in improving balance and sit to stand performance which is a proxy for lower body muscle strength. |
| CHIPs | SOUTH AFRICA | PRE-TEST-POST-TEST |
| Stubbs  et al. 71 | 2019 | RCT | 33 | 62.4 | DIABETES | NS | NS | ✓ | COMBINED | ✓ | ✓ | NA | OPT | CPET | YES | CENTRE | 84 | PT | CONTROL | PSEUDO-ACTIVE CONTROL | 0 | OPT | A structured aerobic exercise program is recommended as a safe well-tolerated adjunctive therapy for the management of diabetic patients with long-standing distal symmetric polyneuropathy |
| No acronym | USA | PARALLEL |
| Myers  et al. 72 | 2013 | RCT | 140 | 71.5 | AAA | NS | NS | ✓ | EXERCISE TRAINING | ✓ | ✓ | NA | NA | HRR | YES | CENTRE & HOME | 1095 | PT | USUAL CARE | USUAL CARE | 0 | NA | A program of exercise training did not influence Abdominal Aortic Aneurysm (AAA) growth rates in patients with presurgical AAA. However, these data support the safety and efficacy of exercise training in patients with small AAA, a population for which few previous data are available. |
| AAA STOP | USA | PARALLEL |
| Paulo  et al. 73 | 2019 | RCT | 36 | 64.9 | BREAST CANCER | NS | NS | ✓ | COMBINED TRAINING | ✓ | ✓ | NA | EDU | HRR | YES | CENTRE | 274 | ET | USUAL CARE | ACTIVE CONTROL | 0 | RELAX | This study demonstrated the potential benefits of combined aerobic plus resistance training on quality of life in older breast cancer survivors who were undergoing aromatase inhibitor therapy. |
| No acronym | BRAZIL | PARALLEL |
| Pressler  et al. 74 | 2016 | RCT | 30 | 81 | AORTIC VALVE DISEASE | NS | NS | ✓ | TRAINING GROUP | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 56 | ET | NA | USUAL CARE | 0 | NA | In this pilot study on exercise after TAVI, 8 weeks of combined endurance and resistance exercise resulted in significant improvements in exercise capacity, muscular strength, and quality of life compared with usual care without affecting cardiac adverse events or prosthesis function |
| SPORT: TAVI | GERMANY | PARALLEL |
| Rmponi  et al. 75 | 2013 | QUASI-EX | 27 | 69 | COPD | NS | NS | ✓ | PR | ✓ | ✓ | NA | EDU | CPET | YES | CENTRE | 63 | PT | NA | NONE | 0 | NA | In summary, 9 weeks of PR provided the chance to improve the cardiovascular response during exercise in COPD patients. This improvement in cardiovascular response found after PR was then associated with an enhancement of ventilatory function upon exercise |
| No acronym | Italy | PRE-TEST-POST-TEST |
| Rengo  et al. 76 | 2018 | QUASI-EX | 119 | 68 | HEART FAILURE | NS | NS | ✓ | INPATIENT | ✓ | ✓ | NA | EDU | HRR | YES | CENTRE & HOME | 84 | NC | OUT  PATIENT | ACTIVE CONTROL | 2 | EDU | The study demonstrated improvements in exercise capacity after completion of CR in patients with HFrEF. |
| No acronym | Canada | PRE-TEST-POST-TEST |
| Stanghelle  et al. 77 | 2020 | RCT | 149 | 74.2 | WOMEN WITH OSTEO-PEROSIS | NS | NS | ✓ | EXERCISE | ✓ | ✓ | BAL | NA | RPE | YES | CENTRE | 84 | PT | USUAL CARE | USUAL CARE | 0 | NA | A supervised multicomponent resistance and balance exercise programme for 12 weeks improved muscle strength and balance and reduced fear of falling in women with osteoporosis and a history of vertebral fractures. |
| No acronym | NORWAY | PARALLEL |
| Thomas  et al. 78 | 2017 | RCT | 121 | 61.2 | INACTIVE FEMALES WITH CANCER | NS | NS | ✓ | EXERCISE | ✓ | ✓ | NA | EDU | HRR | YES | CENTRE & HOME | 365 | ET | EDU & CALL | PSEUDO-ACTIVE CONTROL | 0 | EDU & ATT | The Hormones and Physical Exercise (HOPE) study demonstrates that exercise is effective in improving Aromatase Inhibitor induced arthralgia in previously inactive breast cancer survivors who adhere to their AI medication despite this common adverse effect. |
| HOPE | USA | PARALLEL |
| Torres-Sánchez  et al. 79 | 2017 | RCT | 90 | 71.7 | COPD | NS | 5.04 CCI | NA | EXERCISE | ✓ | 🗶 | RESP & FLEX | NA | RPE | NC | CENTRE | 42 | PT | USUAL CARE | USUAL CARE | 0 | NA | Physical therapy in addition to standard medical treatment in patients hospitalized due to acute exacerbation of COPD achieves a higher improvement in the perceived health status than the prescription of the standard medical treatment alone. |
| No acronym | SPAIN | PARALLEL |
| Zaidi  et al. 80 | 2019 | RCT | 137 | 63.1 | DIABETES & CAD | NS | NS | ✓ | COMBINED TRAINING | ✓ | ✓ | NA | NA | CPET | YES | CENTRE & HOME | 365 | PT | USUAL CARE | USUAL CARE | 0 | NA | In summary, we could not demonstrate any overall significant effects of 1 year of combined exercise training on HbA1c or VO2peak in patients with both type 2 diabetes and CAD. However, we observed significant improvements of VT and TTE, indicating beneficial effects on exercise performance despite the minor change in VO2peak. |
| EXCADI | NORWAY | PARALLEL |
| Barcellos  et al. 81 | 2018 | RCT | 150 | 65 | ↑BP & CKD | NS | NS | ✓ | EXERCISE | ✓ | ✓ | NA | NA | RPE | YES | CENTRE | 112 | PT | USUAL CARE | USUAL CARE | 0 | NA | Exercise applied to patients with earlier stages of CKD did not change the rate of glomerular filtration decline in the short term. Exercise reduces fasting glucose and C-reactive Protein levels among hypertensive and non-diabetic patients, with earlier-stages CKD. |
| No acronym | BRAZIL | PARALLEL |
| Berent  et al. 82 | 2011 | RCT | 295 | 62.7 | PRIOR CORONARY EVENT | NS | NS | ✓ | RES. NORMAL | ✓ | ✓ | NA | NA | RPE | YES | CENTRE | 26 | ET | RES.  HIGH | ACTIVE CONTROL | 2 | NA | The data demonstrates that for cardiac patients, high resistance offered no benefit over normal resistance training. |
| No acronym | AUSTRIA | PARALLEL |
| Edelmann  et al. 7 | 2011 | RCT | 64 | 65 | HEART FAILURE | NS | NS | ✓ | ET | ✓ | ✓ | NA | NA | CPET | YES | CENTRE | 91 | PT | USUAL CARE | USUAL CARE | 0 | NA | The Exercise-Diastolic Heart Failure Pilot (EX-DHF-P) shows that a short-term supervised endurance/ resistance exercise program is feasible, safe, and effective in patients with HFpEF. |
| Ex-DHF-P | GERMANY | PARALLEL |
| Gary  et al. 83 | 2011 | RCT | 24 | 60 | HEART FAILURE | NS | 2.5 CCI | NA | EXERCISE | ✓ | ✓ | NA | NA | HRR | YES | HOME | 84 | ET | WAIT LIST CONTROL | PSEUDO-ACTIVE CONTROL | 0 | ATT | Findings suggest that a combined aerobic and resistance program of exercise improves muscle strength, improves the ability to perform a wide range activities of living, and enhances self-reported health related quality of life. |
| No acronym | USA | PARALLEL |
| Casey  et al.84 | 2012 | RCT | 350 | 68.8 | COPD | NS | NS | ✓ | EXERCISE | ✓ | ✓ | NA | EDU | RPE | YES | CENTRE & HOME | 168 | PT & NUR | USUAL CARE | USUAL CARE | 0 | NA | Physiotherapists and practice nurses who have no prior COPD expertise can be trained to deliver an exercise programme to people with moderate and severe COPD, thereby increasing local accessibility. |
| PRINCE | IRELAND | CLUSTER |
| Nelson  et al. 85 | 2004 | RCT | 72 | 77.7 | OLDER ADULTS | 3.5 | NS | NA | EXERCISE | ✓ | ✓ | BAL | BC | RPE | YES | HOME | 182 | ET | ATTENTION CONTROL | PSEUDO-ACTIVE CONTROL | 0 | NUT & EDU | A home-based, multidimensional exercise program in community-dwelling elders with functional impairment is feasible and effective in improving functional performance, despite limited supervision. |
| No acronym | AUSTRALIA | PARALLEL |
| Helbostad  et al. 86 | 2004 | RCT | 77 | 81.1 | OLDER ADULTS WITH FRAILTY | 4.3 | NS | NA | COMBINED TRAINING | ✓ | ✓ | BAL | NA | PHYSIO ASSESS | NC | CENTRE & HOME | 84 | PT | HOME TRAINING | ACTIVE CONTROL | 1 | EDU & MOT | Home training has the potential to improve motor functioning and health related quality of life in frail old people, however, additional group training gives greater mental health benefits. |
| No acronym | NORWAY | PARALLEL |
| Abbreviations | Abdominal Aortic Aneurysm (AAA), Attention (ATT), Atrial Fibrillation (AF), Balance (BAL), Behaviour Change (BC), Cardiopulmonary Exercise Testing (CPET), Charlson Comorbidity Index (CCI), Coronary Artery Disease (CAD), Chronic Kidney Disease (CKD), Chronic obstructive pulmonary disease (COPD), Community Health Worker (CHW), Cumulative Illness Rating Scale (CIRS), Education (EDU), Exercise Therapist (ET), Falls Prevention (FP), Flexibility (FLEX), Functional (FUNC), Heart Rate Reserve (HRR), Maximal Heart Rate (MHR), Metabolic Syndrome (MET SYN), Motivation (MOT), Multi-Disciplinary Team (MDT), Not Applicable (NA), Not Clear (NC), Not Stated (NS), Nutrition Advice (NUT), Nurse (NUR), Optimisation – Medical (OPT), Parkinson’s Disease (PD), Physiotherapist (PT), Psychological Support (PSY), Quasi-Experimental (QUASI-EX), Rating of Perceived Exertion (RPE), Research Team (RT), Resistance (RES), Respiratory (RESP), Safety Advice (SAFE), Sarcopenia (SARCO), Sedentariness (SEDEN), Self-Administered (SELF), Six Minute Walk Test (6MWT), Symptom Control (SYM), Transient Ischemic Attack (TIA), United States of America (USA), Volunteer (VOL) | | | | | | | | | | | | | | | | | | | | | | | |

## Supplementary Table 3: Three component studies

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **AUTHORS &**  **ACRONYM** | **YEAR &**  **COUNTRY** | **DESIGN &**  **TYPE** | **SAMPLE SIZE**  **(n)** | **MEAN AGE**  **(YEARS)** | **SPECIFIC DISEASE TARGETED** | **COMORBIDITIES**  **(MEAN)** | **COMORBIDITY MEASURE (SCORE & NAME)** | **BASELINE PERCENTAGES OF CONCURRENT CHRONIC CONDITIONS SUGGEST MM** | **ARM NAME** | **INTERVENTION COMPONENT AEROBIC** | **INTERVENTION COMPONENT RESISTENCE** | **INTERVENTION COMPONENT OTHER** | **NON-EXERCISE COMPONENTS** | **BASIS OF PRESCRIPTION** | **TITRATION** | **LOCATION OF INTERVENTION** | **DURATION OF INTERVENTION (DAYS)** | **DELIVERER OF INTERVENTION** | **NAME OF CONTROL OR COMPARISON** | **TYPE OF CONTROL OR COMPARATOR** | **CONTROL EXERCISE COMPONENTS (n)** | **NON-EXERCISE COMPONENTS** | **AUTHORS' CONCLUSIONS** |
| Fisher  et al.87 | 2018 | RCT | 172 | 60.3 | INACTIVITY | NS | NS | ✓ | CENTRE BASED | ✓ | ✓ | FLEX | EDU | NC | NC | CENTRE | 365 | ET | HOME BASED | ACTIVE | 3 | EDU | The two programs were largely comparable in this study. The selection of program option, therefore, might be guided by program availability, patient preference, and a consideration of costs. |
| No acronym | CANADA | PARALLEL |
| Bernocchi  et al.88 | 2018 | RCT | 112 | 70.5 | COPD & HF | NS | NS | ✓ | TELE-REHAB HOME | ✓ | ✓ | FLEX | EDU | RPE | YES | HOME | 121 | PT | USUAL CARE | USUAL CARE | 0 | EDU | A new model of nurse/therapist telerehabilitation programme is feasible, safe, and, effective in improving exercise capacity and maintain better general condition of dyspnoea, physical activity profile, disability and QoL in complex patients with both COPD and CHF. |
| No acronym | ITALY | PARALLEL |
| Hernandez  et al.89 | 2019 | RCT | 572 | 73 | ETHNIC MINORITY GROUPS | 2.6 | NA | NA | EXERCISE | ✓ | ✓ | FLEX | ATT RET | NC | NC | CENTRE | 730 | ET | EDUCATION | PSUEDO ACTIVE | 0 | EDU | both groups experienced significant improvements in physical function at 24 months. Participating in the exercise intervention was associated with improvements in physical function, though, no additional gains were apparent for age attribution retraining. |
| CAMINEMOS! | USA | PARALLEL |
| Roitto  et al.90 | 2018 | RCT | 210 | 78 | ALZHEIMER DISEASE | NS | 2.5  CCI | NA | COMBINED TRAINING | ✓ | ✓ | BAL | COG | NC | NC | CENTRE & HOME | 365 | PT | CARE CONTROL | USUAL CARE | 0 | NA | this study demonstrates that exercise administered at the patient’s home may attenuate the deleterious effects of Alzheimer’s Disease on physical functioning. |
| FINALEX | FINLAND | PARALLEL |
| Selzler  et al.91 | 2016 | QUASI-EXP | 64 | 68.5 | COPD | NS | NS | ✓ | REHAB | ✓ | ✓ | FLEX | EDU | CPET | YES | CENTRE | 56 | PT | NA | NONE | 0 | NA | This study provides preliminary evidence that suggests efforts to enhance exercise self-efficacy within PR may result in greater outcome achievement |
| No acronym | CANADA | PRE-TEST POST-TEST |
| Shubert  et al.92 | 2020 | QUASI-EXP | 42 | 75 | FALLS RISK | 2.3 | NA | NA | STAND TALL | ✓ | ✓ | BAL | NA | NC | NC | HOME | 56 | PT | NA | NONE | 0 | NA | Findings suggest that virtual delivery may be a feasible way to provide a standardized intervention in a variety of settings, including in the community or a person’s home. |
| STAND TALL | USA | PRE-TEST POST-TEST |
| Toots  et al. | 2019 | RCT | 186 | 85.1 | DEMENTIA | NS | NS | ✓ | FUNCTION EXERCISE PROGRAM | 🗶 | ✓ | FCT & BAL | NA | WALK ABILITY | YES | CARE HOME | 121 | PT | ATTENTION CONTROL | PSEUDO ACTIVE | 0 | COG | A 4-month high-intensity functional exercise programme appeared to defer loss of independence in ADLs and improve balance, albeit only in participants with non-Alzheimer’s dementia |
| UMDEX | SWEDEN | CLUSTER |
| Van Dam van Isselt et al.93 | 2019 | QUASI-EXP | 159 | 70.8 | COPD | NS | NS | ✓ | GR-COPD | ✓ | ✓ | RESP | EDU | NC | NC | CENTRE | 43 | MDT | DECLINED CONTROL | USUAL CARE | 0 | NA | The results indicate that geriatric rehabilitation for older patients with severe COPD hospitalized for an acute exacerbation is effective and could be implemented in clinical practice. |
| GR-COPD | NETHER-LANDS | PRE-TEST POST-TEST |
| Witham  et al.94 | 2008 | QUASI-EXP | 17 | 81.6 | HF | 5.1 | NA | NA | EXERCISE PROGRAM | ✓ | ✓ | FCT | EDU GS | RPE | YES | CENTRE | 84 | NC | NA | NONE | 0 | NA | This study has shown that an exercise programme involving aerobic, functional and resistance exercises, tailored to the needs of older people with heart failure, is well-tolerated. The programme was safe; physiological monitoring was not undertaken and the programme therefore required minimal equipment. |
| No acronym | UK | PRE-TEST POST-TEST |
| Angst  et al.95 | 2013 | QUASI-EXP | 252 | 65 | OSTEO-ARTHRITIS | NS | NS | ✓ | REHAB HIP | ✓ | ✓ | FCT | EDU | NC | NC | CENTRE | 21 | PT | REHAB KNEE | ACTIVE | 3 | EDU | Comprehensive inpatient rehabilitation of patients with highly comorbid hip and knee osteoarthritis led to small to moderate, statistically significant, and clinically important improvements in pain and function. |
| No acronym | SWITZER-LAND | PRE-TEST POST-TEST |
| Gretebeck  et al.96 | 2019 | RCT | 111 | 70.8 | DIABETES | NS | NS | ✓ | FCT-PA | ✓ | ✓ | FCT | BC | RPE | YES | CENTRE | 140 | MDT | FCT & HE OR  FT & HE | ACTIVE | 2 OR 3 | EDU | A centre-based group FCT exercise program that includes lifestyle behaviour change and an individualized home exercise program with telephonic support in older adults with Type 2 Diabetes can improve physical function outcomes in older adults |
| No acronym | USA | PARALLEL |
| Hessert  et al.97 | 2005 | QUASI-EXP | 17 | 83.5 | CARE HOME RESIDENT | 3.7 | NA | NA | EXERCISE | 🗶 | ✓ | BAL | NA | NC | NC | CARE HOME | 182 | NC | NA | NONE | 0 | NA | This study showed that elders who participated in this functional fitness program made significant improvements in the fitness parameters studied. |
| No acronym | USA | PRE-TEST POST-TEST |
| Lauze  et al.98 | 2017 | RCT | 32 | 81.1 | CARE HOME RESIDENT | 3.7 | NA | NA | EXERCISE | ✓ | ✓ | BAL | NA | NC | NC | CARE HOME | 84 | PT | USUAL CARE | USUAL CARE | 0 | NA | This study indicates that innovative approaches such as the use of adapted technologies should be accessible to older adults residing in assisted living communities to facilitate practice and increase level of physical activity. |
| No acronym | CANADA | PARALLEL |
| Marengoni  et al.99 | 2018 | RCT | 1260 | 69.1 | DEMENTIA RISK | 2 | NA | NA | MULTI-DOMAIN | ✓ | ✓ | BAL | NUT & COG | RM | NC | CENTRE | 730 | MDT | GENERAL HEALTH ADVICE | PSEUDO ACTIVE | 0 | EDU | We noted significant intervention effects on the primary outcome (overall cognition), main cognitive secondary outcomes (executive functioning and processing speed), and other secondary outcomes (BMI, dietary habits, and physical activity). |
| FINGER RCT | FINLAND | PARALLEL |
| Marigold  et al.100 | 2005 | RCT | 61 | 67.7 | STROKE | NS | NS | ✓ | AGILITY GROUP | ✓ | 🗶 | FCT & BAL | NA | NC | NC | CENTRE | 70 | PT & ET | STRETCH GROUP | ACTIVE | 2 | NA | The community-based group-exercise interventions were effective in reducing fall risk factors in this older adult group with chronic stroke, including functional balance, mobility, and standing postural reflexes |
| No acronym | CANADA | PARALLEL |
| Underwood et al. | 2013 | RCT | 891 | 86.4 | CARE HOME RESIDENT | NS | NS | ✓ | OPERA GROUP | ✓ | ✓ | BAL | EDU | NC | NC | CARE HOME | 365 | PT | USUAL CARE | USUAL CARE | 0 | NA | Despite robust methodology, a strong theoretical grounding and good uptake of a moderately intensive exercise intervention, we identified no evidence that our intervention had a positive effect on any of our carefully selected primary or secondary outcomes. |
| OPERA | UJ | CLUSTER |
| Wuthiwaropas et al.101 | 2013 | QUASI-EXP | 25 | 66 | CORONARY ARTERY DISEASE | NS | NS | ✓ | REHAB GROUP | ✓ | ✓ | FLEX | NA | NC | NA | CENTRE | 91 | NC | NA | NONE | 0 | NA | Diastolic function improved in half of our patients with CAD after 3 months of exercise-based cardiac rehabilitation. |
| No acronym | USA | PRE-TEST POST-TEST |
| Lin  et al.102 | 2007 | RCT | 150 | 76.8 | FALLERS | NS | NS | ✓ | EXERCISE | 🗶 | ✓ | BAL & FLEX | NA | NC | NC | HOME | 121 | PT | SAFETY & EDU | PSEUDO ACTIVE | 0 | EDU | The quality of life outcome supported the superiority of exercise training over the other two interventions in older fallers and paralleled those more-objective functional measures. |
| No acronym | TAIWAN | PARALLEL |
| Robinson  et al.103 | 2002 | QUASI-EXP | 22 | 73.7 | OLDER ADULTS | NS | NS | ✓ | THERAPY GROUP | 🗶 | ✓ | BAL & FLEX | EDU | NC | NC | CENTRE & HOME | 42 | NC | USUAL CARE | USUAL CARE | 0 | NA | It is possible that an exercise program that combined strengthening and dynamic balance activities provides the most appropriate intervention to decrease the likelihood of falls. |
| No acronym | USA | PRE-TEST POST-TEST |
| Suzuki  et al.104 | 2012 | RCT | 50 | 76 | COGNITIVE PROBLEMS | NS | NS | ✓ | MULTI EXERCISE | ✓ | ✓ | BAL | NA | MHR | YES | CENTRE | 365 | PT & ET | EDU GROUP | PSEUDO ACTIVE | 0 | EDU | Twelve months of exercise improved cognitive function in older adults with mild cognitive impairment relative to the education control group. In particular, positive effects were observed for general cognitive function, immediate memory, and language ability. |
| No acronym | JAPAN | PARALLEL |
| Brach et al.105 | 2017 | RCT | 298 | 80 | CARE HOME RSIDENT | NS | 2.8 DCI | NA | ON THE MOVE | ✓ | ✓ | FCT | NA | NC | NC | CARE HOME | 84 | PT | GROUP EXERCISE | ACTIVE | 2 | NA | From a community-based health promotion and wellness exercise programming perspective, the 'On the Move' group exercise program was more effective at improving mobility than a usual-care group exercise program, despite lower attendance. |
| On The Move | USA | CLUSTER |
| Stevens-Lapsley et al.106 | 2016 | RCT | 22 | 84.8 | HOME BOUND MULTI MORBID | 4.6 | NA | NA | MULTI EXERCISE | ✓ | ✓ | FCT | NA | RM | YES | HOME | 60 | PT | USUAL CARE | USUAL CARE | 0 | NA | A 30-day progressive multicomponent intervention delivered at high intensity is feasible and safe for older adults after acute hospitalization and may be more effective than usual care in ameliorating the physical function declines associated with acute hospitalization |
| No acronym | USA | PARALLEL |
| Greening  et al.107 | 2014 | RCT | 389 | 71.1 | COPD | 2 | NA | NA | EARLY REHAB | ✓ | ✓ | NES | SM | SW | YES | CENTRE & HOME | 49 | MDT | USUAL CARE | USUAL CARE | 0 | NA | This trial suggests that the acute admission is not the time to enrol patients in a progressive, rehabilitation process, which may be beyond the capabilities of many participants in this situation and moreover might cause  harm. |
| REACH-trial | UK | PARALLEL |
| Pang  et al.108 | 2005 | RCT | 63 | 65.2 | STROKE | NS | NS | ✓ | FAME | ✓ | ✓ | BAL | NA | MHR | YES | CENTRE | 133 | PT & ET | SEATED CONTROL | ACTIVE | 2 | NA | The results support the hypothesis that the intervention group would have significantly more gains in cardiorespiratory fitness. |
| FAME | CANADA | PARALLEL |
| Brovold  et al. 109 | 2013 | RCT | 115 | 78 | POST HOSPITAL | 2.5 | NA | NA | INTERVAL | ✓ | ✓ | BAL | NA | RPE | YES | CENTRE & HOME | 84 | PT | HOME GROUP | ACTIVE | 2 | NA | The present study showed that home exercises and exercises based on the Norwegian Ulleval Model significantly increased participants’ level of physical activity and improved HRQOL. |
| No acronym | NORWAY | PARALLEL |
| de Rooij  et al.110 | 2017 | RCT | 126 | 63.5 | ONE CHRONIC DISEASE & OSTEO ARTHRITIS | NS | NS | ✓ | EXERISE PROGRAM | ✓ | ✓ | FCT | EDU | RPE | YES | CENTRE & HOME | 140 | PT | WIAT LIST CONTROL | USUAL CARE | 0 | NA | This study showed that tailored exercise therapy is efficacious in improving physical functioning and is safe in patients with knee OA and severe comorbidities |
| No acronym | NETHER-LANDS | PARALLEL |
| Andersson  et al.111 | 2020 | RCT | 74 | 69.6 | ARTHRITIS | NS | NS | ✓ | GYM BASED | ✓ | ✓ | BAL | NA | MHR | YES | CENTRE & HOME | 140 | PT | HOME BASED LIGHT | ACTIVE | 3 | NA | Moderate-to-high intensity exercise was found to effectively improve physical fitness in terms of aerobic capacity, endurance, strength, and dynamic balance in older adults with RA. The participants also rated their experienced health as improved. |
| PEP-walk | SWEDEN | PARALLEL |
| Zak  et al.112 | 2006 | RCT | 50 | 87.1 | FREQUENT FALLS | 4.4 | NA | NA | SENSORI MOTOR GROUP | ✓ | 🗶 | BAL & RESP | FP | NC | NC | HOME | 91 | PT | LOW INTENSITY | ACTIVE | 2 | NA | performance of sensorimotor exercises concomitantly with exercises in changing body position, walking on a short distance, together with learning to rise from a fall result in improved performance of simple motor tasks and reduce the risk of falls. |
| No acronym | POLAND | PARALLEL |
| Gaunaurd  et al.113 | 2014 | RCT | 22 | 68.6 | PULMON-ARY FIBROSIS | NS | NS | ✓ | REHAB | ✓ | 🗶 | BAL & FLEX | EDU | CPET | YES | CENTRE | 84 | PT | CONTROL | USUAL CARE | 0 | NA | pulmonary rehabilitation benefits patients with idiopathic pulmonary fibrosis by enhancing their level of physical activity while in the program and by significantly reducing the disease’s symptom burden. |
| No acronym | USA | PARALLEL |
| Gill  et al.114 | 2004 | RCT | 188 | 83.1 | FRAILTY | 2 | NA | NA | PREHAB | 🗶 | ✓ | BAL & FLEX | BC | PRIOR TEST | YES | HOME | 182 | PT | EDU CONTROL | PSEUDO ACTIVE | 0 | NA | The results of our study indicate that functional decline among physically frail, elderly persons who live at home can be slowed, if not prevented. Further evaluation is needed to determine the cost effectiveness of this program and to identify means by which it exerts a beneficial effect. |
| PREHAB | USA | PARALLEL |
| Kovacs et al.115 | 2013 | RCT | 76 | 68.4 | OLDER FEMALES | NS | NS | ✓ | EXERCISE | ✓ | ✓ | BAL | NA | NC | NC | CENTRE | 175 | PT | CONTROL | USUAL CARE | 0 | NA | The Intervention programme may be a promising type of fall prevention exercise programme improving static balance and functional mobility for community-dwelling older women. |
| No acronym | HUNGARY | PARALLEL |
| Santos  et al.116 | 2015 | RCT | 76 | 68.4 | COPD | NS | NS | ✓ | REHAB 80% | ✓ | ✓ | FLEX | EDU | CPET | YES | CENTRE | 42 | PT | REHAB 60% | ACTIVE | 3 | EDU | This study evidenced an equivalence effect of moderate and high intensities on health related quality of life, symptom control, and exercise tolerance. |
| No acronym | PORTUGAL | PARALLEL |
| Morano  et al.117 | 2013 | RCT | 24 | 66.8 | CANCER | NS | NS | ✓ | REHAB | ✓ | ✓ | RESP | EDU | NC | YES | CENTRE | 28 | PT | USUAL CHEST PHYSIO | PSEUDO ACTIVE | 0 | EDU | We consider this to be an important presurgical intervention that improves the conditioning status of the patients and appears to be effective at reducing morbidity in the postoperative period. |
| No acronym | BRAZIL | PARALLEL |
| Kim  et al.118 | 2016 | RCT | 105 | 81.1 | SARCO-PAENIC OBESITY | NS | NS | ✓ | EXERCISE & NUT | ✓ | ✓ | FCT | NA | NC | NC | CENTRE | 91 | ETT | HEALTH EDU | PSEUDO ACIVE | 0 | EDU | The combination of exercise and nutrition effectively improved body fat, blood components, and physical function in sarcopenic obese elderly women, although no additive effects of the combination intervention could be confirmed |
| No acronym | JAPAN | PARALLEL |
| VanSwearing eta l.119 | 2011 | RCT | 50 | 77.2 | MOBILITY PROBLEMS | 2.6 | NA | NA | EXERCISE | ✓ | ✓ | BAL | NA | RPE | YES | CENTRE | 84 | PT | CONTROL EXERCISE | ACTIVE | 2 | NA | An exercise intervention that improved gait also improved some activity and participation outcomes. A task-oriented, motor sequence learning intervention targeted to “fix” gait may have a greater potential to affect activity and participation. |
| No acronym | USA | PARALLEL |
| Villareal  et al.120 | 2006 | RCT | 27 | 70 | OBESE INACTIVE ADULTS | 2 | NA | NA | DIET & EXERCISE | ✓ | ✓ | BAL | NUT & BC | NC | NC | CENTRE | 182 | PT | USUAL CARE | USUAL CARE | 0 | NA | Moderate weight loss and exercise training improves both objective and subjective measures of physical function and ameliorates frailty in obese older adults. |
| No acronym | USA | PARALLEL |
| Yang  et al.121 | AUS-TRAILIA | RCT | 165 | 80.5 | ADULTS WITH BALANCE PROBLEMS | 4 | NA | NA | HOME EXERCISE | ✓ | ✓ | BAL | NA | PRIOR TEST | YES | HOME | 182 | PT | USUAL CARE | USUAL CARE | 0 | NA | A personalized, home based exercise program of balance and strength training significantly improved performance on balance related measures in older people with mild balance dysfunction. |
| No acronym | 2012 | PARALEL |
| Wisniowska et al.122 | POLAND | RCT | 204 | 74.2 | INACTIVE ADULTS | NS | NS | ✓ | EXERCISEE | 🗶 | ✓ | FCT & BAL | EDU & GS | RPE | NC | CENTRE | 84 | PT | BASIC EXERCISE | ACTIVE | 1 | EDU & GS | the short-term evaluation showed that a functional exercise program, combined with verbal stimulation, is effective in improving physical fitness and raising the level of physical activity spent in free time. |
| No acronym | 2020 | PARALLEL |
| Echeverria  et al.123 | SPAIN | RCT | 55 | 82.5 | OLDER ADULT IN HOSPITAL | NS | 5.7 CCI | NA | GROUP WORL (LONG) | ✓ | ✓ | BAK | NA | RM | YES | CENTRE & HOME | 168 | PT | GROUP WORK (SHORT) | ACTIVE | 3 | NA | Older adults who participated in both multicomponent exercise interventions evaluated in this randomized controlled trial improved their physical function and nutritional status after hospitalization |
| No acronym | 2020 | PARALLEL |
| Hewitt  et al.124 | 2018 | RCT | 221 | 86 | CARE HOME RESIDENT | NS | NS | ✓ | EXERCISE | 🗶 | ✓ | BAL & FCT | NA | RM | YES | CARE HOME | 365 | PT | USUAL CARE | USUAL CARE | 0 | NA | moderate-intensity resistance training and high-level balance exercise can significantly reduce falls and improve physical performance in residents of long-term aged care facilities. |
| Sunbeam | AUS-TRALIA | CLUSTER |
| Rubenstein  et al.125 | 2000 | RCT | 59 | 75.4 | OLDER MEN WOTH FALLS RISK | NS | NS | ✓ | GROUP EXERCISE | ✓ | ✓ | BAL | NA | NC | YES | CENTRE | 84 | PT | USUAL CARE | USUAL CARE | 0 | NA | Older individuals with chronic impairments and risk factors for falls can safely participate in structured group exercise, and achieve improvements in endurance, strength, gait, and function. |
| No acronym | USA | PARALLEL |
| Abbreviations | Abdominal Aortic Aneurysm (AAA), Attention (ATT), Attribution Retraining (ATT RET), Atrial Fibrillation (AF), Balance (BAL), Behaviour Change (BC), Cardiopulmonary Exercise Testing (CPET), Charlson Comorbidity Index (CCI), Coronary Artery Disease (CAD), Chronic Kidney Disease (CKD), Chronic obstructive pulmonary disease (COPD), Cognitive Training (COG), Community Health Worker (CHW), Cumulative Illness Rating Scale (CIRS), Duke Comorbidity Index (DCI), Education (EDU),, Exercise Therapist (ET), Falls Prevention (FP), Flexibility (FLEX), Functional (FCT), Goal Setting (GS), Heart Rate Reserve (HRR), Maximal Heart Rate (MHR), Metabolic Syndrome (MET SYN), Motivation (MOT), Multi-Disciplinary Team (MDT), Neuromuscular Electrical Stimulation (NES), Not Applicable (NA), Not Clear (NC), Not Stated (NS), Nutrition Advice (NUT), Nurse (NUR), Optimisation – Medical (OPT), Parkinson’s Disease (PD), Physiotherapist (PT), Psychological Support (PSY), Quasi-Experimental (QUASI-EX), Rating of Perceived Exertion (RPE), Research Team (RT), Resistance (RES), Respiratory (RESP), Safety Advice (SAFE), Sarcopenia (SARCO), Sedentariness (SEDEN), Self-Administered (SELF), Self-Management (SM), Shuttle Walk (SW), Six Minute Walk Test (6MWT), Symptom Control (SYM), Transient Ischemic Attack (TIA), United Kingdom (UK), United States of America (USA), Volunteer (VOL) | | | | | | | | | | | | | | | | | | | | | | | |

## Supplementary Table 4: Four component studies

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **AUTHORS &**  **ACRONYM** | **YEAR &**  **COUNTRY** | | **DESIGN &**  **TYPE** | **SAMPLE SIZE**  **(n)** | **MEAN AGE**  **(YEARS)** | **SPECIFIC DISEASE TARGETED** | **COMORBIDITIES**  **(MEAN)** | **COMORBIDITY MEASURE (SCORE & NAME)** | **BASELINE PERCENTAGES OF CONCURRENT CHRONIC CONDITIONS SUGGEST MM** | **ARM NAME** | **INTERVENTION COMPONENT AEROBIC** | **INTERVENTION COMPONENT RESISTENCE** | **INTERVENTION COMPONENT BALANCE** | **INTERVENTION COMPONENT OTHER** | **NON-EXERCISE COMPONENTS** | **BASIS OF PRESCRIPTION** | **TITRATION** | **LOCATION OF INTERVENTION** | **DURATION OF INTERVENTION (DAYS)** | **DELIVERER OF INTERVENTION** | **NAME OF CONTROL OR COMPARISON** | **TYPE OF CONTROL OR COMPARATOR** | **CONTROL EXERCISE COMPONENTS (n)** | **NON-EXERCISE COMPONENTS** | **AUTHORS' CONCLUSIONS** | |
| Serra-Prat  et al.126 | 2017 | | RCT | 172 | 78.3 | FRAILTY | 3.6 | NA | NA | EXERCISE | ✓ | ✓ | v | FCT | NUT | NC | YES | HOME | 365 | NC | USUAL CARE | USUAL CARE | 0 | NA | An intervention focused on physical exercise and good nutrition may help prevent frailty in community-dwelling pre-frail older people. However, no effect was demonstrated for the study intervention on muscle strength and physical performance indicators | |
| No acronym | SPAIN | | PARALLEL |
| Matcher  et al.127 | 2017 | | RCT | 354 | 77.7 | FALLS | NS | NS | ✓ | EXERCISE | ✓ | ✓ | ✓ | FCT | EDU & MO | NC | YES | CENTRE & HOME | 273 | PT | USUAL CARE | USUAL CARE | 0 | EDU | This study did not significantly reduce the overall proportion of participants who fell at least once over the entire study period but did result in a significant reduction in the number of injurious fallers. | |
| SAFE | SINGA-PORE | | PARALLEL |
| Reeves et al.18 | 2017 | | RCT | 27 | 72.3 | HEART FAILURE | 4.9 | NA | NA | REHAB-HF | ✓ | ✓ | ✓ | FCT | NA | RPE | YES | CENTRE & HOME | 84 | PT | ATT CONTROL | PSEUDO ACTIVE | 0 | NA | The findings from this pilot study support the feasibility and safety of a novel, tailored multi-domain physical rehabilitation intervention starting in the hospital and continuing for 12 weeks immediately following discharge in older, frail heart failure patients. | |
| REHAB-HF (pilot) | USA | | PARALEL |
| Baptista  et al.128 | 2018 | | QUASI EXP | 96 | 67.4 | HYPER-TENSION | 2.3 | NA | NA | MULTI EXERCISE & THIAZIDE | ✓ | ✓ | ✓ | FLEX | MO | MHR | YES | CENTRE | 730 | ET | MULTI EXERCISE & CACLIUM CHANNEL BLOCKER | ACTIVE | 4 | NA | To maintain functional status, hypertensive older adults should add exercise training into the standard prescription practice, independently of the antihypertensive pharmacological choice, to reduce the rate of physical disability. | |
| No acronym | PORTUGAL | | PRE-TEST POST-TEST |
| Baptista  et al129. | 2017 | | QUASI EXP | 284 | 70.2 | DIABETES | 2 | NA | NA | MULTI EXERCISE ALONE OR WITH MET-FORMIN | ✓ | ✓ | ✓ | FLEX | MO | MHR | YES | CENTRE | 730 | ET | MET-FORMIN ALONE | USUAL CARE | 0 | MO | The current study provides evidence that metformin has no effect on health related quality of life; furthermore, older adults with type 2 diabetes in an early stage of disease are likely to benefit from adopting a regular exercise training regimen to promote positive mood states. | |
| No acronym | PORTUGAL | | PRE-TEST POST-TEST |
| Tomioka et al.130 | 2019 | | QUASI EXP | 1202 | 85.5% >65 | OLDER ADULTS | NS | NS | ✓ | ENHANCE FITNESS | ✓ | ✓ | ✓ | FLEX | NA | NC | NC | CENTRE | 365 | NC | NO CONTROL | NONE | 0 | NA | This study contributes to demonstrating the positive long-term impact of Enhance Fitness on physical performance as well as risk factors associated with dropping out of an exercise program. | |
| Enhance Fitness | HAWAII | | PRE-TEST POST-TEST |
| Vahlberg  et al.131 | 2016 | | RCT | 43 | 73.2 | STROKE | NS | NS | ✓ | EXERCISE | ✓ | ✓ | ✓ | FCT | MOT | RPE | YES | HOME | 91 | PT | USUAL CARE | USUAL CARE | 0 | NA | This study indicates that improved walking capacity induced by a multi-component exercise program among older adults after stroke was associated with a decrease in fat mass but not an increase in fat-free mass. | |
| No acronym | SWEDEN | | PARALLEL |
| Gunther  et al.132 | 2003 | | QUASI EXP | 36 | 73 | ARTHRITIS | NS | NS | ✓ | EXERICSE (LOW-MOD) | ✓ | ✓ | ✓ | FLEX | EDU | NC | YES | CENTRE | 63 | PT | NO CONTROL | NONE | 0 | NA | A 9-week group exercise/education intervention for older people with arthritis shows promise as a means to improve physical function and mental health status. | |
| No acronym | USA | | PRE-TEST POST-TEST |
| Hsieh  et al.133 | 2019 | | RCT | 236 | 71.5 | FRAILTY | NS | NS | ✓ | EXERCISE & EXERCISE + NUT | ✓ | ✓ | ✓ | FLEX | NUT | PRIOR TEST | YES | HOME | 182 | PT | USUAL CARE | USUAL CARE | 0 | NA | Individualized home based exercise and nutrition interventions are effective in improving frailty and physical performance among community-dwelling pre-frail or frail older adults. | |
| No acronym | TAIWAN | | PARALLEL |
| Loyola et al.134 | 2018 | | QUASI EXP | 164 | 71.7 | OLDER ADULTS | NS | 3.1 CCI | NA | NOT SOCIALLY ACTIVE | ✓ | ✓ | ✓ | FCT | NA | RM | YES | CENTRE | 84 | PT | SOCIALLY ACTIVE | ACTIVE | 4 | NA | Despite the fact that socially not active older adults are more disabled and with more comorbidity than their socially active counterparts, they had a higher response in terms of balance and disability to a community exercise program based on functional circuits. | |
| No acronym | CHILE | | PRE-TEST POST-TEST |
| Schlenk  et al.135 | 2020 | | RCT | 182 | 64.7 | OSTEO-ARTHRITIS & HYPER-TENSION | 6.6 | NA | NA | STAR | ✓ | ✓ | ✓ | FLEX | SE | NC | YES | CENTRE | 42 | MDT | ATT CONTROL | PSEUDO ACTIVE | 0 | NA | Some improvements were observed however the intervention failed to achieve the goal of 150 minutes moderately vigorous physical activity per week. | |
| STAR | USA | | PARALLEL |
| Smith et al.136 | 2006 | | QUASI EXP | 113 | 76 | ≥3 CHRONIC DISEASES | NS | NS | ✓ | EXERCISE (MALES) | ✓ | ✓ | ✓ | FCT | MO | MHR & RM | YES | CENTRE | 91 | MDT | EXERCISE (FEMALES) | ACTIVE | 4 | MO | Integrated therapy interventions that aim to increase the functional strength and functional capacity result in an improvement in ability to perform activities of daily living, psychological state, and a reduction in health care utilization. | |
| No acronym | USA | | PRE-TEST POST-TEST |
| Hinrichs  et al.137 | 2015 | | RCT | 209 | 79.8 | INACTIVE ADULTS WITH MULTI-MORBIDITY | NS | NS | ✓ | MULTI EXERCISE HOME | ✓ | ✓ | ✓ | FLEX | BC | RPE | YES | HOME | 84 | ET | LIGHT PHYSICAL ACTIVITY PRO-MOTION | PSEUDO-ACTIVE | 0 | NA | Home-based exercise delivered by therapists in regular counselling sessions may be ineffective in the target population. Possibilities for improving the concept will have to be evaluated. | |
| HOMEfit | SWITZER-LAND | | PARALLEL |
| Cesari  et al.138 | 2015 | | RCT | 424 | 76.6 | INACTIVE OLDER ADULTS | NS | NS | ✓ | LIFE-P | ✓ | ✓ | ✓ | FLEX | EDU | RPE | YES | CENTRE & HOME | 365 | ET | AGE GROUP | ACTIVE | 1 | EDU | Compared with a successful aging health education intervention, a structured exercise intervention significantly improved the short physical performance battery score and 400-meter walk speed, and tended to reduce the risk of major mobility disability. | |
| LIFE-P | USA | | PARALLEL |
| Coutney  et al139 | 2009 | | RCT | 128 | 78.8 | AT RISK OF REPEAT HOSP. | 5 | NA | NA | EXERCISE | ✓ | ✓ | ✓ | FLEX | MO | NC | YES | CENTRE & HOME | 168 | MDT | USUAL CARE | USUAL CARE | 0 | NA | The implementation of a 24-week exercise-based program of hospital and in-home follow-up care resulted in a reduction in emergency health service utilization and better health-related quality of life. | |
| No acronym | AUSTRALIA | | PARALLEL |
| Tse  et al.140 | 2011 | | QUASI EXP | 75 | 84.9 | NURSING HOME RESIDENT | NS | NS | ✓ | PAIN GROUP | ✓ | ✓ | ✓ | FLEX | MAS | NC | NC | CENTRE | 56 | MDT | NO PAIN GROUP | ACTIVE | 4 | MAS | A physical exercise programme is effective in relieving pain, improving range of motion and enhancing functional mobility and activities of daily living for older persons living in nursing homes. | |
| No acronym | CHINA | | PRE-TEST POST-TEST |
| Aquino  et al.141 | 2016 | | RCT | 28 | 67.2 | COPD | NS | NS | ✓ | COMBINED EXERCISE | ✓ | ✓ | ✓ | RESP | NA | MHR | YES | CENTRE | 28 | NC | AEROBIC GROUP | ACTIVE | 3 | NC | The combined training protocol could be a possible means for the cognitive rehabilitation of patients with COPD. | |
| No acronym | ITALY | | PARALLEL |
| Boongird  et al. 142 | 2017 | | RCT | 439 | 74 | BALANCE PORBLEMS | NS | NS | ✓ | COMBINED EXERCISE | ✓ | ✓ | ✓ | FLEX | FP | NC | NC | HOME | 365 | MDT | EDU CONTROL | PSEUDO ACTIVE | 0 | EDUY | The present randomized controlled clinical study showed that a simple multicomponent home-based exercise program implemented in a primary care setting demonstrated a reduction in the fear of falling, as well as a positive trend of exercise adherence. | |
| No acronym | THAILAND | | PARALLEL |
| Bouchonville et al.143 | 2014 | | RCT | 80 | 69.7 | OBESITY & FRAILTY | 2 | NA | NA | EXERCISE OR DIET + EXERCISE | ✓ | ✓ | ✓ | FLEX | NUT | MHR | YES | CENTRE | 365 | PT | USUAL CARE | USUAL CARE | 0 | NA | Weight loss alone or exercise alone improves physical function and ameliorates frailty in obese older adults; however, a combination of weight loss and regular exercise may provide greater improvement in physical function and amelioration of frailty than either intervention alone. | |
| No acronym | USA | | PARALLEL |
| Campo  et al.144 | 2020 | | RCT | 235 | 76.4 | ACUTE CORONARY SYN-DROME | NS | NS | ✓ | EXERCISE | ✓ | ✓ | ✓ | FLEX | NA | PRIOR TEST | YES | CENTRE & HOME | 365 | ET & NUR | EDU GROUP | PSEUDO ACTIVE | 0 | EDU | The largely home-based exercise intervention reduced anxiety and depression and improved quality of life. The benefits were maintained over time and up to the first year of follow-up. | |
| HULK | ITALY | | PARALLEL |
| Edgren  et al.145 | 2015 | | RCT | 81 | 79.4 | HIP FRACTURE | 3 | NA | NA | PROMO | 🗶 | ✓ | ✓ | FLEX \* FCT | EDU, BC, FP | PRIOR TEST | YES | HOME | 365 | PT | CONTROL | USUAL CARE | 0 | NA | Multi-component home-based rehabilitation had a positive, though not significant, effect on physical disability. | |
| ProMo | FINLAND | | PARALLEL |
| Kwok  et al. 146 | 2016 | | RCT | 80 | 70.1 | FRAILTY | NS | NS | ✓ | PROMO | ✓ | ✓ | ✓ | FLEX | FP | PRIOR TEST | NC | CENTRE & HOME | 84 | PT | GYM PROGRAM | ACTIVE | 3 | FP | This study found that participants who received Promo (Wii) intervention had a sustained reduction in fear of falling at week 24 whereas strength improvement was better sustained with the Gym intervention. | |
| EFFECT | SINGA-PORE | | PARALLEL |
| Newman  et al.147 | 2014 | | RCT | 1635 | 78.8 | INACTIVE WITH MOBILITY PROBLEM | NS | NS | ✓ | LIFE | ✓ | ✓ | ✓ | FLEX | NA | RPE | YES | CENTRE & HOME | 1277 | PT | HEALTH EDU | PSEUDO ACTIVE | 0 | EDU | A structured moderate intensity physical activity program, compared with a health education program, reduced major mobility disability over 2.6 years among older adults at risk of disability. | |
| LIFE | USA | | PARALLEL |
| Perula  et al.148 | 2012 | | RCT | 404 | 76.4 | OLDER ADULTS | 3 | NA | NA | EPICA | ✓ | ✓ | ✓ | FLEX | MOT | NC | NC | CENTRE & HOME | 365 | PT | CONTROL | PSEUDO ACTIVE | 0 | FP | The multifactorial intervention program did not seem significantly better than the brief intervention; however, during the year-long multifactorial intervention, the incidence of falls dropped by almost 50%, which is not the case with minimal intervention. | |
| EPICA | SPAIN | | CLUSTER |
| Piva  et al.149 | 2019 | | RCT | 240 | 69.6 | KNEE REPLACE & MOBILITY PROBLEMS | 4.4 | NA | NA | EXERCISE | ✓ | ✓ | ✓ | FLEX | NA | NC | NC | CENTRE | 91 | ET | USUAL CARE | USUAL CARE | 0 | NA | This study provides new evidence about the safety and effectiveness of exercise programs at a late stage after total knee replacement. | |
| No acronym | USA | | PARALLEL |
| Vainshelboim et al.150 | 2016 | | RCT | 32 | 67.3 | PULMON-ARY FIBROSIS | NS | NS | ✓ | EXERCISE | ✓ | ✓ | 🗶 | FLEX & RESP | NA | HRR | YES | CENTRE | 84 | PT | USUAL CARE | USUAL CARE | 0 | NA | Participating in a supervised exercise training program in the short-term can improve home-based physical activity levels and body composition in patients with idiopathic pulmonary fibrosis, although the benefits were not sustained at 11-month follow-up. | |
| No acronym | ISREAL | | PARALLEL |
| Venkataraman et al.151 | 2019 | | RCT | 143 | 62.1 | DIABETES | NS | NS | ✓ | TRAINING GROUP | ✓ | ✓ | ✓ | FLEX | NA | NC | NC | HOME | 56 | PT | USUAL CARE | USUAL CARE | 0 | NA | Short-term structured strength and balance training resulted in sustained improvements in functional status at 6 months in individuals with diabetes and peripheral neuropathy. | |
| PDN-QoL | SINGA-PORE | | PARALLEL |
| Villareal  et al.152 | 2017 | | RCT | 160 | 70 | INACTIVE ADULTS WITH OBESITY & FRAILTY | 3 | NA | NA | COMBINED | ✓ | ✓ | ✓ | FLEX | NUT | HRR OR RM | YES | CENTRE | 182 | ET | USUAL CARE | USUAL CARE | 0 | NA | Weight loss plus resistance training or aerobic training improved physical function and ameliorated frailty; however, weight loss plus combined aerobic and resistance training provided greater improvement in physical function and reduction of frailty than either intervention alone. | |
| LITOE | USA | | PARALLEL |
| Batra  et al.153 | 2019 | | QUASI EXP | 1295 | ALL >60 | OLDER ADULTS | NS | NS | ✓ | Enhance Fitness | ✓ | ✓ | ✓ | FLEX | NA | NC | NC | CENTRE | 365 | ET | NO CONTROL | NONE | 0 | NA | The current study provides evidence in support of the effectiveness of Enhance Fitness. | |
| Enhance Fitness | USA | | PRE-TEST POST-TEST |
| Barnett  et al.154 | 2003 | | RCT | 163 | 74.8 | FALLS RISK | NS | NS | ✓ | EXERCISE | ✓ | ✓ | ✓ | FCT | FP | NC | YES | CENTRE & HOME | 365 | ET | USUAL CARE | USUAL CARE | 0 | NA | Participation in a weekly group exercise program with ancillary home exercises improves balance and reduces the rate of falling in at-risk community dwelling older people. | |
| No acronym | AUSTRALIA | | PARALLEL |
| Comans  et al.155 | 2010 | | RCT | 107 | 78.9 | FALLS RISK | 3.9 | NA | NA | TRAINING GROUP (CENTRE) | ✓ | ✓ | ✓ | FCT | EDU | PRIOR TEST | NC | NC | 56 | PT | TRAINING GROUP (HOME) | ACTIVE | 4 | EDU | For superior efficacy, where possible, participants should be enrolled in centre-based falls prevention programs. | |
| No acronym | AUSTRALIA | | PARALLEL |
| Binder  et al.156 | 2002 | | RCT | 119 | 83 | FRAILTY | NS | NS | ✓ | GROUP PROGRAM | ✓ | ✓ | ✓ | FLEX | NA | CPET | YES | CENTRE | 273 | PT | LOW INTENSE HOME | ACTIVE | 1 | NA | Supervised high intensity exercise training is a safe and effective intervention in older physically frail community-dwelling adults that reduces physical impairments and improves functional limitations more than unsupervised low-intensity home exercise. | |
| No acronym | USA | | PARALLEL |
| Abbreviations | | Abdominal Aortic Aneurysm (AAA), Attention (ATT), Attribution Retraining (ATT RET), Atrial Fibrillation (AF), Balance (BAL), Behaviour Change (BC), Blood Pressure (BP)Cardiopulmonary Exercise Testing (CPET), Charlson Comorbidity Index (CCI), Coronary Artery Disease (CAD), Chronic Kidney Disease (CKD), Chronic obstructive pulmonary disease (COPD), Cognitive Training (COG), Community Health Worker (CHW), Cumulative Illness Rating Scale (CIRS), Duke Comorbidity Index (DCI), Education (EDU),, Exercise Therapist (ET), Falls Prevention (FP), Flexibility (FLEX), Functional (FCT), Goal Setting (GS), Heart Rate Reserve (HRR), Massage (MAS), Maximal Heart Rate (MHR), Metabolic Syndrome (MET SYN), Motivation (MOT), Multi-Disciplinary Team (MDT), Neuromuscular Electrical Stimulation (NES), Not Applicable (NA), Not Clear (NC), Not Stated (NS), Nutrition Advice (NUT), Nurse (NUR), Optimisation – Medical (OPT), Parkinson’s Disease (PD), Pulmonary Rehabilitation (PR)Physiotherapist (PT), Psychological Support (PSY), Quasi-Experimental (QUASI-EX), Rating of Perceived Exertion (RPE), Research Team (RES), Resistance (RES), Respiratory (RESP), Safety Advice (SAFE), Sarcopenia (SARCO), Sedentariness (SEDEN), Self-Administered (SELF), Self-Management (SM), Shuttle Walk (SW), Six Minute Walk Test (6MWT), Symptom Control (SYM), Transient Ischemic Attack (TIA), United States of America (USA), Volunteer (VOL) | | | | | | | | | | | | | | | | | | | | | | | |

## Supplementary Table 5: Five component studies

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **AUTHORS &**  **ACRONYM** | **YEAR &**  **COUNTRY** | | **DESIGN &**  **TYPE** | **SAMPLE SIZE**  **(n)** | **MEAN AGE**  **(YEARS)** | **SPECIFIC DISEASE TARGETED** | **COMORBIDITIES**  **(MEAN)** | **COMORBIDITY MEASURE (SCORE & NAME)** | **BASELINE PERCENTAGES OF CONCURRENT CHRONIC CONDITIONS SUGGEST MM** | **ARM NAME** | **INTERVENTION COMPONENT AEROBIC** | **INTERVENTION COMPONENT RESISTENCE** | **INTERVENTION COMPONENT BALANCE** | **INTERVENTION COMPONENT OTHER** | **NON-EXERCISE COMPONENTS** | **BASIS OF PRESCRIPTION** | **TITRATION** | **LOCATION OF INTERVENTION** | **DURATION OF INTERVENTION (DAYS)** | **DELIVERER OF INTERVENTION** | **NAME OF CONTROL OR COMPARISON** | **TYPE OF CONTROL OR COMPARATOR** | **CONTROL EXERCISE COMPONENTS (n)** | **NON-EXERCISE COMPONENTS** | **AUTHORS' CONCLUSIONS** | |
| Yokocji  et al.157 | 2012 | | QUASI  EXP | 61 | 68.3 | ARTHRITIS + OBESITY OR MS OR DIABETES | NS | NS | ✓ | EXERCISE | ✓ | ✓ | ✓ | FLEX & FCT | MO | MHR | YES | CENTRE | 142 | MDT | NO CONTROL | NONE | 0 | NA | The intervention provided by our medical support team and the execution of the exercise therapy-based metabolic improvement program resulted in increased daily life activity level. | |
| No acronym | JAPAN | | PRE-TEST POST-TEST |
| Morey  et al.158 | 1989 | | QUASI  EXP | 69 | ~70 | VETERANS | NS | NS | ✓ | EXERCISE | ✓ | ✓ | ✓ | FLEX & FCT | NA | MHR | NC | CENTRE | 121 | MDT | NO CONTROL | NONE | 0 | NA | Results suggest that elderly patients may be more willing and able than we expect to adopt more active lifestyles with the hope of maintaining their independence and vitality. | |
| No acronym | USA | | PRE-TEST POST-TEST |
| Tarazone  et al.159 | 2016 | | RCT | 100 | 79.9 | INACTIVE FRAIL OLDER ADULTS | NS | NS | ✓ | MULTI EXERCISE | ✓ | ✓ | ✓ | FLEX & FCT | NA | NC | NC | CENTRE | 168 | MDT | USUAL CARE | USUAL CARE | 0 | NA | There were improvements in anthropometric and analytical variables; some of which are considered good biomarkers of frailty. There was also a significant decrease in the number of visits to the primary care physician after the training program. | |
| EMTIFE | SPAIN | | PARALLEL |
| Kalka  et al.160 | 2013 | | RCT | 286 | 61.5 | ISCHAEMIC HEART DISEASE | NS | NS | ✓ | REHAB | ✓ | ✓ | ✓ | FLEX & FCT | NA | CPET | YES | CENTRE | 182 | NC | CONTROL | USUAL CARE | 0 | NA | Six-month of cardiac rehab significantly increased the heart rate reserve value, however cardiac training intensity did not affect the exertion-evoked change in its intensity. | |
| No acronym | POLAND | | PARALLEL |
| Abbreviations | | Abdominal Aortic Aneurysm (AAA), Attention (ATT), Attribution Retraining (ATT RET), Atrial Fibrillation (AF), Balance (BAL), Behaviour Change (BC), Cardiopulmonary Exercise Testing (CPET), Charlson Comorbidity Index (CCI), Coronary Artery Disease (CAD), Chronic Kidney Disease (CKD), Chronic obstructive pulmonary disease (COPD), Cognitive Training (COG), Community Health Worker (CHW), Cumulative Illness Rating Scale (CIRS), Duke Comorbidity Index (DCI), Education (EDU),, Exercise Therapist (ET), Falls Prevention (FP), Flexibility (FLEX), Functional (FCT), Goal Setting (GS), Heart Rate Reserve (HRR), Massage (MAS), Maximal Heart Rate (MHR), Metabolic Syndrome (MET SYN), Motivation (MOT), Multi-Disciplinary Team (MDT), Neuromuscular Electrical Stimulation (NES), Not Applicable (NA), Not Clear (NC), Not Stated (NS), Nutrition Advice (NUT), Nurse (NUR), Optimisation – Medical (OPT), Parkinson’s Disease (PD), Physiotherapist (PT), Psychological Support (PSY), Quasi-Experimental (QUASI-EX), Rating of Perceived Exertion (RPE), Research Team (RT), Resistance (RES), Respiratory (RESP), Safety Advice (SAFE), Sarcopenia (SARCO), Sedentariness (SEDEN), Self-Administered (SELF), Self-Management (SM), Shuttle Walk (SW), Six Minute Walk Test (6MWT), Symptom Control (SYM), Transient Ischemic Attack (TIA), United Kingdom (UK) United States of America (USA), Volunteer (VOL) | | | | | | | | | | | | | | | | | | | | | | | |

# PRISMA Checklist

| **Section and Topic** | **Item #** | **Checklist item** | **Location where item is reported** |
| --- | --- | --- | --- |
| **TITLE** | | |  |
| Title | 1 | Identify the report as a systematic review. | title |
| **ABSTRACT** | | |  |
| Abstract | 2 | See the PRISMA 2020 for Abstracts checklist. | abstract formatted to journal requirements |
| **INTRODUCTION** | | |  |
| Rationale | 3 | Describe the rationale for the review in the context of existing knowledge. | 4-5 |
| Objectives | 4 | Provide an explicit statement of the objective(s) or question(s) the review addresses. | 4-5 |
| **METHODS** | | |  |
| Eligibility criteria | 5 | Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses. | 5-6 |
| Information sources | 6 | Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. | 5-6 |
| Search strategy | 7 | Present the full search strategies for all databases, registers and websites, including any filters and limits used. | supplement |
| Selection process | 8 | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | 6 |
| Data collection process | 9 | Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process. | 7 |
| Data items | 10a | List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect. | 7-8 |
| 10b | List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information. | 7-8 |
| Study risk of bias assessment | 11 | Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process. | 7 |
| Effect measures | 12 | Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. | NA not reviewing effects |
| Synthesis methods | 13a | Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)). | 7 |
| 13b | Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions. | 7 |
| 13c | Describe any methods used to tabulate or visually display results of individual studies and syntheses. | 7 |
| 13d | Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used. | 7-8 |
| 13e | Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression). | NA to review |
| 13f | Describe any sensitivity analyses conducted to assess robustness of the synthesized results. | NA to review |
| Reporting bias assessment | 14 | Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). | NA to review |
| Certainty assessment | 15 | Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome. | NA to review |
| **RESULTS** | | |  |
| Study selection | 16a | Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.8 | 8-10 |
| 16b | Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded. | Figure 1 |
| Study characteristics | 17 | Cite each included study and present its characteristics. | Supplement |
| Risk of bias in studies | 18 | Present assessments of risk of bias for each included study. | NA to review, will be presented in MA |
| Results of individual studies | 19 | For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. | NA to review |
| Results of syntheses | 20a | For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies. | 8-3 |
| 20b | Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect. | NA not a MA |
| 20c | Present results of all investigations of possible causes of heterogeneity among study results. | NA to review |
| 20d | Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results. | NA to review |
| Reporting biases | 21 | Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed. | NA to review |
| Certainty of evidence | 22 | Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed. | NA to review |
| **DISCUSSION** | | |  |
| Discussion | 23a | Provide a general interpretation of the results in the context of other evidence. | 13 |
| 23b | Discuss any limitations of the evidence included in the review. | 15 |
| 23c | Discuss any limitations of the review processes used. | 15 |
| 23d | Discuss implications of the results for practice, policy, and future research. | 15 |
| **OTHER INFORMATION** | | |  |
| Registration and protocol | 24a | Provide registration information for the review, including register name and registration number, or state that the review was not registered. | 2 |
| 24b | Indicate where the review protocol can be accessed, or state that a protocol was not prepared. | 2 |
| 24c | Describe and explain any amendments to information provided at registration or in the protocol. | on PROSPERO |
| Support | 25 | Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review. | 15 |
| Competing interests | 26 | Declare any competing interests of review authors. | 15 |
| Availability of data, code and other materials | 27 | Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review. | 15 |

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