

## Supplementary material

**Supplementary figure 1:** Detailed search string used in the electronic database PubMed

((((((((multi[tiab] OR multiple[tiab] OR inter[tiab] OR intra[tiab] OR combi\*[tiab] OR combination[tiab] OR combinatorial[tiab] OR fusion[tiab]) AND (domain[tiab] OR component[tiab] OR compartment[tiab] OR conjunction[tiab] OR department[tiab] OR disciplin\*[tiab] OR district[tiab]))) OR "Interdisciplinary Studies"[Mesh] OR supplement\*[tiab] OR multidomain\*[tiab] OR multicomponent\*[tiab] OR multicompartment[tiab] OR multidepartment[tiab] OR multidisciplin\*[tiab] OR multidistrict[tiab] OR interdisciplin\*[tiab] OR interdepartment[tiab] OR additionally[tiab] OR additional[tiab])))) AND (Nutrition[MeSH] OR nutri\*[tiab] OR "Nutritional status"[MeSH] OR "Nutrition Therapy"[Mesh] OR "Diet Therapy"[Mesh] OR "Diet"[MeSH] OR diet[tiab] OR diets[tiab] OR "dietary supplements"[MeSH] OR dietary[tiab] OR supplement\*[tiab] OR "Food, Fortified"[Mesh] OR "Food, Formulated"[Mesh] OR food[tiab] OR foods[tiab] OR "dietary proteins"[MeSH] OR "dietary protein"[tiab] OR "dietary proteins"[tiab] OR "energy intake"[MeSH] OR "Vitamins"[Mesh] OR "vitamin\*"[tiab] OR "Antioxidants"[Mesh] OR "antioxidant\*"[tiab] OR "Calcium"[Mesh] OR "calcium"[tiab] OR "Micronutrients"[Mesh] OR "micronutrient\*"[tiab] AND "Minerals"[Mesh] OR "mineral\*"[tiab] OR "Physical Fitness"[Mesh] OR "Exercise Therapy"[Mesh:noexp] OR "Physical Therapy Modalities"[Mesh:noexp] OR "exercise therapy"[tiab] OR exercise program\*[tiab] OR physical exercise[tiab] OR fit[tiab] OR fitness[tiab] OR "Exercise Movement Techniques"[Mesh] OR "Circuit-Based Exercise"[Mesh] OR endurance[tiab] OR aerobic[tiab] OR "Physical Conditioning, Human"[Mesh] OR "Resistance Training"[Mesh] OR "resistance training"[tiab] OR "resistance exercise"[tiab] OR "resistance exercises"[tiab] OR "Weight Lifting"[Mesh] OR weight lift\*[tiab] OR progressive resist\*[tiab] OR "Muscle Strength"[Mesh] OR strength\*[tiab] OR strengthen\*[tiab] OR muscle volume[tiab] OR stretching[tiab] OR stretch[tiab] OR "Muscle Stretching Exercises"[Mesh] OR "Isometric Contraction"[Mesh] OR "Isotonic Contraction"[Mesh] OR isometric\*[tiab] OR isokinetic\*[tiab] OR isotonic\*[tiab] OR eccentric[tiab] OR concentric[tiab] OR balance exercise\*[tiab] OR stability training[tiab] OR "Gymnastics"[Mesh] OR gymnastic\*[tiab] OR treadmill[tiab] OR walking[tiab] OR jogging[tiab] OR jogged[tiab] OR run\*[tiab] OR swim\*[tiab] OR bicycl\*[tiab] OR cycling[tiab] OR pilates[tiab] OR yoga[tiab] OR tai ji[tiab] OR tai chi[tiab] OR taiji[tiab] OR dance therapy[tiab] OR "Dance Therapy"[Mesh] OR danc\*[tiab] OR vibration[tiab] OR cardio training[tiab] OR jump[tiab] OR jumping[tiab] OR rowing[tiab] OR "Testosterone"[Mesh] OR testosterone[tiab] OR "Anabolic Agents"[Mesh] OR anabol\*[tiab] OR "Human Growth Hormone"[Mesh] OR "Growth Hormone"[Mesh] OR growth hormone[tiab] OR "Insulin-Like Growth Factor I"[Mesh] OR insulin like growth factor[tiab] OR IGF[tiab] OR myostatin inhibitors[tiab] OR "Angiotensin-Converting Enzyme Inhibitors"[Mesh] OR ACE-I[tiab] OR angiotensin converting enzyme[tiab] OR "Occupational Therapy"[Mesh] OR "Occupational therapy"[tiab] OR "Occupational therapies"[tiab] OR functional therapy[tiab] OR functional therapies[tiab] OR "Social Support"[Mesh] OR Social Support[tiab] OR Social Supports[tiab] OR Psychosocial[tiab] OR Psychological[tiab] OR psychomotor\*[tiab] OR social[tiab] OR cogniti\*[tiab] OR mental training[tiab] OR "mental activity"[tiab] OR "mental activities"[tiab] OR reasoning[tiab] OR memory training[tiab] OR "Attention"[Mesh] OR attention[tiab] OR "processing speed"[tiab] OR concentration[tiab])) AND ((("Frail Elderly"[Mesh] OR frail\*[tiab] OR prefrail\*[tiab] OR pre frail\*[tiab] OR ("Aged"[Mesh:noexp] OR aged[tiab] OR aging[tiab] OR ageing[tiab] OR elder\*[tiab] OR "Aged, 80 and over"[Mesh] OR oldest old[tiab] OR old\*[tiab] OR senior\*[tiab])) AND (fragil\*[tiab] OR vulnerab\*[tiab)))) NOT (Editorial[ptyp] OR Letter[ptyp] OR Case Reports[ptyp])) AND ((dutch"[Language] OR english"[Language] OR french"[Language] OR german"[Language]))

<b>Supplementary table 1a: Exclusion reasons</b>	
Reason for exclusion	References
Abstract/commentary/summary or letter	1-44
Research design	45-57
Other/no outcomes	58-82
Other population	83-128
No multi-domain intervention	129-133
No appropriate intervention	134-144
No differentiation of intervention effects	145-190
Duplicates	190-200

**Supplementary table 1b: References:**

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Supplementary table 2: Secondary outcomes

Study	-3 m <sup>a</sup>	Post-intervention (0 m)	3 m FU	6 m FU	9 m FU
<b>Quality of life</b>					
Chan: Ex + NuAd + PS (32)	/	NS	NS	/	NS
Tarazona-Santabalbina: Ex + NuAd + NuVM (54)	/	Ex + NuAd + NuVM ( $8.2 \pm 1.6$ ): significantly improved *compared to NuAd + NuVM group ( $7.6 \pm 1.3$ )	/	/	/
<b>Psychosocial well-being/ depression</b>					
Kwon: Ex + NuAd (44)	/	Ex + NuAd ( $7.2 \pm 13.5$ ): change significantly improved ** in role emotional score compared to control group ( $-0.3 \pm 13.4$ ) Ex: NS	/	NS	/
Chin A Paw: Ex + NuP + NuVM (34)	/	NS	/	/	/
Chan: Ex + NuAd + PS (32)	/	NS	NS	/	NS
Tarazona-Santabalbina: Ex + NuAd + NuVM (54)	/	Ex + NuAd + NuVM ( $2.3 \pm 2.2$ ): significantly improved *compared to NuAd + NuVM group ( $3.2 \pm 2.5$ )	/	/	/
<b>Social involvement</b>					

Chin A Paw: Ex + NuP + NuVM (34)	/	NS	/	/	/
Tarazona-Santabalbina: Ex + NuAd + NuVM (54)	/	Ex + NuAd + NuVM ( $45.5 \pm 9.3$ ): significantly improved *compared to NuAd + NuVM group ( $41.2 \pm 8.5$ )	/	/	/
<b>Subjective health/ health belief model</b>					
Chin A Paw: Ex + NuP + NuVM (34)	/	NS	/	/	/
Rydwik: Ex + NuAd (46)	/	NS	/	NS	/

Values are (mean  $\pm$  SD) or (median (10th – 90th percentile)) unless otherwise indicated.

\*: p-value < 0.05; \*\*: p-value < 0.01; \*\*\*: p-value < 0.001; <sup>a</sup> = 3 m before end of intervention; FU = follow-up; Hor = Hormone; Ex: Exercise intervention; Cog: Cognitive intervention; NuVM: Nutritional supplementation of vitamins and minerals; NuP: Nutritional supplementation of proteins; NuMF: Nutritional supplementation of MFGM; PS: psychosocial intervention; NS: no significant difference; /: not available; CI: 95% confidence interval