

Role of psychological characteristics and physical activity in neuromuscular functioning among middle-aged women

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Physical Activity and Nutrition Influences in ageing

Background

Women report greater prevalence of functional limitation in old age and simultaneously have a greater life expectancy (1,2). In comparison with men, woman have earlier and rapid strength decline around midlife

Study questions

- Are there differences in neuromuscular function, level of physical activity, and psychological characteristics across menopausal stages?
- Does physical activity moderate association between psychological characteristics and differences in neuromuscular function across menopausal stages?
- Does neuromuscular function and the level of physical activity change during menopausal transition?
- Whether psychological characteristics moderate level of physical activity during menopausal transition.



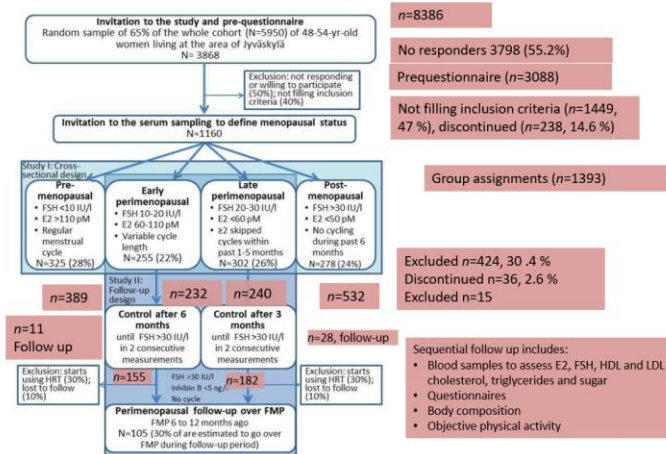
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Cross-sectional design

Longitudinal design

Estrogenic Regulation of Muscle Apoptosis (ERMA) study, PI - docent Vuokko Kovanen and co-PI docent Eija Pöllänen

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Assessments

Menopausal status,

Premenopausal: FSH < 10 IU/l, E2 > 110pM, regular menstrual cycle
Perimenopausal: FSH = 10-20 IU, E2 > 60 -110 pM, variable cycle length
Postmenopausal: 1) FSH >30 IU/l, E2 <50 pM, no menses within past 6-12 months

Neuromuscular function

- Maximal isometric knee extension and grip strength using an adjustable dynamometer chair
- Maximal gait speed
- Vertical jumping height
- Six minute walking test
- Plantar flexor muscle strength will be assessed both using voluntary effort and by using supramaximal (125% maximum M-wave) intensity electrical stimulation
- Muscle cross-sectional area and muscle composition analysis (fat infiltration and Achilles tendon thickness)

Psychological characteristics

- Extraversion and neuroticism
- Emotional well-being
- Life satisfaction
- Depressive symptoms

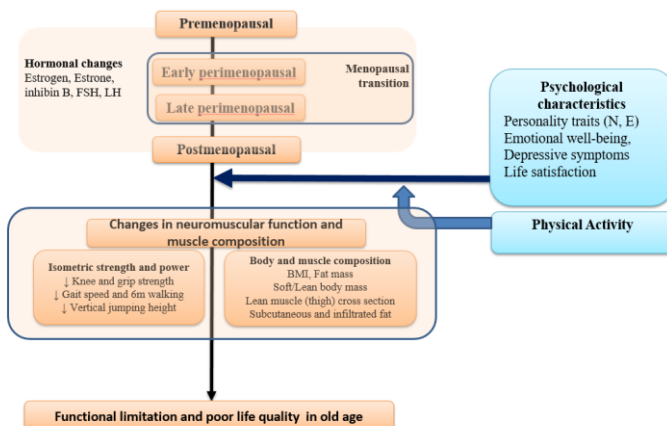
Physical Activity

- Grimby Scale
- 7 days GT3X+ and wGT3X+ Actigraphy/accelerometers



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Empirical model of the study



Preliminary results

Cross-sectional data for menopausal transition

Variables	Premenopausal (n = 202)	Perimenopausal (n = 332)	Postmenopausal (n = 263)	p value,
Age (years)	50.1 (1.62)	51.2 (1.92)	52.5 (1.89)	<0.01 pre < peri < post
BMI (kg/m ²)	25.4 (3.30)	25.8 (3.86)	25.0 (3.76)	0.04 peri-post 0.043 pre > peri
Percent Body FAT	29.5 (7.12)	31.2 (7.73)	30.5 (7.31)	
Maximum Leg extension force, N	470 (100.9)	468 (93.4)	447 (90.4)	0.008 pre>post
Grip strength, N	323 (60.3)	317 (61.8)	298 (53.9)	p < 0.001 pre>post, peri>post
Maximum gait speed (ms ⁻¹)	2.70 (0.49)	2.63 (0.48)	2.59 (0.39)	0.018 pre>post
Vertical jumping height, m	0.20 (0.04)	0.19 (0.04)	0.18 (0.04)	0.001 pre>peri>post
Six-minute walking test (m)	676.3 (58.86)	664.1 (64.49)	668.3 (58.30)	0.07
Depressive symptoms	0.407 (0.338)	0.479 (0.371)	0.471 (0.380)	0.048 (pre>peri)



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