

Relationships between body composition and exercise types in adults with Achondroplasia

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Achondroplasia



Genetic Condition

Rare bone condition caused by a single point mutation at the fibroblast growth factor receptor 3 gene (FGFR3).



Skeletal Impact

Disproportionate short stature.
Adult height: 110-130 cm.
Skeletal deformities, spinal stenosis, pain.



Prevalence

1 in 25 000
births



Physical impact



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Genu varus

Knees bend inward, resulting in a bowlegged appearance.

Joints hyperlaxity

Increased joint flexibility and laxity, leading to instability and increased risk of injury.

Hyper lordosis

Exaggerated curvature at the lower back, which causes pain and mobility challenges.

Small chest

Can lead to respiratory difficulties and increased susceptibility to respiratory infections.

Facial hypoplasia

Midface and jaw are underdeveloped, leading to a distinctive facial appearance.

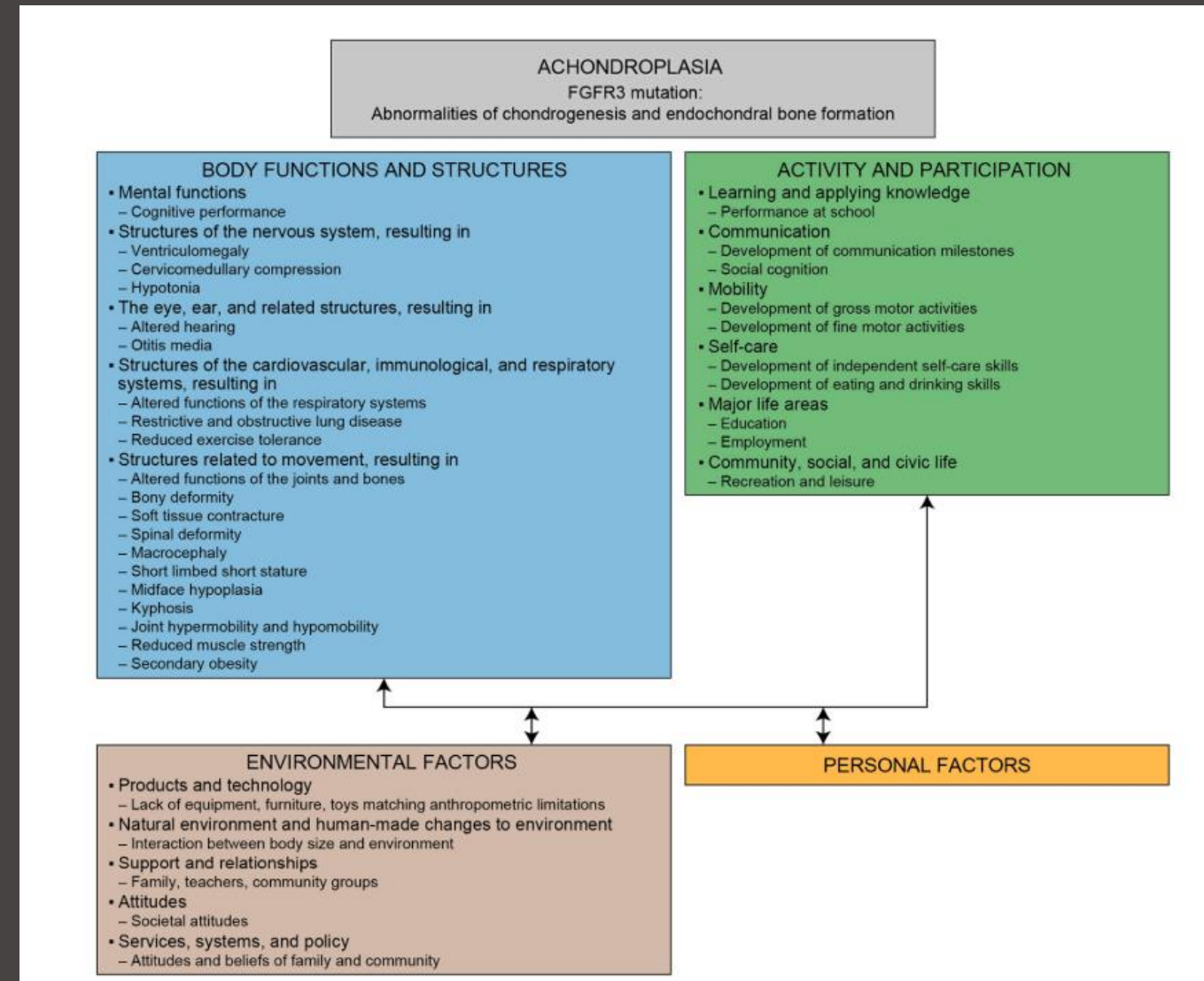
Macrocephaly

Larger head size which can contribute to the characteristic appearance of the condition.

Functional diversity / disability



Credits: Tom Shakespeare



Hoover-Fong 2021 – ICF model for achondroplasia

Aims



Do different types of exercise influence anthropometric measures?



Do different types of exercise influence physical well-being?

MET values for Physical Activity



Activity Type	MET Value
Walking	3.3 METs
Moderate Physical Activity	4.0 METs
Vigorous Physical Activity	8.0 METs

MET-minutes are calculated by multiplying the MET score by the minutes performed. This provides a measure of the volume of activity, which is equivalent to kilocalories for a 60 kg person.

Grouping types of exercises

Applying a semi-structured interview



Group 0 (G0)

No exercise
(Includes walking)

N = 6



Group 1 (G1)

Lower MET exercises (leisure
swimming or slow cycling)

N = 3

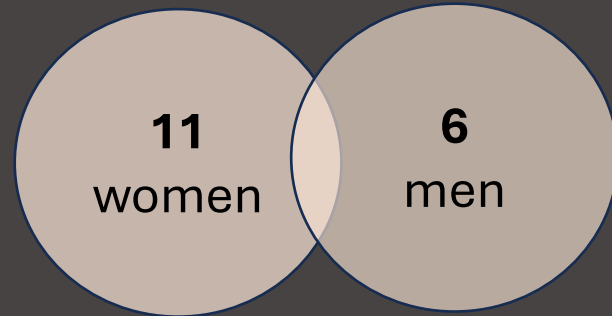


Group 2 (G2)

Higher MET exercises
(gym workout, martial arts)

N = 8

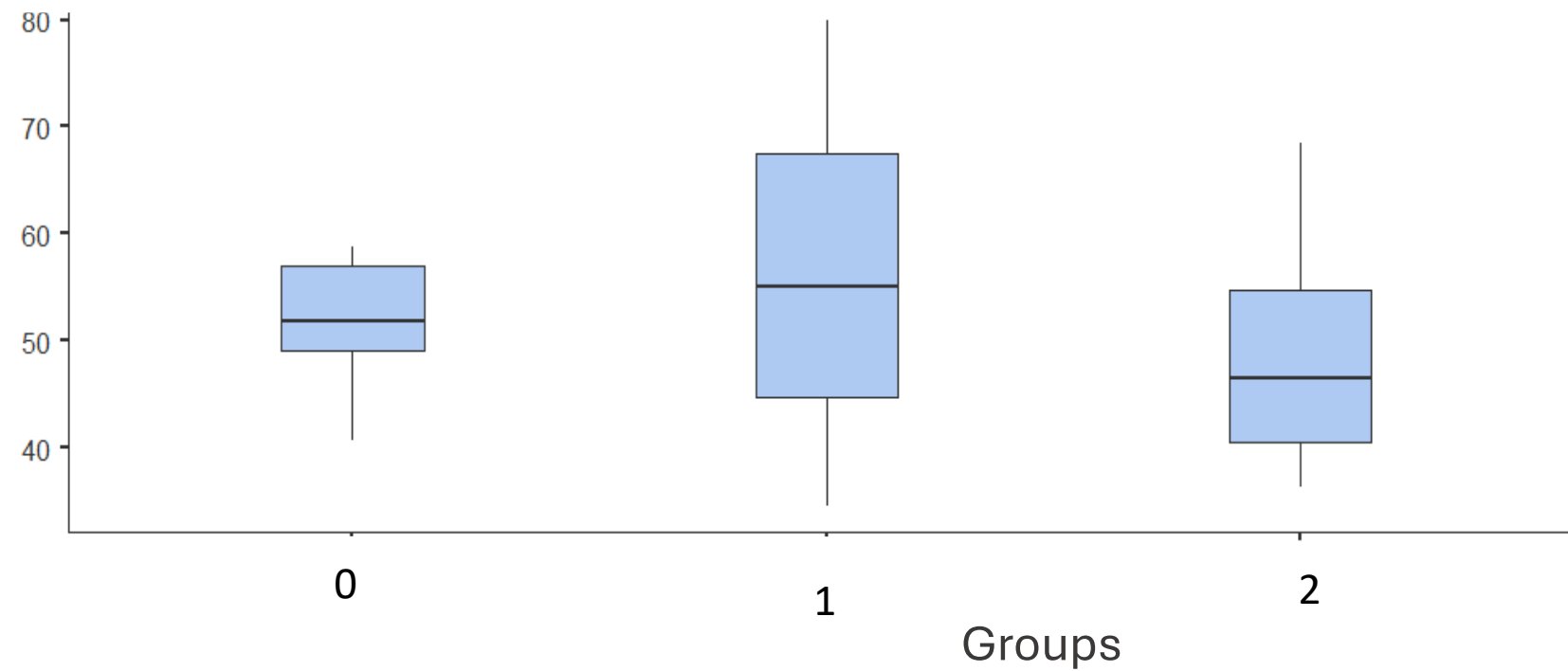
Anthropometric measures



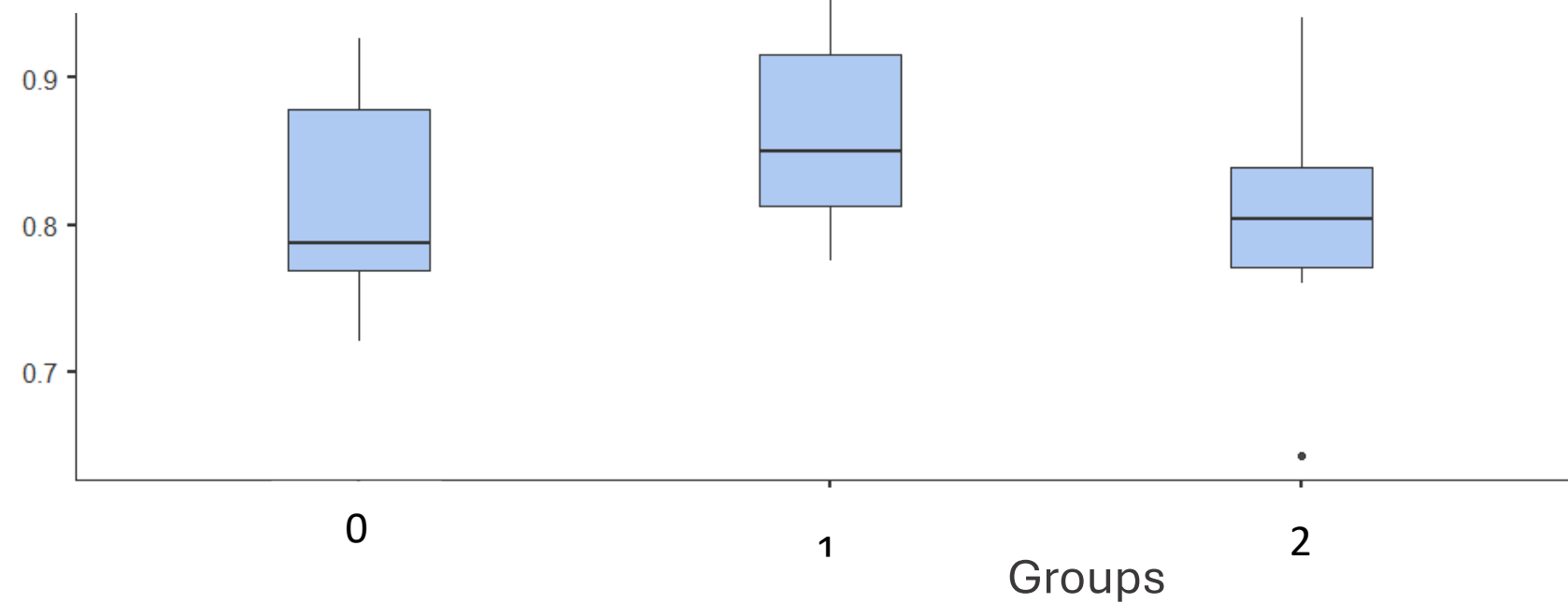
Exercise groups (G)	Age (years)	Weight (kg)	Height (cm)
G0 (n=6)	35.7±16.7	56±15.2	125±9.4
G1 (n=3)	48±6.2	56.5±22.7	119±10.6
G2 (n=8)	35.8±12.2	49±11.9	128±15.5
	Waist (cm)	Hip (cm)	Waist/Hip
G0 (n=6)	86.6±15.1	106±11.6	0.82±0.08
G1 (n=3)	91.7±20.8	105±13.6	0.87±0.11
G2 (n=8)	77.8±10.4	96.9±9.5	0.80±0.09

Anthropometric measures analysis

Weight (kg)

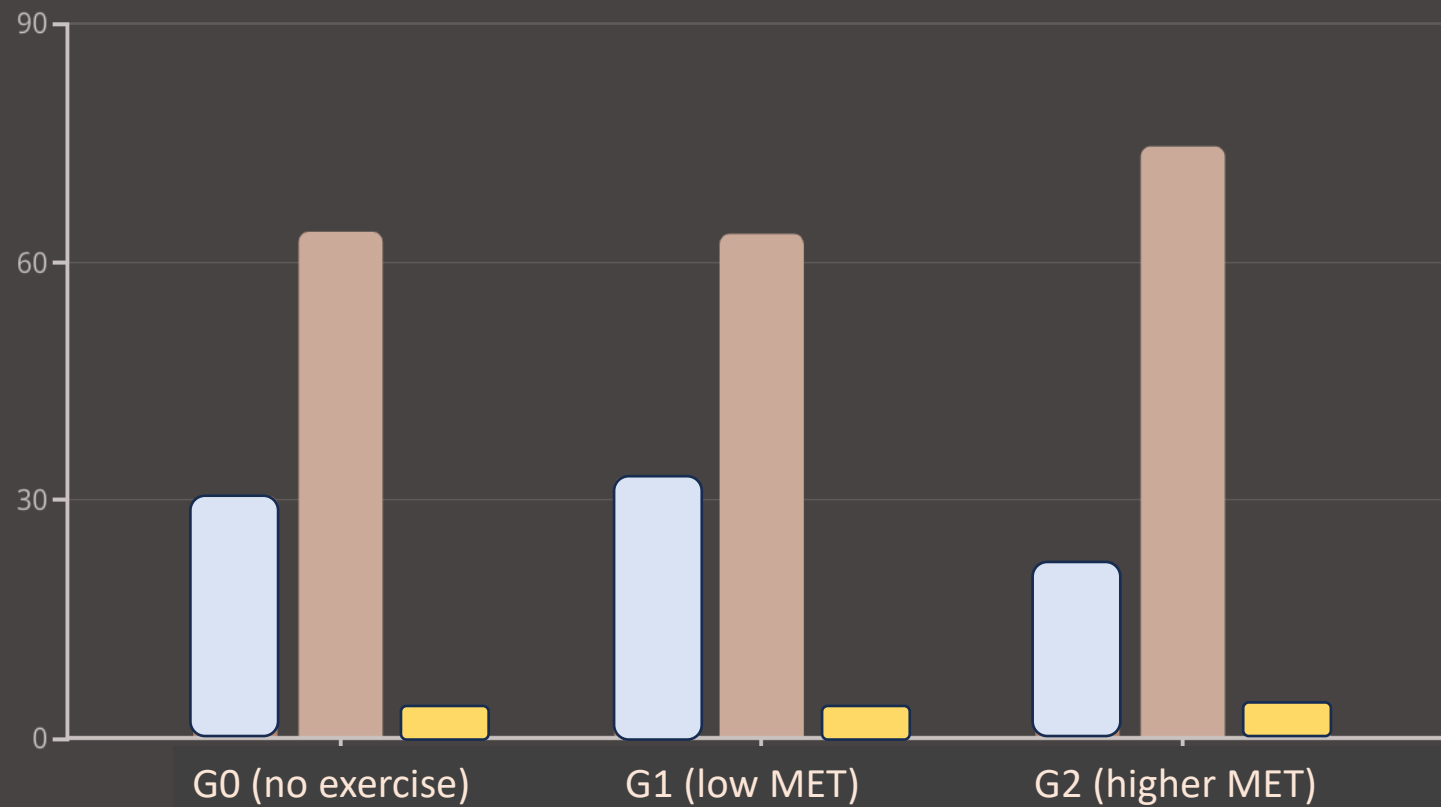


Waist/hip



Body composition

Exercise groups (G)	Fat mass %	Lean mass %	Bone mineral mass%
G0 (n=6)	30.5±10.3	63.8±11.3	3.58±0.52
G1 (n=3)	33±12.0	63.5±11.3	3.47±0.72
G2 (n=8)	21.9±8.1	74.5±8.74	4.08±0.45



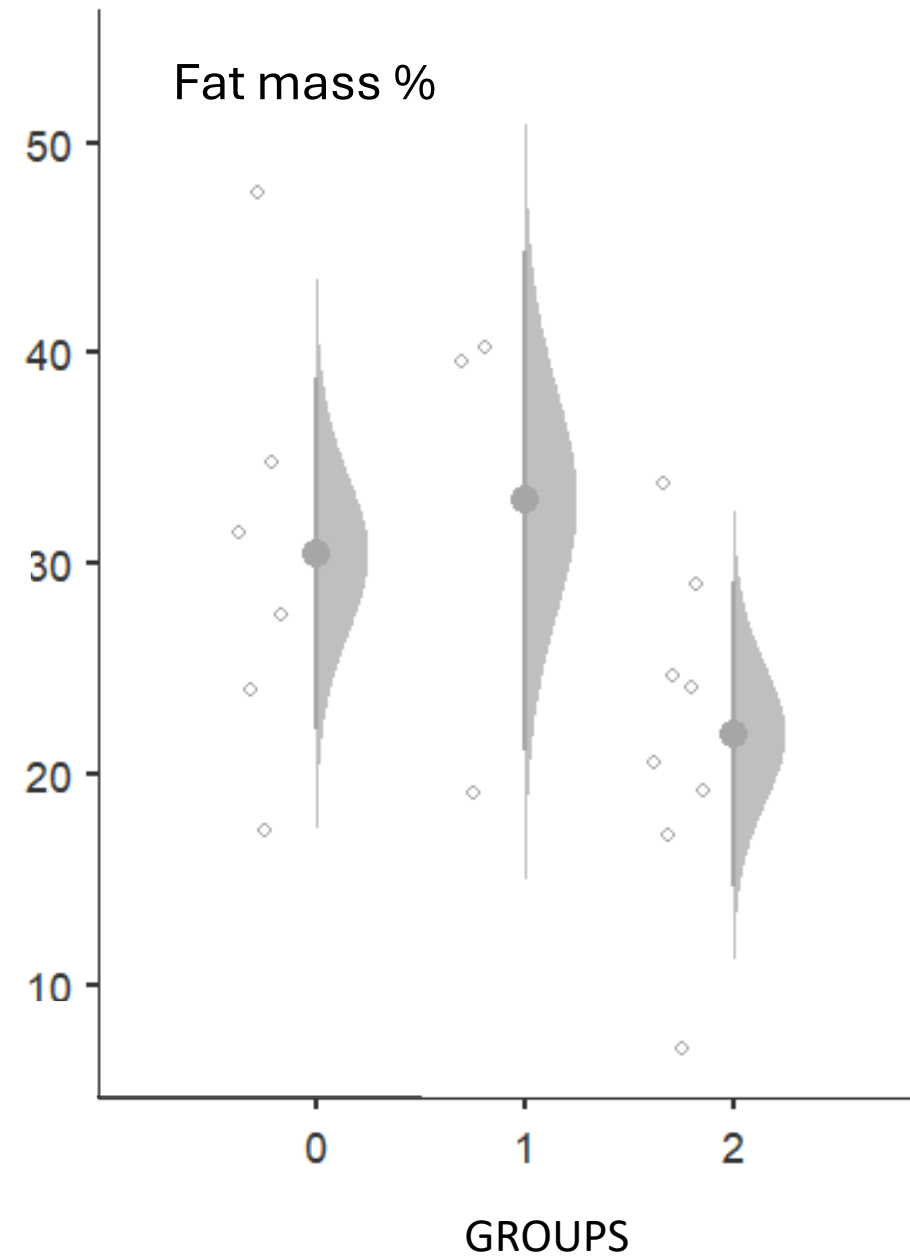
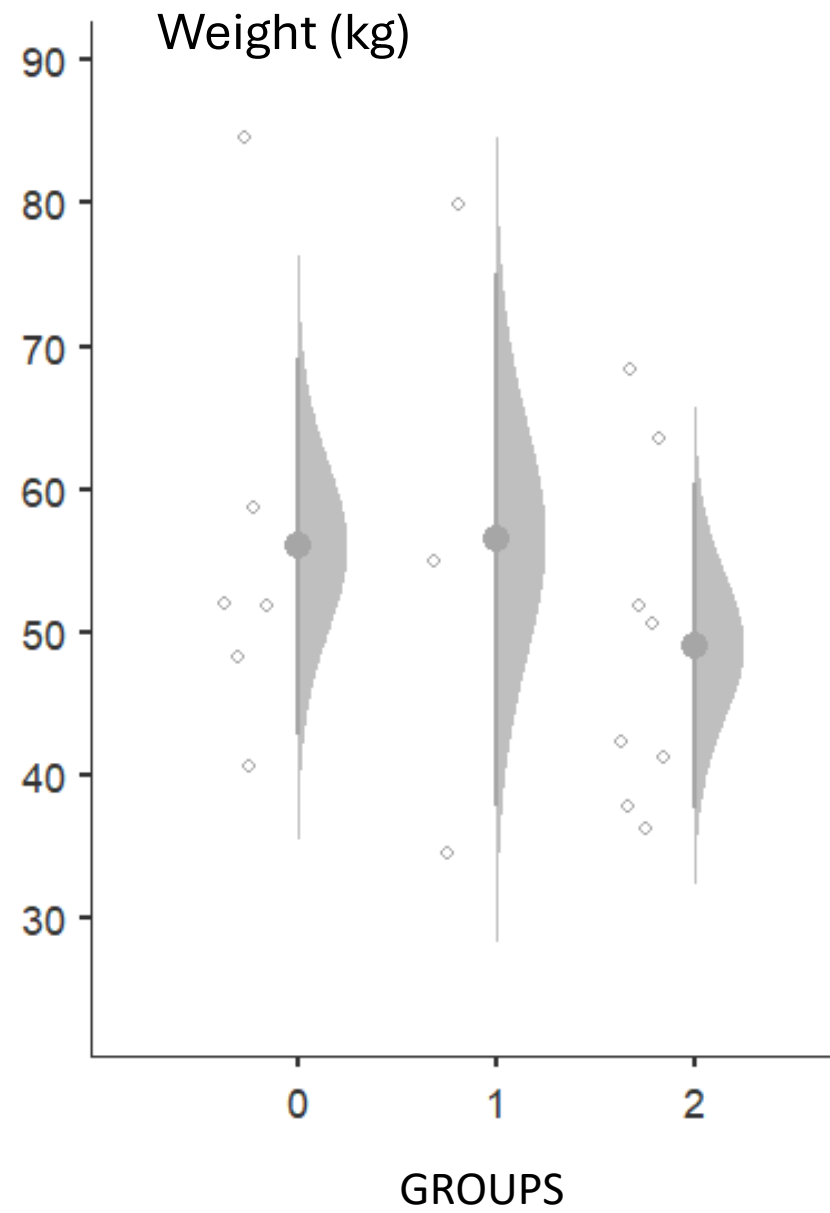
Bioimpedance
Tanita MC-780



- Fat mass %
- Lean mass %
- Bone mass %

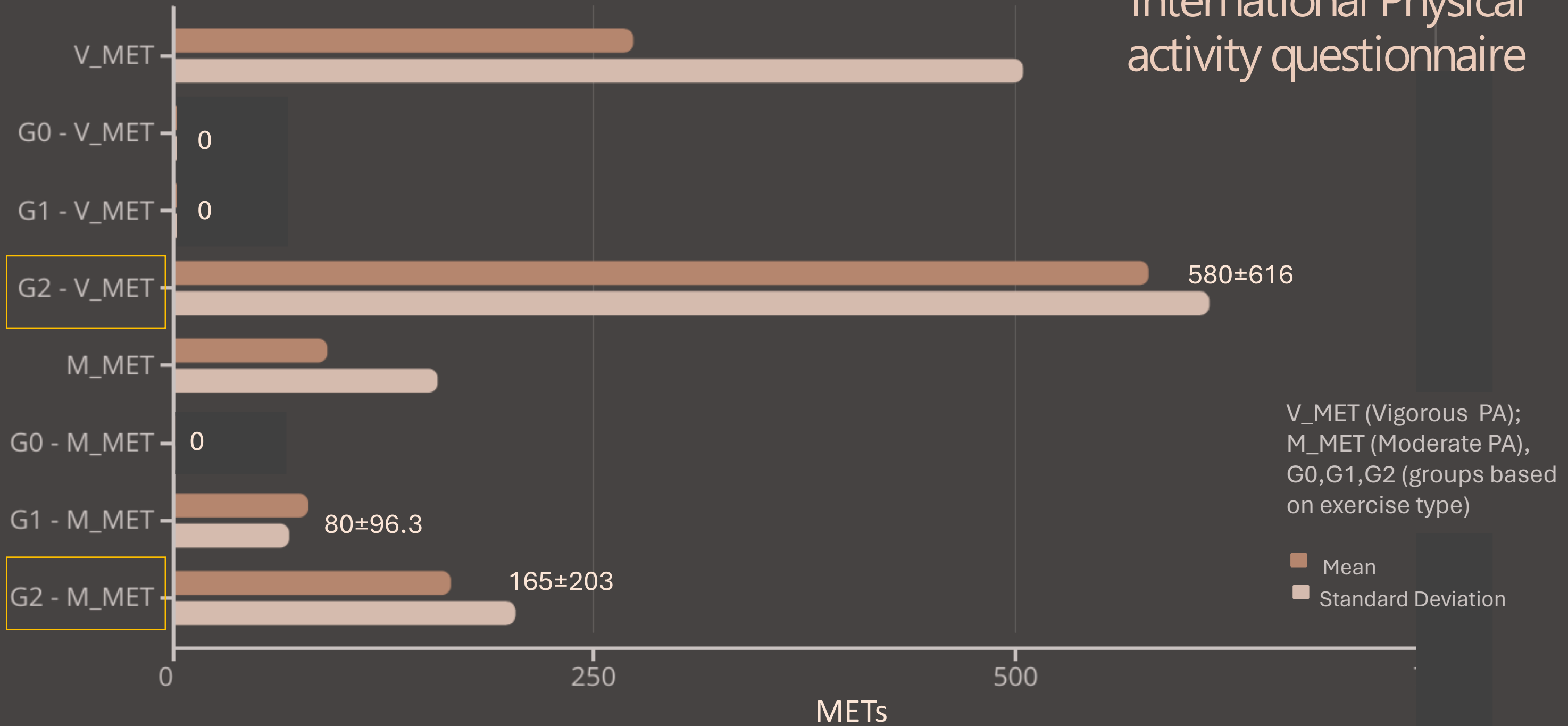
Mean comparison between groups

(95% CI, $p < 0.05$)

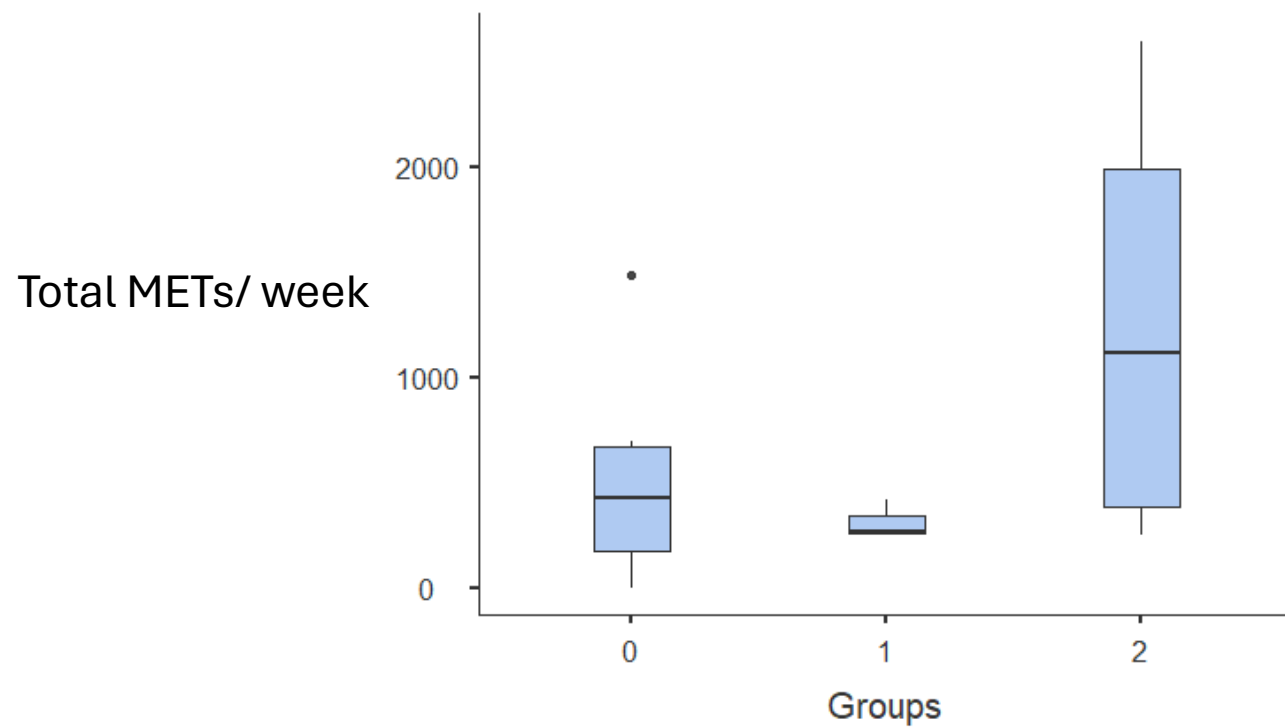
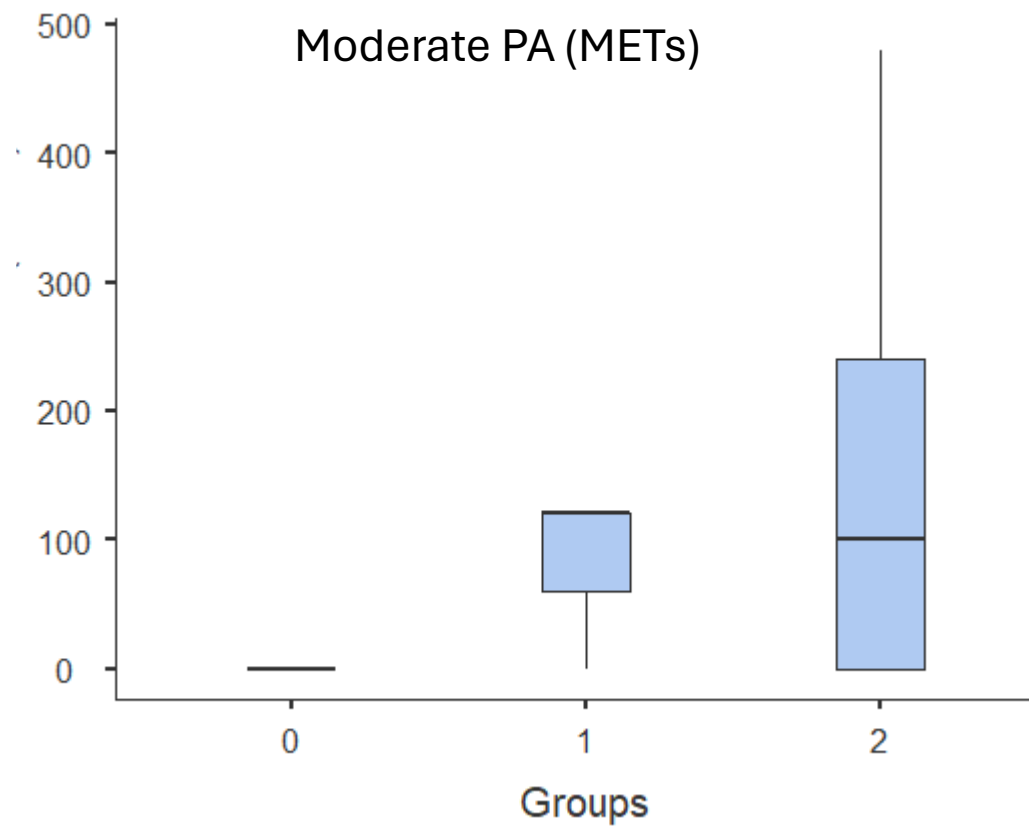
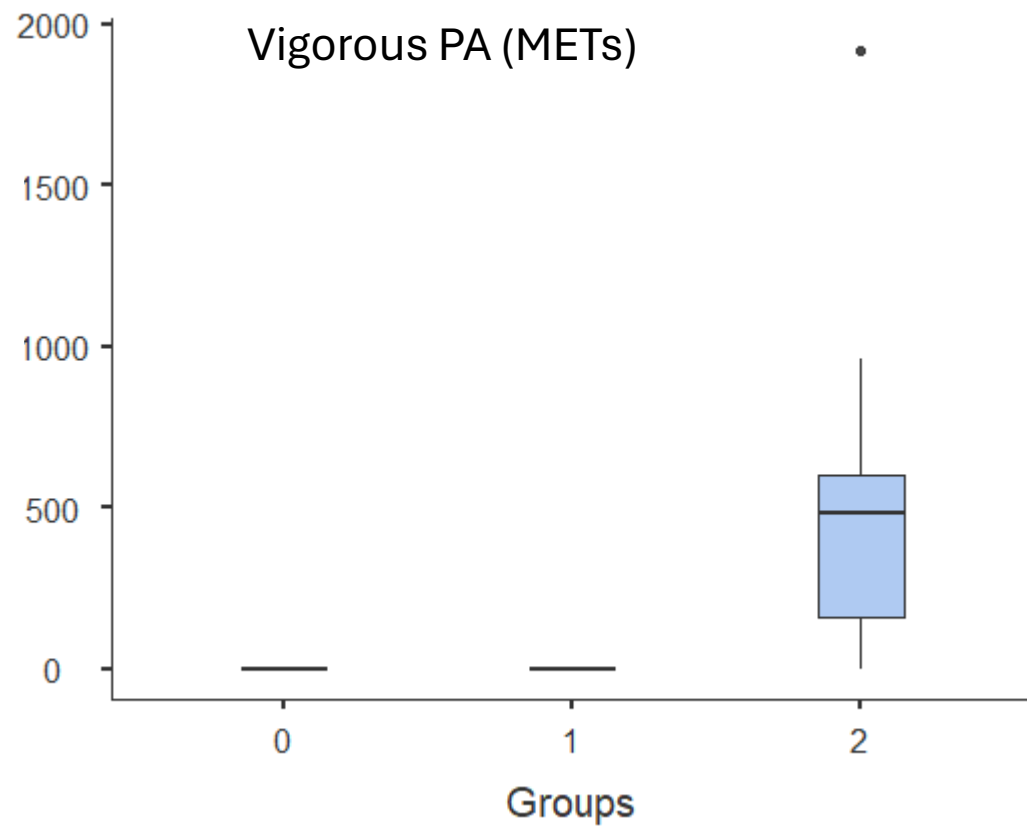


IPAQ

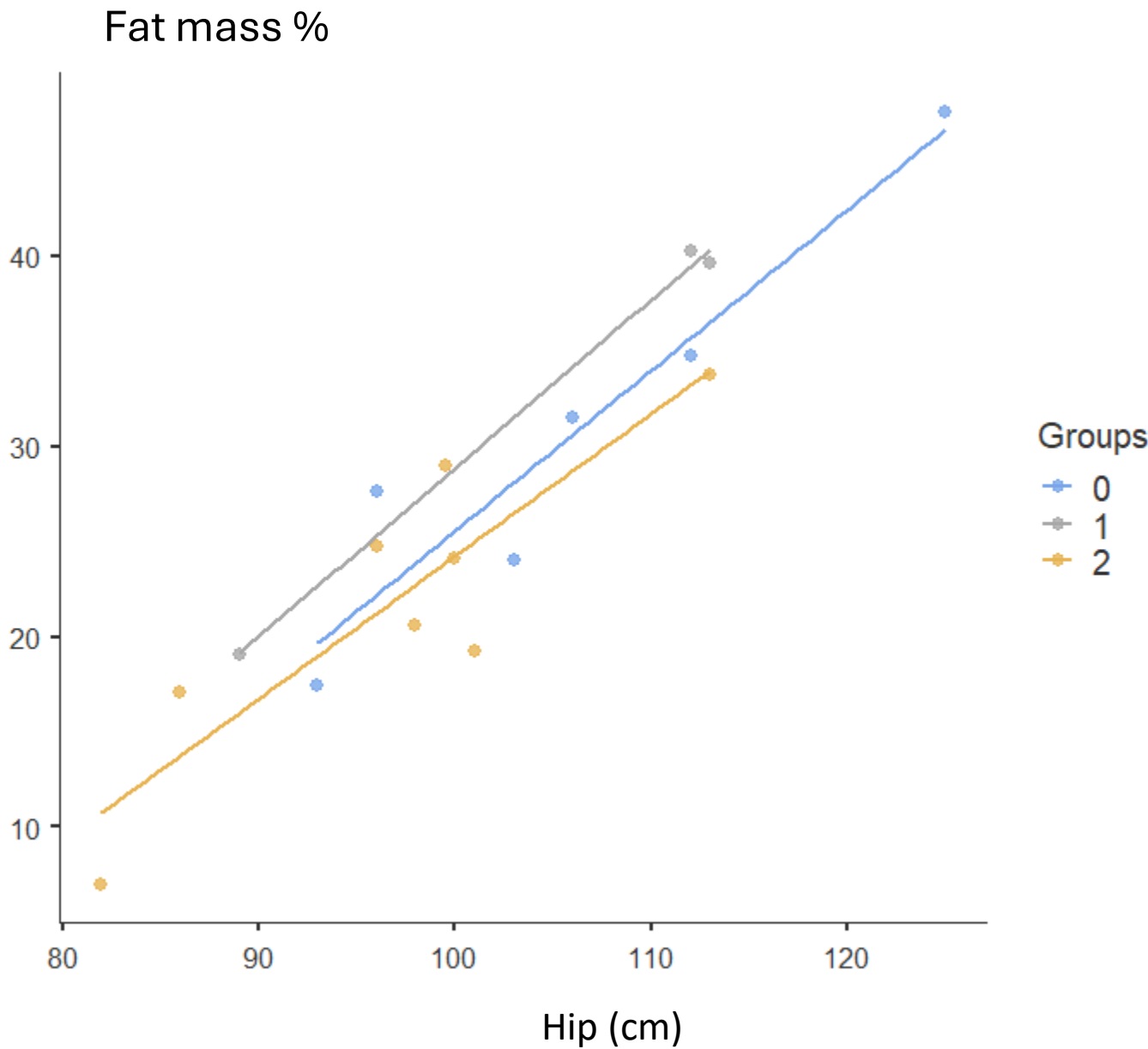
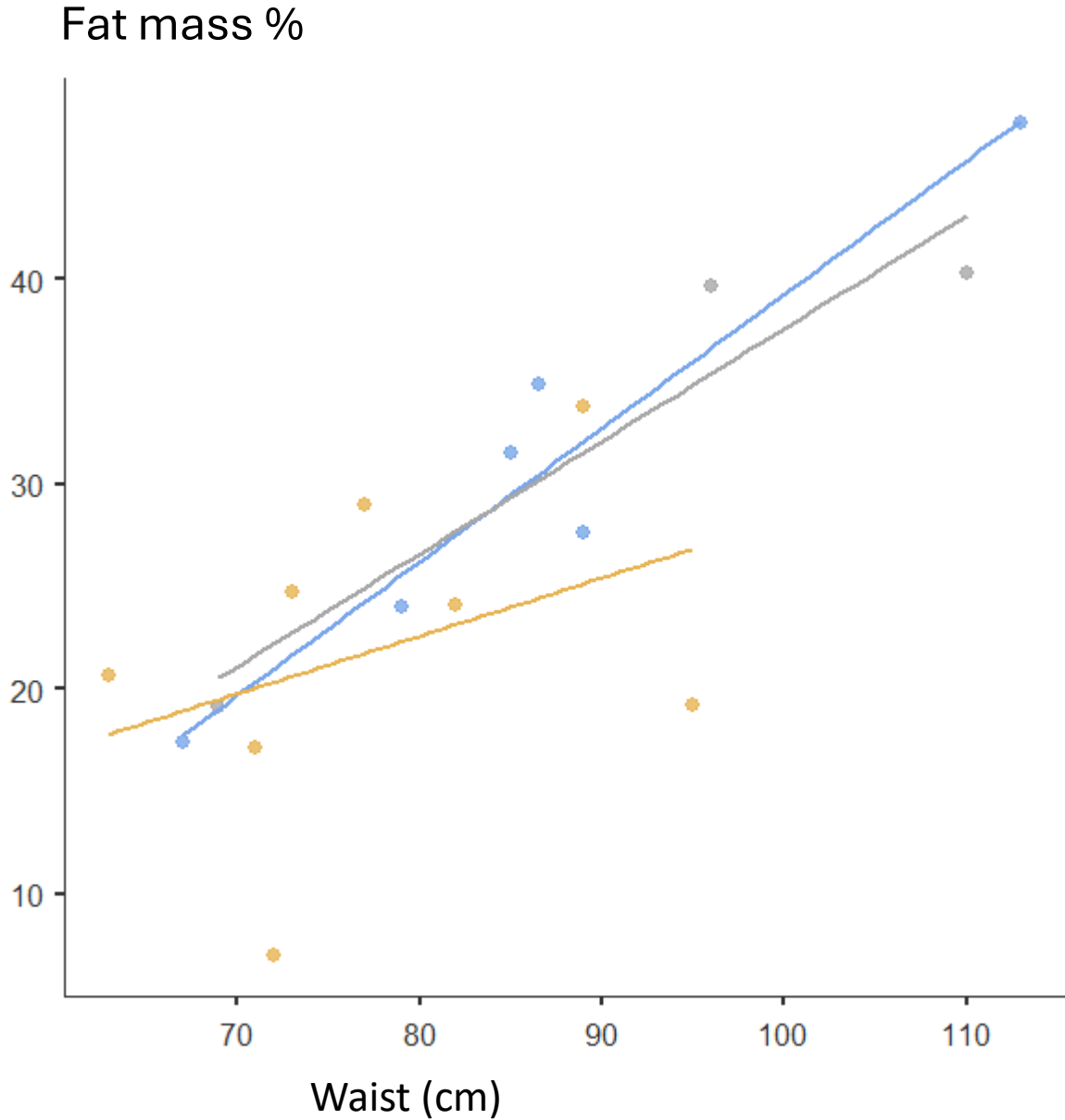
International Physical activity questionnaire



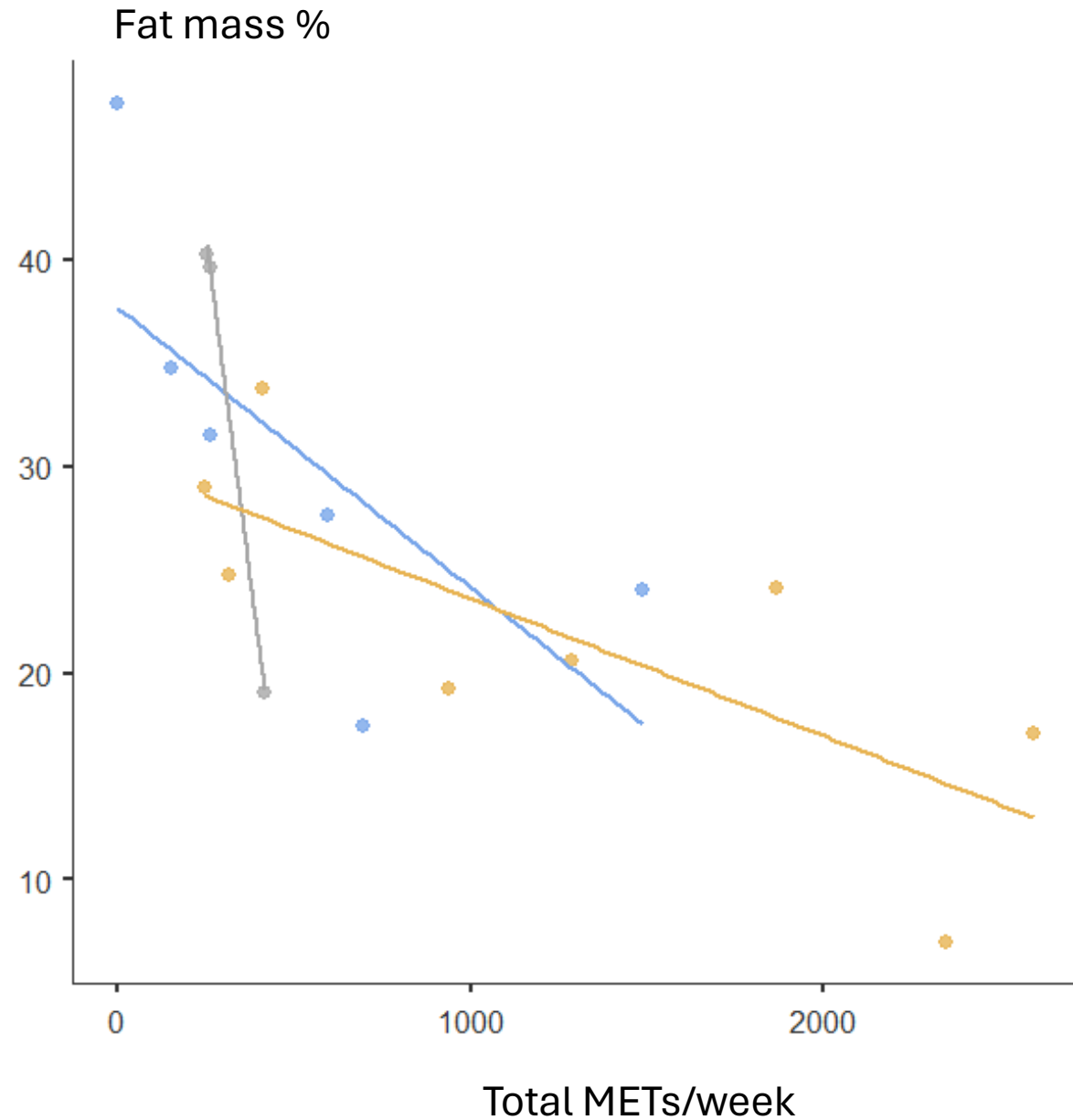
Physical activity in METs



Correlations anthropometric x Body composition



Correlations Body composition x Physical activity

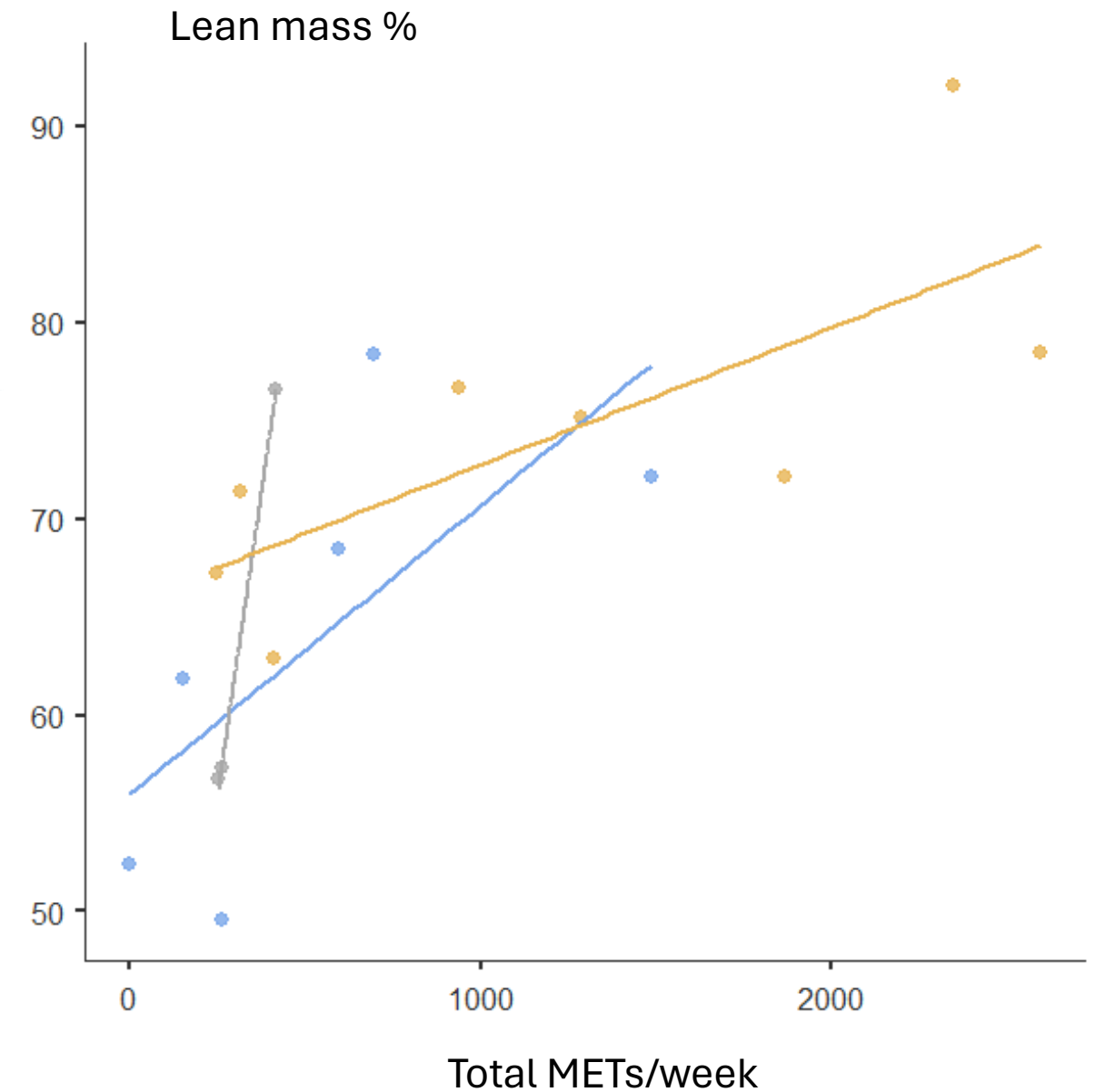


Groups

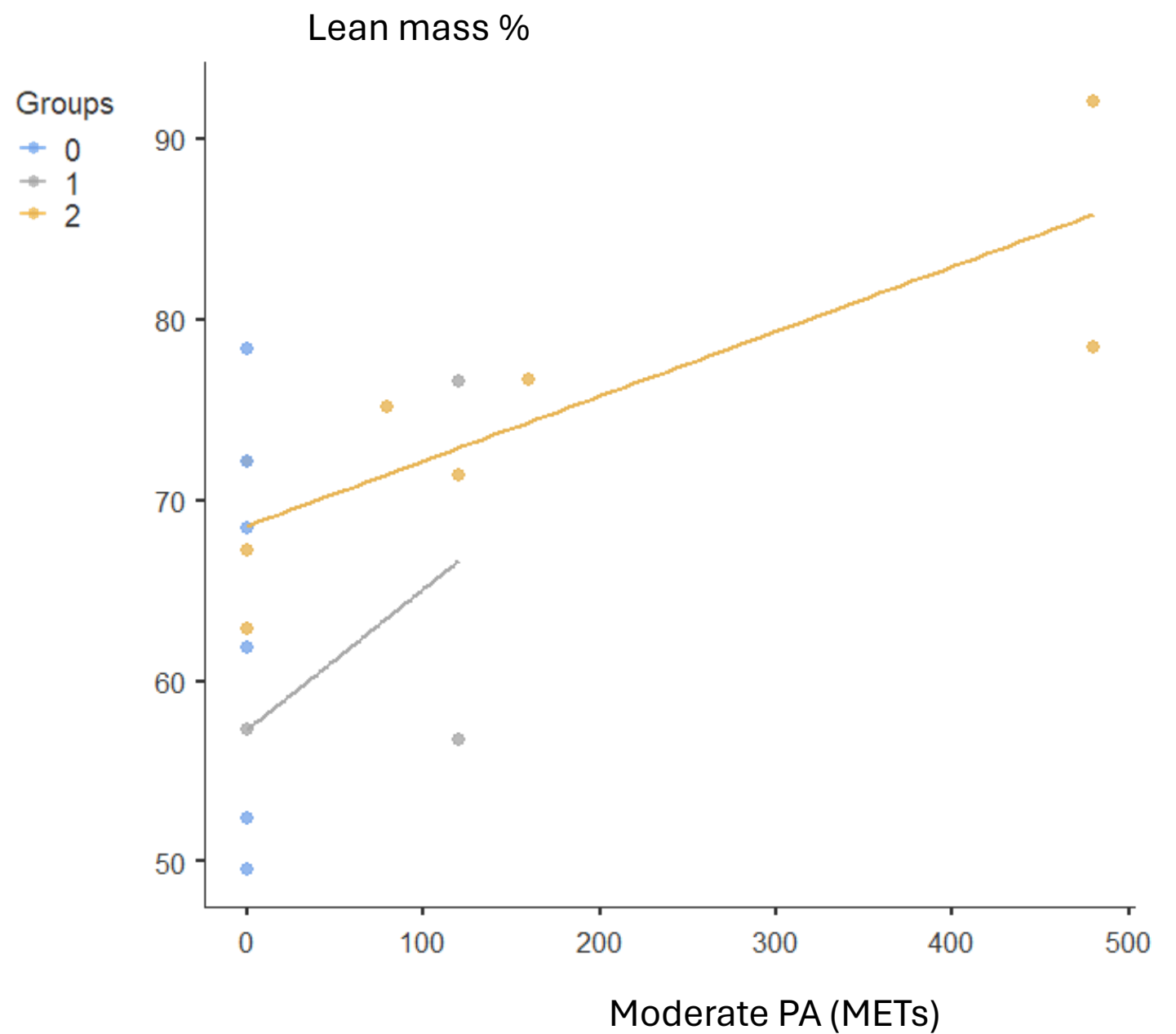
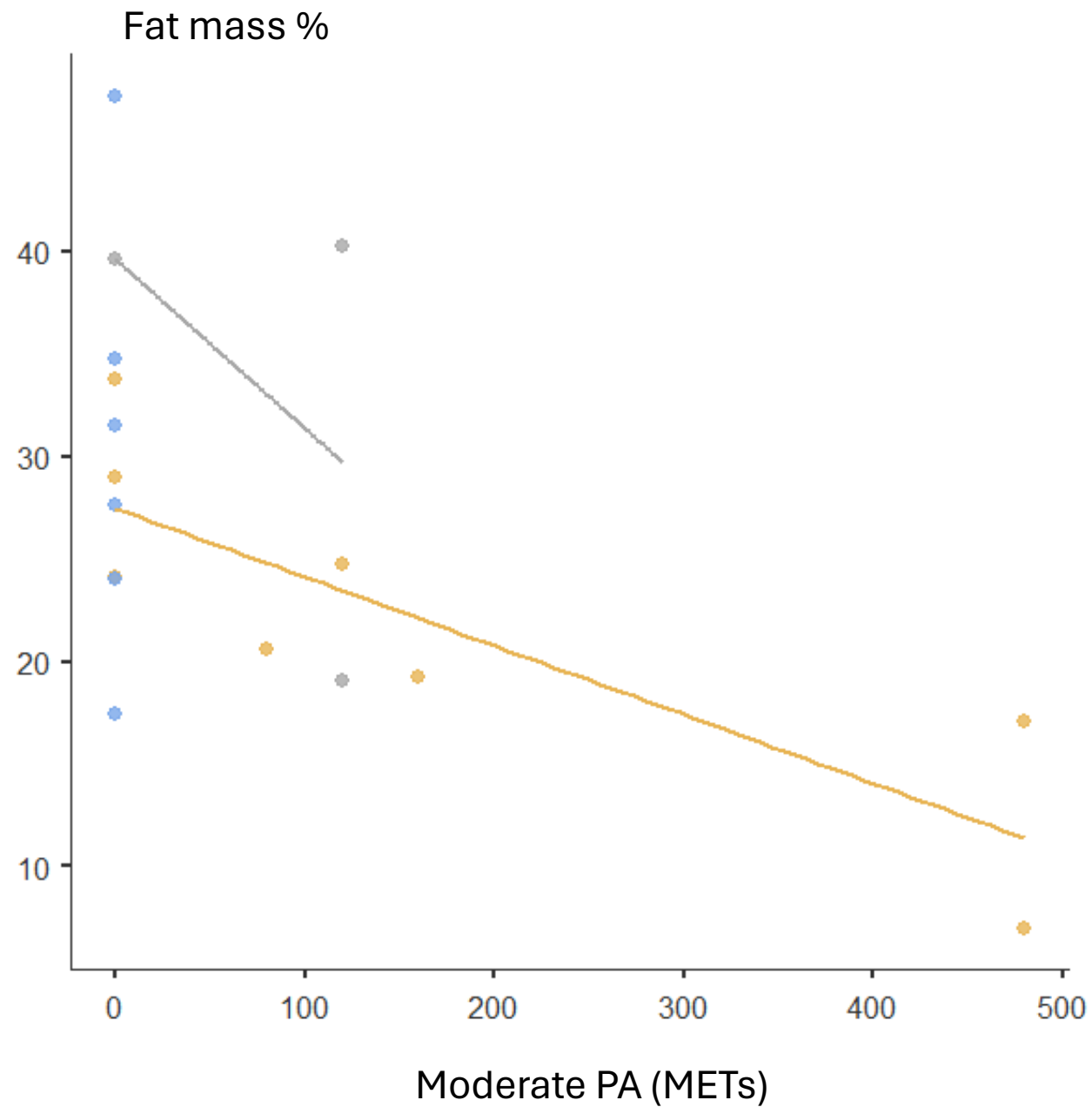
0

1

2



Correlations Body composition x Physical activity



Results summary

21.90

Fat mass %

Lower in G2 vs G0

G2 vs G1

74.50

Lean mass%

Higher in G2 vs G0

G2 vs G1

4.08

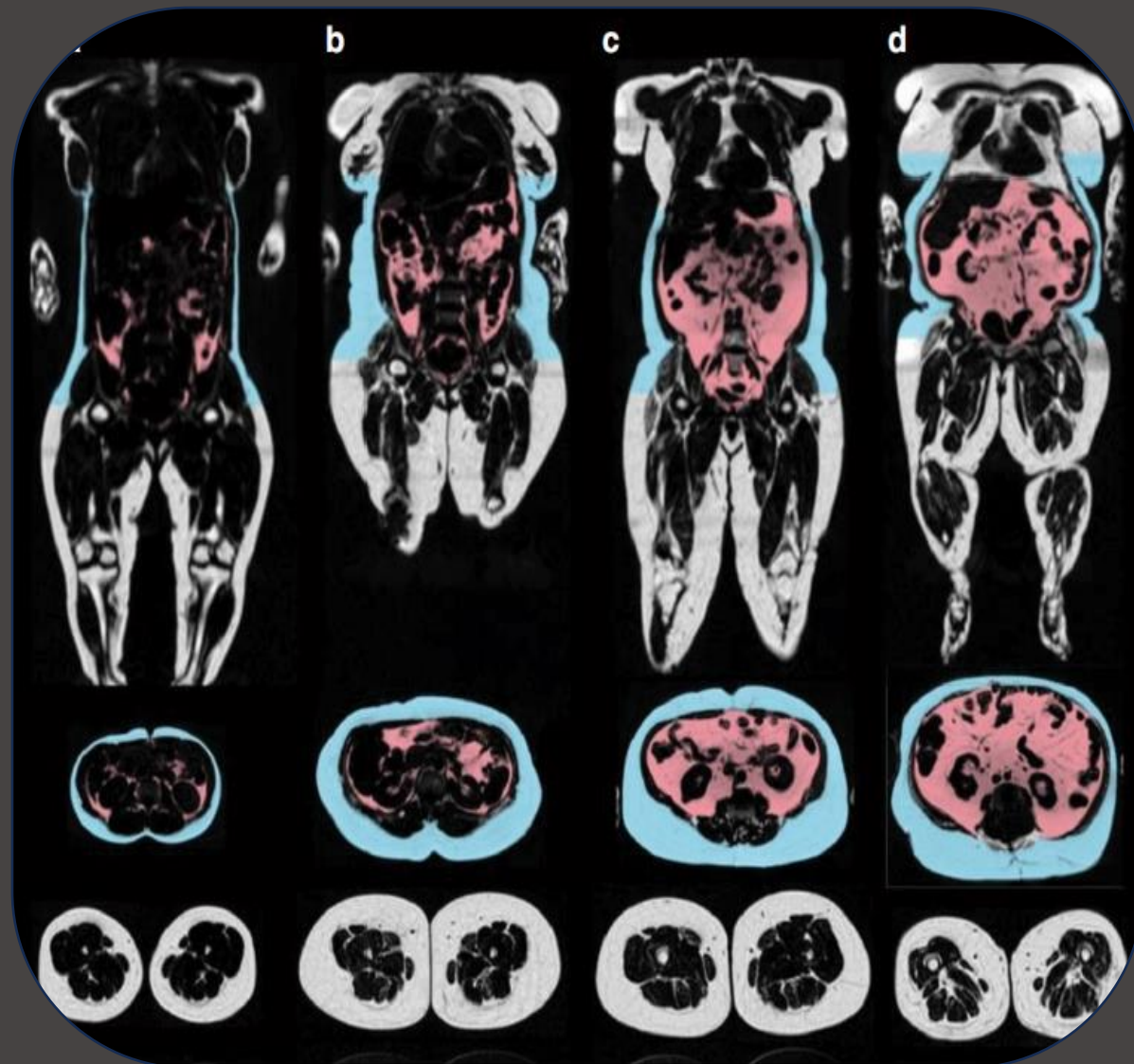
Bone mass %

Higher in G2 vs G0 and

G2 vs G1



Conclusions



Higher adiposity associated with lower MET exercises and physical activity



Improving body composition, may facilitate physical activity participation



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Thank you

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