Sarcopenic Obesity in Facioscapulohumeral Muscular Dystrophy

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Abstract
Background: Sarcopenic obesity has been observed in people with neuromuscular impairment, and is linked to adverse health outcomes. It is unclear, however, if sarcopenia obesity develops in adults with facioscapulohumeral muscular dystrophy (FSHD).

Methods: This research was designed to determine if adults with FSHD meet criteria for sarcopenic obesity (appendicular lean mass index (ALMI) scores of <7.26 kg/m² or 5.45 kg/m²; % body fat of >28% or 40% in men/women). Ten people with FSHD (50±11 years, 2 females) and ten age/sex-matched controls (47±13 years, 2 females) completed one visit, which included a full-body dual-energy x-ray absorptiometry (DXA) scan. Regional and whole body total mass (g), fat mass (FM, (g, %)), and lean mass (LM, (g, %)) were collected; body mass index (BMI, kg/m²) and and sarcopenia measures (appendicular lean mass (sum of arm/leg lean mass, ALM (kg)), ALMI (kg/m²)) were computed.

Results: Although total body mass was similar between adults with FSHD and controls (84.5±12.9 vs. 81.8±13.5 kg, respectively; p=0.65), the proportion of mass due to fat was much higher in FSHD, with many individuals having >50% mass due to fat (means: 40.8±7.0 vs. 27.9±7.5%; p=0.001). ALM volume was 23% lower and ALMI was 27% lower in FSHD (p<0.01). Whole body LM trended to be lower in FSHD vs. controls (p=0.05) and arm and leg LM were both lower in FSHD compared with controls (p<0.05). Furthermore, the % LM was 18% lower in FSHD vs. controls (p=0.001). FSHD participants exhibited greater total body FM (p<0.01), total leg fat mass (p<0.001), and but similar total arm fat mass (p=0.09).

Conclusions: These data demonstrate that people with FSHD, although similar in total body mass to controls, commonly meet the definition of sarcopenic obesity, with significant consequences for quality of life, and implications for disease management.

Full Text
Due to technical limitations, full-text HTML conversion of this manuscript could not be completed.

However, the manuscript can be downloaded and accessed as a PDF.

Tables
**Table 1**: Measures of Body Composition. ALM, appendicular lean mass; kg, kilogram, p<0.05.

| Measures of Sarcopenia | FSHD       | Control    | Significance (p-value) |
|------------------------|------------|------------|------------------------|
| ALM (kg)               | 20.5±4.4   | 26.5±5.9   | 0.02                   |

**Additional Measures of Lean Mass**

| Whole body lean mass (kg) | 47.6±6.0   | 56.6±11.1  | 0.05                   |
| Total arms lean mass (kg) | 5.4±1.1    | 7.5±2.1    | <0.01                  |
| Total legs lean mass (kg) | 15.1±3.5   | 19.0±3.9   | 0.03                   |

**Additional Measures of Adiposity**

| Whole body fat mass (kg) | 33.7±10.1  | 22.0±6.9   | <0.01                  |
| Total arms fat mass (kg) | 3.2±0.9    | 2.5±0.9    | 0.09                   |
| Total legs fat mass (kg) | 10.7±2.4   | 6.0±1.6    | <0.001                 |

**Table 2**: Self-reported comorbidities.

| Do you experience, or have you been diagnosed with the following: | FSHD group | Control group |
|-------------------------------------------------------------------|------------|---------------|
| Heart trouble, an abnormal electrocardiogram, a heart attack, or coronary artery disease? | 2          | 0             |
| Increased thumping of the heart?                                  | 1          | 0             |
| A racing heart?                                                   | 1          | 0             |
| Extra heart beats or skipped beats?                              | 0          | 1             |
| High blood pressure?                                              | 2          | 1             |
| Increased shortness of breath?                                   | 1          | 0             |
| Chronic, recurrent, or morning cough?                            | 0          | 1             |
| Increased anxiety or depression                                   | 4          | 1             |
| Problems with recurrent fatigue, trouble sleeping, or increased irritability? | 4          | 2             |
| Nervousness or emotional problems?                               | 1          | 0             |
| Migraine or recurrent headaches?                                  | 3          | 2             |
| Swollen or painful knees or ankles?                              | 2          | 0             |
| Swollen, stiff or painful joints?                                | 2          | 1             |
| Foot problems?                                                   | 1          | 1             |
| Back problems?                                                   | 0          | 4             |
| Anemia?                                                          | 1          | 0             |

**Table 3**: FSHD Health Index (HI) Survey mean scores.

**Figures**
Appendicular lean mass index (ALMI, kg/m²) in FSHD and Controls. Individuals with FSHD had lower lean mass as compared to controls. *p<0.001

% Body fat in FSHD and Controls. Individuals with FSHD had a higher % body fat, as compared to controls. *p<0.001

% Lean mass in FSHD and Controls. Individuals with FSHD had a lower % lean mass, as compared to controls. *p<0.001