INTRODUCTION

FSHD is an autosomal-dominant disorder that asymmetrically affects the face, shoulders, and upper arms and later progresses to affecting the trunk and lower extremities. Symptoms usually begin before the age of 20 with a prevalence thought to occur around 4-10 per 100,000 people (1,2). The pathogenesis has been linked to the inappropriate expression of DUX4, a gene usually limited to the germline, that relaxes the chromatin either by a loss of macroautosomes (D4Z4) or mutations in the structural maintenance of chromosome flexible hinge domain containing gene 1 (SMCHD1) (3).

Figure 1. Pathogenesis of FSHD (4)

Figure 2. Signs of FSHD (5)

Much has yet to be done with validating clinical outcome measures that are sensitive to significant disease progression and correlating these with patient’s perception of the condition (6-8). The World Health Organization defines health-related quality of life as a multidimensional concept including physical, psychological, and social health dimensions (9,10). The need for easily administered measures of health-related quality of life that are sensitive to changes in treatments across ages and disease severity is becoming increasingly apparent. The US Food and Drug Administration has strongly recommended including patient-reported outcome (PRO) measures as endpoints in all clinical trials (11, 12).

Prior studies have shown relationships between PRO measures may not be as expected at times. Instead of associations with weakness, PRO measures were found to be more associated with ADLs, pain, and fatigue depending on the patient population (12). Furthermore, more patients have reported the social role limitations were of greater importance than those of facioscapulohumeral weakness (13).

OBJECTIVES

• Explore the relationship among clinical and person-reported measures of strength and function and health-related quality of life.
• Evaluate magnitude of change in scores over time according to age or duration of symptoms.

MATERIALS & METHODS

This is a retrospective study of pre-existing data from the NIDRR-funded study entitled “State-of-the-Art Clinical Endpoints versus Person-Reported Outcomes in Individuals with Neuromuscular Disease: Reliability, Validity, and Responsiveness to Change” (PI: Craig McDonald, Co-PI: Henrikson) (9).

Patients’ results will be from a de-identified data set from the REDCap data management system. There will be no access to identifiable PRO and it is anticipated that the study will be exempt from IRB review. They were assessed at initial visit and again one year later. 25 initial patients were assessed and 18 followed up in a year. An estimate of arm strength was created averaging elbow flexion and shoulder abduction and adjusting for weight.

Table 1. Descriptive statistics (n=41)

RESULTS

Figure 2. Signs of FSHD (6)

Table 2. Strong correlation among average pain, general activity, mood, walking ability, normal work, relations with others, sleep, and enjoyment of life in Brief Pain Inventory (p < 0.01, r = 0.001)

Person’s feeding and drinking

MATERIALS & METHODS

This is a retrospective study of pre-existing data from the NIDRR-funded study entitled “State-of-the-Art Clinical Endpoints versus Person-Reported Outcomes in Individuals with Neuromuscular Disease: Reliability, Validity, and Responsiveness to Change” (PI: Craig McDonald, Co-PI: Henrikson) (9).

Patients’ results will be from a de-identified data set from the REDCap data management system. There will be no access to identifiable PRO and it is anticipated that the study will be exempt from IRB review. They were assessed at initial visit and again one year later. 25 initial patients were assessed and 18 followed up in a year. An estimate of arm strength was created averaging elbow flexion and shoulder abduction and adjusting for weight.

Table 1. Descriptive statistics (n=41)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>53.2</td>
<td>13</td>
<td>80</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>169.2</td>
<td>103</td>
<td>184.5</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>178.2</td>
<td>41.7</td>
<td>224</td>
</tr>
<tr>
<td>Weight-adjusted strength of elbow flexion and shoulder abduction</td>
<td>0.15</td>
<td>0.07</td>
<td>0.44</td>
</tr>
<tr>
<td>Average Pain</td>
<td>4.07</td>
<td>1.90</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Figure 3a. On average a ten-year increase in age is associated with a 1.3 percent decline in arm strength as a percentage of overall body weight (p=0.037) (n=38)

Figure 3b. On average a one-hundred-meter decrease in six-minute walk distance is associated with a 2.2 percent decrease in arm strength as a percentage of overall body weight (p=0.049) (n=15)

Figure 4. Decline in strength with pain (1 low, 2 medium, and 3 high), *p<0.05

Figure 5. Decline in strength with ability to get in and out of a car and doing regular activities with others, *p<0.05, **p<0.001

Figure 6. Decline in strength with feeling depressed and ability to cope with condition, *p<0.05, **p<0.001

Figure 7. Decline in strength with ability to do household chores, *p<0.05, **p<0.001

Figure 8. Decline in strength with ability to stand on one foot, *p<0.05, **p<0.001

Figure 9. Decline in strength with ability to walk up stairs, *p<0.05, **p<0.001

REFERENCES

5. Grandomics Biosciences Co. [https://www.grandomics.com/fshd/]
6. NIH Workshop on translational Research in Muscular Dystrophy: June 25-27, 2007; Silver Spring, MD.

ACKNOWLEDGEMENTS

Many thanks to Dr. Henrikson, Dr. McDonald, and the Department of Physical Medicine and Rehabilitation for mentorship and help this past year.

CONCLUSIONS

• As expected, strength in arms and legs both decrease with age and disease progression when normalized for body weight.
• Strong correlation with level of pain, general activity, mood, walking ability, and related QOL outcomes, relationships with others, sleep, and enjoyment of life provide an indication that these domains should be addressed from a psychosocial standpoint in regular assessment.
• Declining strength is strongly associated with pain at later stages.
• Questions regarding mobility and social activities are sensitive to changes in strength.
• More work needs to be done to explore the relationships among weakness, pain, reduced social activity, and depression.