Parent Prioritization of Meaningful Treatment Targets for Sanfilippo Syndrome

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INTRODUCTION

Sanfilippo syndrome (MPS III) is a rare, degenerative condition with no approved therapies. This study is part of a larger project to inform new therapy development for Sanfilippo syndrome. Prior qualitative research informed the development of a quantitative survey of caregivers. Here, we report survey results on caregiver priorities for meaningful treatment benefits.

METHODS

- A Best-Worst Scaling (BWS) case 1 experiment was conducted via an online survey of caregivers of children with Sanfilippo syndrome.
- BWS methodology elicits preference weights for different attributes—in this study, features that represent the impact of Sanfilippo syndrome. Features were selected based on previous qualitative research which identified highly-valued treatment targets of Sanfilippo caregivers.
- Participants completed 12 choice sets to select features that they considered most- and least-important to address in the context of a non-curative therapy. Figure 1 depicts an example of a BWS choice set item.
- Subgroup analysis was conducted based on child's age and caregiver ratings of their child's disease-specific symptoms. Log-odds importance weights were estimated using random-parameters logit for age group (6 or younger vs 7 or older) and stage (early/mid vs later) based on symptom progression. Due to small sample sizes for Sanfilippo syndrome subtypes C and D, only simple scores (i.e., best-worst scores) were calculated for sub-type analysis. Cluster analysis allowed for estimates of a child's disease stage based on a combination of caregiver-reported cognitive ability, self-feeding ability, and autistic behaviors.

	Median
Age	41.4*
	(26-70+)
	Count
	(n = 164)
Total Countries	16
USA	116
Other countries	47
	Count
Marital Status	
Married/Partnered	137
Separated/Divorced	15
Single	12
Sex	
Female	124
Male	40
Relationship to Child	
Biological Mother	122
Biological Father	37
Step-parent	2
Other	2
Race	
White	146
Asian	7
Hispanic/Latino	4
More than 1	4
Other	3

Table 1. Characteristics of Participant Caregivers

	Median
Age	10.3*
	(1-40+)
	Count
	(n = 164)
Sex**	
Male	76
Female	82
Sub-type	
A	116
B	37
C	10
D	1
Staging	
Mild/Moderate Stage	94
Severe/End Stage	70

Table 2. Characteristics of Participant's Child

If a new treatment could improve one of these symptoms, which would be the most important to improve for your child? Which would be the least important to improve?
Click here for a reminder about what the items mean

Most Important		Least Important
○	Sharing feelings back and forth	○
●	Unsafe behaviors	○
○	Feeling unwell	○
○	Hyperactivity	●
○	Aggressive/impulse to others	○
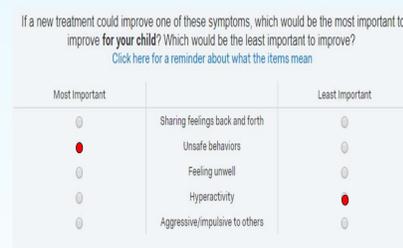
Figure 1. Example BWS Item Set

RESULTS

164 caregivers of children and adults with Sanfilippo syndrome completed the Best-Worst Scaling item sets. Tables 1 and 2 detail participant and child characteristics.

BWS Results by Child's Age (Figure 2)
- Across both age groups, features with highest importance weights were having pain and unsafe behaviors.
- Hyperactivity (p=0.001) and communicating "no" (p=0.026) were significantly more important for caregivers of younger children. Trouble getting around (p<0.001), sleep (p=0.019), and unsafe behaviors (p=0.019) were significantly more important for caregivers of children aged 7 and older.

BWS Results by Disease Stage (Figure 3)
- Pain and unsafe behaviors remained the most prioritized features across stage of disease.
- Caregivers of early/mid-stage children were significantly more likely to prioritize aggressive/impulsive behaviors (p<0.001), paying attention (p<0.001), feeling frustrated (p=0.001), and following directions (p=0.002) than caregivers of later stage children.
- Caregivers of later-stage children prioritized trouble getting around (p<0.001), worry/anxiety (p<0.001), sleep (p=0.001), and sharing feelings (p=0.028), significantly more than caregivers of early/mid-stage children.

BWS Results by Disease Sub-Type
- Simple scores reveal caregivers of children with Type A and B similarly prioritized having pain, unsafe behaviors, and feeling unwell.
- For Type C, caregivers prioritized aggressive/impulsive toward others, not enough sleep, and having pain.
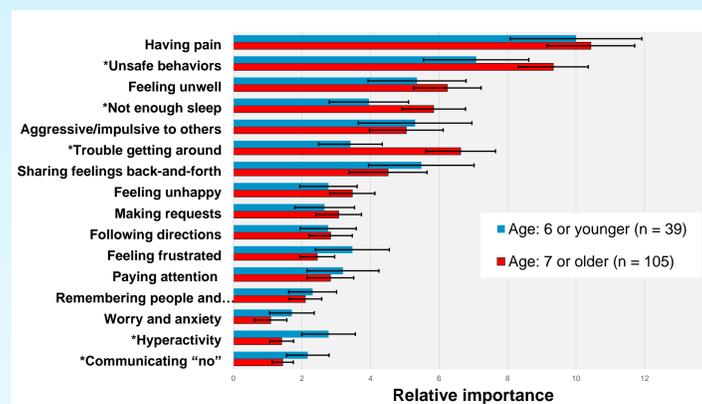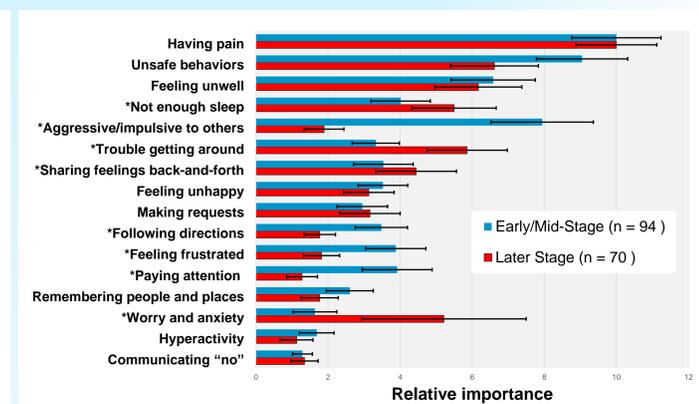

Figure 2. BWS by Age

Figure 3. BWS by Stage

CONCLUSIONS

Caregivers' relative treatment priorities reinforce the multi-symptom impacts of Sanfilippo syndrome.

The top set of prioritized features span several domains:
- Health: pain, sleep, and feeling unwell
- Behavioral: hyperactivity, unsafe and aggressive/impulsive behaviors
- Motor: trouble getting around
- Communication: communicating "no" and sharing feelings back-and-forth and

Pain and safety, two areas important to child and family quality of life, were most prioritized. Though there were differences by age and severity that reflect the child's changing needs and function as the condition progresses, overall caregivers' priorities for disease stage features were fairly consistent.

Additional research targeting the rarer subtypes C and D may elucidate whether there are distinct treatment priorities of those caregivers.

This study provides insight into caregivers' treatment priorities that will help inform development of therapeutics. Results here indicate that targeted, non-curative therapies that extend beyond global cognitive ability are highly valued by caregiver participants.

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