Children with growth hormone deficiency (GHD) typically have normal body proportions,1,2 but may look chubbier, be much shorter, and younger for their age compared with most children of the same age and gender.

Many children with GHD can reach normal height with growth hormone (GH) replacement treatment.

Treatment requires daily injections, which can be painful and disruptive, and for most children, the injections are administered by an adult, usually their parent.

Unfortunately, little is known about the burden that a child’s GHD treatment places on the parent and no disease-specific measures exist to assess this impact.

The Growth Hormone Deficiency – Parent Treatment Burden Measure (GHD-PTB) was developed according to United States (US) Food and Drug Administration/European Medicines Agency guidelines to address this gap.3–4

Items were based on qualitative interviews with 31 parents of children with GHD, aged 4 or less than 13 years, to develop the concepts assessed in the measure.5 Cognitive debriefing interviews with an additional 13 parents confirmed relevance and readability (comprehension) of items and instructions.

Psychometric testing was conducted to determine the measurement properties, reliability, validity, and interpretability of the measure. This study presents the GHD-PTB psychometric validation results.

Methods

Study design

A non-interventional, multi-clinic-based study was conducted in the USA and the United Kingdom with pre-pubertal children with GHD and parents/guardians of similar children.

Psychometric analyses were conducted according to an a priori statistical analysis plan to determine a final item set. All completed questionnaires were included in the analyses.

The child patients with GHD were treated with commercially available GHD treatment, and parents/guardians of similar children.

Convergent construct validity was assessed with Pearson’s correlation, between the measure scores and the other items or total score, floor or ceiling effects, poor fit or response options.5

Known-groups validity hypotheses were proven for the hypotheses using known groups of patients with GHD (aged 4 to less than 9 years).

The child patients with GHD were treated with commercially available GHD treatment, and parents/guardians of similar children.

Results

The analytic data included 98 parents (mean age of children 9.2 years and parents: 41.6 years), who were predominantly mothers (80.7%), married (94.9%), and worked full-time (83%)

Respondents answered all items using the full range of response options (0 “Not at all/lower” to 4 “Extremely/lower of the time”) for all items except one (Child’s treatment interferes with social life), to which no one responded 4.

Ceiling effects, responses of “Not at all/lower” (where respondents could not get any better), ranged between 39.5% to 74.9%.

Factor analyses identified two domains: Interference in Daily Life and Emotional Well-being (Figure 2).

During item reduction, four items were dropped due to high correlations indicating conceptual redundancy resulting in a final GHD-PTB 8-item measure (Figure 3).

For each domain and the Overall score, internal consistency reliability was acceptable (Cronbach’s alpha > 0.70) as was test-retest for Emotional and Overall (>0.70) and slightly lower than expected for Interference (0.66).

Convergent validity hypotheses for domains and Overall were supported.

Known groups validity hypotheses were proven for the Emotional domain, which discriminated between whether the parent gave the injections more often than the child (p<0.05) and the Overall domain (p<0.5).

The length of time their child was on treatment did not discriminate, suggesting that treatment continues to be interfering over time.

Marked improvements after 12 weeks of treatment were noted for Emotional and Overall domains (16.6 and 8.6 points).

The Interface domain score had a very small improvement.

Assessed effect sizes were 0.24 (Emotional) and 0.69 (Overall), indicating that the GHD-PTB is sensitive to change at high levels.

Preliminary recommendation for the MID is 7 points for the Overall, 10 for Emotional Well-Being and 6 for the interference domains.

Summary

Conclusions

The GHD-PTB was found to be reliable and valid and is considered ready for inclusion in clinical trials and clinical practice.

Since parents are often primarily responsible for administering and ensuring compliance of treatment for young children, accurate and reliable assessment of their treatment burden can help researchers and clinicians better assess the broader range of treatment impacts.

Less frequent treatment requirements may reduce this burden for parents.

References

1. The analytic data included 98 parents (mean age of children 9.2 years and parents: 41.6 years), who were predominantly mothers (80.7%), married (94.9%), and worked full-time (83%)

2. A minimum correlation of 0.70 was expected.


4. The clinical trial was sponsored by Novo Nordisk A/S.

5. MB and SA are consultants to Novo Nordisk A/S. MHR, KV, and JB are employees of Novo Nordisk A/S.

6. This research was supported by Novo Nordisk A/S.

7. The clinical trial was sponsored by Novo Nordisk A/S.

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9. This research was supported by Novo Nordisk A/S.

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