Non-Hyperphagic Factors Influencing Hyperphagia Questionnaire Scores in Bardet-Biedl Syndrome

Anna Isberg
Fritz Wenzel Clinical Research Center

Anna Isberg, Jeremy Pomeroy, PhD
Fritz Wenzel Clinical Research Center

Background: Bardet-Biedl Syndrome (BBS) is a rare heterogeneous genetic disorder with widespread symptoms, including obesity and hyperphagia, or excessive appetite. Hyperphagia symptoms and intensity are typically assessed using questionnaires, but the degree to which other factors such as age, neurocognitive functioning, language delays, and BBS genotypes influence questionnaire scores is unknown. The purpose of this study was to identify non-hyperphagic factors that influenced hyperphagia questionnaire scores in children with BBS.

Methods: Data from participants in the Clinical Registry Investigating Bardet-Biedl Syndrome (CRIBBS) who were age 4-17 years was used in this analysis. Interviews with a parent or caregiver of the person with BBS included the Hyperphagia Questionnaire (HQ), the Social Communication Questionnaire (SCQ), items about speech and language development, and genetic testing results. Spearman's correlations and Wilcoxon tests were used to evaluate associations between HQ scores (total and subscale scores) and various non-hyperphagic factors, including age, SCQ scores, language development, and pathogenic variants in BBS1 or BBS10 genes.

Results: All HQ scores were significantly correlated with age, including total (n=131, r=-0.36, p<0.001), as well as subscale scores for drive (r=-0.40, p<0.001), behavior (r=-0.29, p=0.009), and severity (r=-0.21, p=0.0182). In addition, HQ total (n=68, r=0.34, p=0.0049), drive (r=0.31, p=0.0115), and behavior (r=0.35, p=0.0044) scores were significantly correlated with SCQ scores after controlling for age. Participants who were reported to get frustrated or upset when not understood by others had significantly higher HQ drive (n=161, Wilcoxon two sample test p=0.0416) subscale scores than participants not reported to get frustrated or upset. Participants reported to know when others felt sick or sad had significantly lower HQ total (n=163, Wilcoxon two sample test p=0.0002), drive (p=0.0002), behavior (p=0.0025), and severity (p=0.001) scores than those not reported to know. There were no significant differences in HQ scores between participants with BBS1 or BBS10 genotypes.

Conclusions: Younger ages and higher SCQ scores were significantly correlated with higher HQ scores. Participants with some speech and language deficits also had significantly higher HQ scores, while no significant association between BBS genotypes and HQ scores emerged. These non-hyperphagic factors may prevent hyperphagia from being validly assessed using extant hyperphagia questionnaires, and likely need to be considered further to guide the clinical development of personalized therapies.