Adherence to Polyethylene Glycol Treatment in Children with Functional Constipation Is Associated with Parental Illness Perceptions, Satisfaction with Treatment, and Perceived Treatment Convenience

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Objectives To assess treatment adherence in children with functional constipation and to evaluate the association with parental beliefs about medication, illness perceptions, treatment satisfaction, and satisfaction with information about medication.

Study design A cross-sectional survey was administered among parents of children with functional constipation treated with polyethylene glycol. Adherence was measured via the Medication Adherence Report Scale (MARS-5, score 5-25), with greater scores indicating better adherence (scores ≥23 were defined as adherent). Beliefs about medication, illness perceptions, satisfaction with treatment, and satisfaction with information about treatment were measured with the Beliefs about Medication Questionnaire, the Brief Illness Perception Questionnaire, the Treatment Satisfaction Questionnaire for Medication (TSQM), and the Satisfaction with Information about Medication Questionnaire. Associations between the questionnaire scores and adherence (MARS-5 score as a continuous variable) were analyzed with regression analyses.

Results In total, 43 of 115 included children (37%) were adherent (MARS-5 ≥23). Spearman rank correlation test revealed a statistically significant correlation between TSQM-convenience, TSQM-satisfaction, Brief Illness Perception Questionnaire question 8 (emotions), and the MARS-5 score (r_s 0.342, $P = .000$; r_s 0.258, $P = .006$; r_s –0.192, $P = .044$), which suggests that parental perceived treatment convenience, satisfaction with treatment, and illness perceptions may affect adherence in children with functional constipation. In the hierarchical multivariate regression model, 22% of the variability of the MARS-5 score could be explained by the selected predictors. The TSQM-convenience score contributed the most to the model (β: 0.384, $P = .000$).

Conclusions Parents reported low adherence rates in their children with functional constipation. Treatment inconvenience, dissatisfaction with treatment, and the emotional impact of functional constipation may negatively influence treatment adherence. *(J Pediatr 2018;■■:■■-■■).*

Functional constipation affects between 0.7% and 29.6% of children worldwide.[1] It is a common reason for consultations to pediatricians and pediatric gastroenterologists and is associated with substantial healthcare costs.[2,3] Treatment of functional constipation consists of a combination of nonpharmacologic and pharmacologic interventions.[4] Nonpharmacologic interventions involve education and demystification, scheduled toilet sits, instating a reward system, and keeping a defecation diary. Pharmacologic treatment primarily consists of laxative treatment with polyethylene glycol and comprises 3 steps: disimpaction, maintenance treatment, and weaning.[5] After 6-12 months of treatment, approximately 50% of patients visiting a pediatric gastroenterologist are off laxatives and recovered, but 40% of patients remain symptomatic despite intensive pharmacologic treatment.[5,6] Although prognostic factors for treatment failure in children with functional constipation have been poorly studied, treatment adherence is thought to play an important role.[7]

Adherence is defined as "the extent to which a person's behavior, in terms of taking medication, following diets, or executing lifestyle changes, coincides with medical or health advice."[8] Nonadherence to pharmacologic maintenance treatment is common in children with chronic diseases and is considered a strong predictor of poor outcome.[7,9,10] Nonadherence can either be intentional (ie, based on an active decision to change the dose or not to take the medication) or unintentional (eg, forgetfulness, carelessness or as a consequence of a lack of capacity or resources).[11,12] Adherence is considered to

B-IPQ	Brief Illness Perception Questionnaire
BMQ	Beliefs about Medication Questionnaire
MARS-5	Medication Adherence Report Scale
SIMS	Satisfaction with Information about Medicines Scale
TSQM	Treatment Satisfaction Questionnaire for Medication

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be influenced by various determinants. Previous studies in children with chronic conditions have shown that adherence is associated with parental beliefs about medication, illness perceptions, treatment satisfaction, and satisfaction with information about medication.[12-14]

Studies on treatment adherence in children with functional constipation are scarce, and factors associated with treatment adherence in children with functional constipation remain poorly understood. Therefore, the aim of this study was to evaluate treatment adherence in children with functional constipation and identify associated factors.

Methods

For this cross-sectional questionnaire study, we included children aged 0-18 years diagnosed with functional constipation (according to the Rome IV criteria) who were using polyethylene glycol as maintenance treatment.[15,16] Exclusion criteria were limited knowledge of the Dutch language and organic causes of constipation.

We invited families who were eligible to participate during their follow-up visit to the pediatric gastroenterology outpatient clinic in either a tertiary hospital in Amsterdam (The Netherlands) or a secondary care center in Almere (The Netherlands). It should be noted that the Dutch insurance system is designed in such a way that healthcare visits at these centers and laxatives prescribed for chronic use were free of costs.

All parents signed informed consent forms, and all children ≥8 years of age who filled out a questionnaire signed an assent form. All participants were informed that information from the questionnaires would not be shared with their treating physicians. This study was approved by the institutional review board of the Academic Medical Center.

Questionnaire

For children <8 years of age, parents were asked to complete the questionnaire (proxy-report). For children ≥8 years of age, both parents and children were asked to complete separate questionnaires (proxy-report and self-report). The contents of the children's questionnaires were similar to the parent's questionnaires, only with age-appropriate language. Completing the questionnaire took approximately 10 minutes and was done either directly after the outpatient clinic visit at the hospital or at home, after which questionnaires were returned via mail.

In addition to questions on sociodemographics, the study questionnaire incorporated 5 validated questionnaires: the Medication Adherence Report Scale (MARS-5),[17] the Beliefs about Medication Questionnaire (BMQ),[18] the Brief Illness Perception Questionnaire (B-IPQ),[19] the Treatment Satisfaction Questionnaire for Medication (TSQM),[20] and the Satisfaction with Information about Medicines Scale (SIMS).[21] For a previous study, these questionnaires have been translated into Dutch and afterward translated back to English to ensure validation of the translation.[13]

Medication Adherence Report Scale. The MARS-5 questionnaire assesses medication adherence via 5 statements, scored on a 5-point Likert scale (1 = always true and 5 = never true), resulting in a score ranging from 5 to 25.[17] The greater the score, the more adherent patients are considered to be. One item assesses unintentional nonadherence ("I forget to take the medication"), and 4 items relate to intentional nonadherence. The MARS-5 score can be interpreted as a continuous variable and as a dichotomous variable (adherent vs nonadherent); in our study, we chose to use both approaches. There is no consensus on which cut-off value to use for dichotomizing the MARS-5 score; cut-off values in the literature have ranged from 20 to 25.[11,17,22-33] No studies have previously used the MARS-5 in children with functional constipation. We chose to define adherence as a MARS-5 score of ≥23, a cut-off value that commonly has been used for dichotomization of the MARS-5 in previous studies, specifically in pediatric asthma studies.[11,17,26-30]

Beliefs About Medication Questionnaire. The BMQ assesses beliefs about medication and consists of 2 parts; the BMQ-Specific and the BMQ-General.[18] The BMQ-Specific comprises two 5-item sections assessing beliefs about the necessity of prescribed medication (eg, "without my medicines I would be very ill") and concerns about prescribed medication based on beliefs about the disruptive effects of medication and the danger of dependence and long-term toxicity (eg, "having to take medicines worries me").[18] The BMQ-General contains two 4-item sections on medication in general: one pertaining to possible harms that medication could cause (eg, "all medicines are poisons") and one about thoughts on overuse (eg, "doctors use too many medicines").[18,34] All BMQ questions are scored on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) and scores are calculated for all 4 subscales (Specific-Concerns, Specific-Necessity, General-Harm, General-Overuse). By subtracting the Specific-Concerns score from the Specific-Necessity score, the Necessity-Concerns differential score is obtained, which ranges from –20 to 20, with greater scores indicating stronger perceived necessity and/or lower concerns towards the use of medication.[12] The BMQ has been used in previous pediatric studies on medication adherence.[11,12]

Brief Illness Perception Questionnaire. To assess cognitive and emotional perceptions of illness, the B-IPQ was used.[19] This questionnaire uses a single-item scale approach with 8 questions which are rated on a 10-point Likert scale. Greater scores reflect stronger perceptions of the respective item. Questions pertain to cognitive illness perceptions (identity, cause, timeline, consequences, cure-control), emotional perceptions, and overall illness comprehensibility. The ninth and final question of the B-IPQ is an open question on thoughts about the cause of the illness; this item was not included in the analyses in the current study. The B-IPQ has been used in previous studies on adherence in both children and adults.[12,26]

Treatment Satisfaction Questionnaire for Medication. The TSQM assesses treatment satisfaction and consists of 14 ques-

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