

Predicting Persistence of Functional Abdominal Pain From Childhood Into Young Adulthood

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BACKGROUND & AIMS: Pediatric functional abdominal pain has been linked to functional gastrointestinal disorders (FGIDs) in adulthood, but little is known about patient characteristics in childhood that increase the risk for FGID in young adulthood. We investigated the contribution of gastrointestinal symptoms, extraintestinal somatic symptoms, and depressive symptoms in pediatric patients with functional abdominal pain and whether these predicted FGIDs later in life.

METHODS: In a longitudinal study, consecutive new pediatric patients, diagnosed with functional abdominal pain in a subspecialty clinic, completed a comprehensive baseline evaluation of the severity of their physical and emotional symptoms. They were contacted 5 to 15 years later and evaluated, based on Rome III symptom criteria, for abdominal pain-related FGIDs, including irritable bowel syndrome, functional dyspepsia, functional abdominal pain syndrome, and abdominal migraine. Controlling for age, sex, baseline severity of abdominal pain, and time to follow-up evaluation, multivariable logistic regression was used to evaluate the association of baseline gastrointestinal, extraintestinal somatic, and depressive symptoms in childhood with FGID in adolescence and young adulthood.

RESULTS: Of 392 patients interviewed an average of 9.2 years after their initial evaluation, 41% (n = 162) met symptom criteria for FGID; most met the criteria for irritable bowel syndrome. Extraintestinal somatic and depressive symptoms at the initial pediatric evaluation were significant predictors of FGID later in life, after controlling for initial levels of GI symptoms. Age, sex, and abdominal pain severity at initial presentation were not significant predictors of FGID later in life.

CONCLUSIONS: In pediatric patients with functional abdominal pain, assessment of extraintestinal and depressive symptoms may be useful in identifying those at risk for FGID in adolescence and young adulthood.

Keywords: Functional Gastrointestinal Disorders; Somatic Symptoms; Depression; Irritable Bowel Syndrome; Prospective.

Q6 Q7 **C**hronic or recurrent abdominal pain is common in childhood, affecting 8% to 25% of otherwise healthy school-aged children. In the majority of cases, medical evaluation yields no evidence of organic disease and the pain is considered functional.¹⁻³ A review of the literature estimated that abdominal pain persisted at long-term follow-up evaluation in 29.1% (95% confidence interval, 28.1-30.2) of youth with pediatric functional abdominal pain (Ped-FAP).⁴ Indeed, it has been suggested that Ped-FAP in childhood may be a precursor to functional gastrointestinal disorders (FGIDs) such as irritable bowel syndrome (IBS) in adulthood.⁵⁻⁷

Little is known, however, about characteristics of symptom presentation in childhood that may predict

outcomes in adolescence and young adulthood. The empiric literature has shown that, in addition to their gastrointestinal symptoms, many patients with Ped-FAP

Abbreviations used in this paper: CDI, Children's Depression Inventory; FGID, functional gastrointestinal disorder; FGID-Neg, without Rome III symptom criteria for functional gastrointestinal disorders at follow-up evaluation; FGID-Pos, with Rome III symptom criteria for functional gastrointestinal disorders at follow-up evaluation; GI, gastrointestinal; IBS, irritable bowel syndrome; Ped-FAP, pediatric functional abdominal pain.

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1542-3565/\$36.00

<http://dx.doi.org/10.1016/j.cgh.2014.03.034>

117 experience high rates of extraintestinal somatic
118 complaints⁸⁻¹¹ and psychological symptoms such as
119 depression.¹²⁻¹⁷ Whether these co-existing symptoms
120 are relevant to clinical outcomes of Ped-FAP and there-
121 fore merit inclusion in the clinical evaluation is unclear.

122 A recent review of the literature on prognostic factors
123 for Ped-FAP found insufficient evidence to determine
124 whether extraintestinal somatic symptoms predicted
125 persistence of abdominal pain and conflicting evidence
126 regarding the relation of psychological symptoms to pain
127 persistence.¹⁸ No studies to date have evaluated whether
128 extraintestinal and depressive symptoms increment the
129 prediction of the prognosis of Ped-FAP over and above
130 abdominal symptoms alone. This is an important limi-
131 tation of the literature because abdominal symptoms
132 correlate with both extraintestinal and depressive
133 symptoms, raising the concern that assessing these latter
134 symptoms may not add to the prognostication beyond
135 the value of assessing abdominal symptoms, and there-
136 fore might not be necessary at all. Although other patient
137 characteristics such as attentional bias to bodily symp-
138 toms and parental factors may predict clinical outcomes
139 of Ped-FAP,¹⁹⁻²¹ we focused here on extraintestinal and
140 depressive symptoms because these can be assessed
141 reliably and efficiently in the clinic setting without
142 appreciably extending the clinic visit. Specifically, the
143 current study assessed the extent to which extra-
144 intestinal somatic symptoms and depressive symptoms
145 prospectively predicted FGID in adulthood, over and
146 above the baseline severity of abdominal pain and other
147 GI symptoms evaluated at the time of initial subspecialty
148 evaluation for Ped-FAP.

149 Materials and Methods

150 Sample

151 Participants were drawn from a large database of
152 consecutive new patients with Ped-FAP who had partici-
153 pated in studies conducted by Walker et al²²⁻²⁴ between
154 1993 and 2004 and agreed to be contacted for follow-up
155 evaluation. They were contacted by mail or telephone
156 and invited to participate in the follow-up evaluation.
157 Eligibility criteria at the time of initial study enrollment in
158 childhood included evaluation at a single-center pediatric
159 gastroenterology clinic for abdominal pain of at least 3
160 months' duration and consistent with the definition by
161 Apley and Naish¹² of pediatric recurrent abdominal pain,
162 age between 8 and 16 years, living with parent(s) or
163 parent figure, capable of consent/assent, and no chronic
164 illness or developmental delay. Patients who had minor
165 histologic findings of esophagitis (with normal endoscopy
166 on visualization at initial pediatric evaluation) were
167 eligible for the follow-up study because histologic findings
168 alone are neither sensitive nor specific for reflux esoph-
169 agitis or other organic disorders.²⁵ Additional eligibility
170 criteria for the follow-up study included the following: age

171 Procedure

172 12 years or older at follow-up evaluation, at least 4 years
173 elapsed since the initial pediatric evaluation, and no cur-
174 rent chronic or life-threatening disease.
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205 The protocol for the follow-up study included a
206 structured interview conducted by telephone by an
207 interviewer who was unaware of the participant's origi-
208 nal symptom presentation. The interviewer elicited de-
209 mographic information and administered patient-report
210 measures of current health status and functioning. In-
211 formed consent/assent was obtained by telephone
212 before conducting the interview. All procedures were
213 approved by our center's Institutional Review Board.

214 Baseline Measures

215 **Depressive symptoms.** Depressive symptoms in
216 childhood were evaluated using the Children's Depres-
217 sion Inventory (CDI), a validated self-report measure for
218 children ranging from 7 to 17 years of age.^{28,29} This
219 questionnaire was completed by the child at the baseline
220 pediatric evaluation. A total score was computed, with
221 higher scores indicating greater severity of depressive
222 symptoms; scores higher than 12 indicate clinically sig-
223 nificant depressive symptoms in children evaluated in a
224 medical setting.^{30,31}

225 **Gastrointestinal and extraintestinal somatic symp-
226 toms.** Gastrointestinal (GI) and extraintestinal (non-GI)
227 symptoms were assessed at the initial pediatric evalua-
228 tion with the Children's Somatization Inventory, a vali-
229 dated self-report questionnaire for children and
230 adolescents.³² The Children's Somatization Inventory
231 includes 9 GI symptoms (eg, abdominal pain, nausea,
232 constipation, diarrhea, and bloating) and 26 extra-
233 intestinal somatic symptoms (eg, dizziness, back pain,
234 headaches, and sore muscles). Participants rate the
235 extent to which they have experienced each symptom in
236 the past 2 weeks using a 5-point scale ranging from not
237 at all (0) to a lot (4). Separate scores were calculated to
238 reflect the total number of GI symptoms (range, 0-9) and
239 extraintestinal symptoms (range, 0-26), with symptoms
240 rated 3 or 4 considered present at the initial evaluation.

241 **Abdominal pain severity.** Abdominal pain severity in
242 childhood was evaluated using the Abdominal Pain

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