Annual Costs of Care for Pediatric Irritable Bowel Syndrome, Functional Abdominal Pain, and Functional Abdominal Pain Syndrome

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Objectives To estimate annual medical and nonmedical costs of care for children diagnosed with irritable bowel syndrome (IBS) or functional abdominal pain (syndrome; FAP/FAPS).

Study design Baseline data from children with IBS or FAP/FAPS who were included in a multicenter trial (NTR2725) in The Netherlands were analyzed. Patients' parents completed a questionnaire concerning usage of healthcare resources, travel costs, out-of-pocket expenses, productivity loss of parents, and supportive measures at school. Use of abdominal pain related prescription medication was derived from case reports forms. Total annual costs per patient were calculated as the sum of direct and indirect medical and nonmedical costs. Costs of initial diagnostic investigations were not included.

Results A total of 258 children, mean age 13.4 years (±5.5), were included, and 183 (70.9%) were female. Total annual costs per patient were estimated to be €2512.31. Inpatient and outpatient healthcare use were major cost drivers, accounting for 22.5% and 35.2% of total annual costs, respectively. Parental productivity loss accounted for 22.2% of total annual costs. No difference was found in total costs between children with IBS or FAP/FAPS.

Conclusions Pediatric abdominal pain related functional gastrointestinal disorders impose a large economic burden on patients' families and healthcare systems. More than one-half of total annual costs of IBS and FAP/FAPS consist of inpatient and outpatient healthcare use. *(J Pediatr 2015;167:1103-8)*.

Trial registration Netherlands Trial Registry: NTR2725.

Chronic abdominal pain is one of the most common complaints in childhood, accounting for 2%-4% of visits to pediatricians.[1] In most cases, no evidence of an organic disease causing symptoms can be found. These children are usually diagnosed with one of the abdominal pain-related functional gastrointestinal disorders (AP-FGIDs), which affect up to 20% of children worldwide.[2,3]

Irritable bowel syndrome (IBS) and functional abdominal pain (syndrome; FAP/FAPS) are characterized by chronic or recurrent abdominal pain. In addition, children with IBS have altered bowel movements.[2] Children with IBS or FAP/FAPS report significantly lower quality of life scores compared with healthy peers.[4] Furthermore, these children report high levels of school absenteeism and are more at risk for social isolation and symptoms of depression and/or anxiety.[5,6] Despite a variety of available treatments, a significant proportion of children with IBS or FAP/FAPS have persisting symptoms, with up to 30% of patients still experiencing symptoms in adulthood.[7,8] IBS in adults is associated with substantial costs to patients, healthcare systems, and society.[9] Care for patients with IBS in the US alone consumes more than 20 billion US dollars per year.[10] Furthermore, in a recent study, total costs to society in the US for adolescents (aged 10-17 years) with chronic pain were estimated to be $19.5 billion US per year.[11] To date, pediatric data on costs of treatment of AP-FGIDs are not available. Considering the economic impact of prevalent disorders such as IBS or FAP/FAPS is very important in times of increasing healthcare costs and growing constraints on healthcare budgets. Therefore, the aim of this study was to estimate annual medical and nonmedical costs for children who are diagnosed with IBS or FAP/FAPS.

Methods

This study is part of a nationwide, multicenter, randomized controlled trial (RCT) on the effect of gut-directed hypnotherapy in children and adolescents with IBS or FAP/FAPS (Netherlands Trial Registry: NTR2725). A detailed

AP-FGID	Abdominal pain-related functional gastrointestinal disorder
BCaCI	Bias-corrected and accelerated 95% CI
DMC	Dutch Manual for Costing in Economic Evaluations
FAP	Functional abdominal pain
FAPS	Functional abdominal pain syndrome
IBS	Irritable bowel syndrome
RCT	Randomized controlled trial

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description of the study protocol of this RCT has been reported previously.[12] Briefly, children were recruited at the outpatient pediatric gastroenterology clinic of 2 academic hospitals and the outpatient pediatric clinic of 7 teaching hospitals. Medical ethics committees of all participating hospitals approved the trial. Patients and/or parents gave written consent to participate.

A total of 260 children aged 8-18 years with a diagnosis of IBS or FAP/FAPS according to Rome III criteria were included.[2] All children underwent routine laboratory testing prior to inclusion to rule out organic causes for the abdominal pain. Exclusion criteria were a concomitant organic gastrointestinal disease, previous hypnotherapy, intellectual disability, and insufficient knowledge of the Dutch language. During the RCT, children were not allowed to receive treatment by another healthcare professional for abdominal pain symptoms.

At baseline, children and/or their parents completed the Health and Labor Questionnaire[13] adjusted to the study setting. The recall period of questionnaire items was 4 weeks prior to inclusion. Questionnaire items reflected the societal perspective, referring to all significant costs related to the illness or intervention, regardless of who bears these costs.[14,15] We distinguished between direct costs of healthcare and out-of-pocket expenses of patients and indirect costs of productivity loss and school assistance in accordance with Dutch guidelines for costing in healthcare research (Dutch Manual for Costing in Economic Evaluations [DMC]).[16]

Direct Medical Costs

Direct medical costs are directly related to the disease, such as costs for diagnostics, therapeutics, and care.[16] This study is part of an RCT in which children were subjected to laboratory testing prior to study inclusion to exclude underlying organic disorders.[12] Because we cannot rule out the possibility that the amount of diagnostic testing has been research-driven, we excluded these costs of diagnostics from the analysis.

Parents were asked about the frequency and types of out-patient hospital (eg, pediatrician, pediatric gastroenterologist) and out-of-hospital (eg, general practitioner, psychologist) consultations related to their child's abdominal pain. The reported frequency of pediatrician consultations was subtracted by 1 visit to compensate for a potential overestimation because of consultations related to study inclusion. Unit costs of respective consultations were derived from the DMC.[16] No differentiation in costs was made between consultations in academic or teaching hospitals. If unit costs of certain healthcare providers (eg, complementary and alternative therapists) were not available from the DMC, costs per consultation were estimated based on average cost of a consultation with 10 randomly selected providers of the concerned specialty from different parts of The Netherlands. Unit costs of hospital admissions and consultations are provided in **Table I** (available at www.jpeds.com).

Reported dose and dosing frequency of abdominal pain related prescription medication were derived from case report forms. Medication reported to be used exclusively as needed was excluded from the analysis. The following classes of medication were considered abdominal pain related: laxatives, antidiarrheal agents, antispasmodics, gastric acid suppressants, and antiemetics. Unit costs of medication use per patient per month were based on the drugs registry from the Dutch National Health Care Institute.[17]

Indirect Medical Costs

Because treatment of AP-FGIDs is not expected to increase life expectancy of these children, indirect medical costs were not included in the analysis.[15]

Direct Nonmedical Costs

Direct nonmedical costs included costs associated with traveling to the hospital or healthcare providers. In addition, costs for resources related to the illness, which are not reimbursed by health insurance companies (out-of-pocket expenses), were categorized as direct nonmedical costs.[16]

Costs of traveling were estimated based on patients' reported usual mode of transportation to the hospital or nearby healthcare providers. Standard kilometer unit costs per mode of transportation and distances to different healthcare providers were derived from the DMC.[16] Travel costs per visit were derived from the mode of transportation and these unit costs, and subsequently, total costs of transportation were calculated by multiplying travel costs per visit with the average number of visits per patient per year. Average distances to respective healthcare providers and travel costs were derived from the DMC and are provided in **Table I**.

Parents were asked whether they paid for abdominal pain related medication, such as analgesics, that was not reimbursed by their healthcare insurance. If applicable, parents specified the amount spent. In addition, parents were asked about expenses for special dietary products, extra domestic help, extra childcare, and other expenses associated with their child's abdominal pain.

Indirect Nonmedical Costs

Parents were asked whether they are in paid employment and about absence from work because of their child's abdominal pain. If applicable, the number of hours parents worked less as a consequence of their child's abdominal pain were specified. General unit costs of productivity loss per hour were used, irrespective of age and sex. Unit costs are provided in **Table I**.

Parents were asked whether their child received extra support from school to compensate for school absenteeism and/or loss of productivity, such as remedial teaching or video conferencing facilities. For costs related to remedial teaching, an estimated 40 school weeks per year was used. Unit costs of supportive measures were derived from the respective agencies providing the support (**Table I**).

Total Costs and Further Analysis

Unit costs are shown in **Tables I** and **II** (available at www.jpeds.com) for the base year 2013. Unit costs from sources