

Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Overview of Outcomes

Outcome	Instrument	T0	4 wks	8 wks	T1	T2	T3
Abdominal pain	Abdominal pain dairies	X	X	X	X	X	X
Depression and anxiety	Revised Child Anxiety and Depression Scale-short version (RCADS-25)	X			X	X	X
Somatization	Children's Somatization Inventory (CSI)	X			X	X	X
Health-related quality of life	KIDSCREEN-52	X			X	X	X
Pain beliefs	Pain Beliefs Questionnaire (PBQ)	X			X	X	X
Coping strategies	Children's Coping Strategies Checklist-revision 1 (CCSC-R1)	X			X	X	X
Adequate relief	Binary question on adequate relief				X	X	X

eTable 2. Secondary Outcomes During Treatment and Follow-up

	CD-group Mean (SD)				iHT-group Mean (SD)			
	T0	T1	T2	T3	T0	T1	T2	T3
Depression (RCADS-25) [#] (possible score range 0-15)	3.9 (2.4) N= 126	3.5 (2.2) N= 113	3.1 (2.4) N= 111	2.8 (2.4) N= 110	3.8 (2.5) N= 124	3.4 (2.7) N= 121	3.3 (2.8) N= 117	2.9 (2.6) N= 114
Anxiety total score (RCADS-25) [#] (possible score range 0-60)	10.9 (7.6) N= 126	10.1 (6.9) N= 113	9.0 (6.9) N= 111	8.1 (7.4) N= 110	11.8 (8.9) N= 124	11.0 (9.0) N= 121	10.2 (8.4) N= 117	9.2 (8.0) N= 114
Somatization: non GI- symptoms (CSI) [#] (possible score range 0-112)	14.1 (12.1) N= 126	12.5 (11.4) N= 113	10.1 (10.4) N= 111	11.2 (14.2) N= 110	14.9 (11.8) N= 124	12.5 (15.0) N= 121	10.9 (13.0) N= 116	9.7 (10.4) N= 115
QoL physical well-being (KIDSCREEN-52) [#] (10 th percentile 40.5; 90 th percentile 64.6) [*]	44.9 (10.3) N= 126	47.5 (10.7) N= 112	47.3 (10.9) N= 107	50.1 (12.6) N= 107	44.2 (9.7) N= 124	48.8 (11.6) N= 116	48.9 (12.5) N=107	48.6 (10.8) N= 109
QoL psychological well- being (KIDSCREEN-52) [#] (10 th percentile 42.6; 90 th percentile 68.5) [*]	49.2 (9.9) N= 126	51.8 (9.7) N= 113	53.0 (10.3) N= 111	53.4 (10.2) N= 109	47.8 (9.6) N= 124	51.2 (10.4) N= 121	52.2 (10.2) N= 117	52.2 (10.2) N= 113
QoL moods & emotions (KIDSCREEN-52) [#] (10 th percentile 39.9; 90 th percentile 67.5) [*]	49.8 (10.8) N= 126	51.9 (10.9) N= 113	53.8 (11.2) N= 111	55.6 (12.2) N= 109	47.5 (11.4) N= 123	50.7 (12.7) N= 120	53.0 (11.6) N= 117	52.5 (12.5) N= 114
QoL self-perception (KIDSCREEN-52) [#] (10 th percentile 40.7; 90 th percentile 69.8) [*]	52.3 (10.4) N= 126	52.7 (10.0) N= 113	52.4 (11.0) N= 111	52.7 (10.9) N= 109	52.4 (10.4) N= 123	53.0 (11.3) N= 121	51.7 (10.6) N= 117	51.9 (11.2) N= 114
QoL social support & peers (KIDSCREEN-52) [#] (10 th percentile 42.3; 90 th percentile 66.3) [*]	50.7 (12.2) N= 125	50.7 (11.8) N= 113	52.1 (11.4) N= 110	53.9 (10.1) N= 109	49.2 (10.5) N= 124	51.3 (9.3) N= 120	51.0 (9.4) N= 117	53.1 (10.6) N= 114
QoL school environment (KIDSCREEN-52) [#] (10 th percentile 42.4; 90 th percentile 66.3) [*]	53.1 (9.5) N= 124	54.4 (12.0) N= 108	54.7 (10.8) N= 104	56.1 (10.6) N= 105	51.9 (9.2) N= 123	54.8 (10.6) N= 119	54.1 (11.5) N= 111	53.8 (10.4) N= 111
Negative pain beliefs (PBQ) ^{#,†} (possible score range 0-4)	2.2 (0.6) N= 124	1.7 (0.8) N= 113	1.5 (0.9) N= 110	1.4 (0.9) N= 110	2.3 (0.6) N= 121	1.5 (0.8) N= 120	1.4 (0.9) N= 116	1.2 (0.8) N= 113
Problem focused coping potential (PBQ) ^{#,†} (possible score range 0-4)	1.4 (0.9) N= 126	2.0 (1.0) N= 113	2.3 (1.1) N= 110	2.4 (1.1) N= 110	1.3 (0.8) N= 124	2.3 (1.0) N= 121	2.4 (1.0) N= 116	2.5 (0.9) N= 113
Emotion focused coping potential (PBQ) [#] (possible score range 0-4)	2.2 (0.9) N= 126	2.7 (0.8) N= 113	2.9 (0.9) N= 111	3.1 (0.8) N= 110	2.3 (0.9) N= 124	2.8 (0.7) N= 121	3.1 (0.8) N= 117	3.2 (0.7) N= 114

SD = standard deviation; QoL = quality of life
^{*} percentiles based on norm data for children and adolescents aged 8-18 years in the Netherlands

#: time effect, reference category baseline;

†: treatment group effect: negative pain beliefs: CD vs iHT, mean difference (95% CI): 0.2 (0.1 to 0.4); problem focused coping potential: CD vs iHT mean difference (95% CI): -0.2 (-0.4 to -0.03). No time-by-treatment group interaction effects were observed;

Analyses were performed with marginal linear model analysis using SPSS MIXED Procedure. Logarithmic transformation was done to normalize distributions, if appropriate. The main treatment and treatment-time interaction effects were assessed by analysis of the scores over the course of the study (T1, T2, T3), adjusted for the respective outcome baseline (T0) value, age, and gender and based on restricted maximum likelihood estimation. The covariance structure between residuals observed at the three time points was based on the covariance structure that gave the lowest value for the Akaike information criterion. The main time effect was estimated in a similar marginal linear model including baseline (T0), T1, T2 and T3 in the outcome vector, adjusted for the covariates age and gender. Adjustment for age and gender was done since these are possibly associated with these outcomes.⁵ A Bonferroni test was used for pairwise group comparisons.

RCADS-25: lower scores represent less symptoms of depression/anxiety; CSI: lower scores represent lower intensity of somatic complaints experienced by the child; KIDSCREEN-52: higher scores indicate a better health-related QoL; PBQ: higher scores on a scale indicate that the child has such thoughts more frequently.

eTable 3. Baseline Characteristics of Participants Who Started With Treatment Versus Children That Did Not Start With Treatment

	Participants that did not start with treatment (N=10)	Participants that started with treatment (N=250)
<u>Demography</u>		
Age (years) ^a	14.0 (2.2)	13.4 (2.8)
Girls (%)	50.0	71.6
<u>Clinical features</u>		
IBS (%)	60.0	50.4
% IBS-C	66.6	58.7
% IBS-D	16.7	10.3
% IBS-M	0.0	27.0
% IBS-U	16.7	4.0
FAP(S) (%)	40.0	49.6
% FAP	25.0	41.1
% FAPS	75.0	58.9
Duration of symptoms (years) ^b	3.3 (3.0)	3.7 (3.2)
School absenteeism (%)	90.0	74.4
Number school days missed prior 6 months ^b	63.1 (59.6)	21.0 (24.4)
Positive family history abdominal pain (%)	70.0	46.4
Prior psychological treatment (%)	30.0	17.6
<u>Abdominal pain scores</u>		
Pain Frequency Score ^a	15.5 (5.4)	14.8 (5.5)
Pain Intensity Score ^a	16.3 (3.5)	14.9 (4.5)
<u>Depression & anxiety</u>		
Depression ^a	4.1 (2.1)	3.9 (2.4)
Anxiety (total score) ^a	11.4 (10.6)	11.4 (8.3)
<u>Quality of life</u>		
QoL physical well-being ^a	41.0 (5.1)	44.5 (9.9)
QoL psychological well-being ^a	43.1 (11.6)	48.5 (9.8)
QoL moods & emotions ^a	46.4 (7.6)	48.7 (11.1)
QoL self-perception ^a	44.5 (9.0)	52.4 (10.4)
QoL social support & peers ^a	51.1 (5.6)	49.9 (11.4)
QoL school environment ^a	43.3 (8.8)	52.5 (9.3)
<u>Somatization</u>		
Non GI-symptoms ^a	8.9 (4.2)	7.5 (4.7)
<u>Pain beliefs</u>		
Negative pain beliefs ^a	1.9 (0.9)	2.2 (0.6)
Problem focused coping potential ^a	1.3 (0.9)	1.4 (0.8)
Emotion focused coping potential ^a	1.9 (0.9)	2.2 (0.9)
<u>Coping strategies</u>		
Problem focused coping	2.3 (0.4)	2.4 (0.5)
Positive cognitive reframing	2.2 (0.5)	2.1 (0.6)
Distraction strategies	1.8 (0.3)	1.8 (0.4)
Avoidance strategies	2.2 (0.4)	2.2 (0.4)
Support seeking strategies	1.9 (0.7)	2.1 (0.6)
* P<0.05; ^a Data are mean (SD); ^b Data are median (IQR)		

eTable 4. Logistic Regression Analysis to Identify Factors Predicting Treatment Success at T3

Predictor*	Univariate analysis		Multivariate analysis	
	OR (95% CI)	P- value	Adjusted OR (95% CI)	P- value
Gender (male vs female)	2.81 (1.40-5.66)	0.00	2.78 (1.33-5.81)	0.007
Age (in years)	0.89 (0.80-0.98)	0.02		
Including center (academic vs teaching center)	0.93 (0.51-1.71)	0.83		
Diagnosis (FAP(S) vs IBS)	1.31 (0.76-2.26)	0.33		
Duration of symptoms (in years)	0.91 (0.84-0.99)	0.02	0.89 (0.82-0.98)	0.017
School absenteeism (yes vs no)	1.32 (0.69-2.53)	0.39		
Hypnotic susceptibility	0.92 (0.73-1.17)	0.49		
Baseline depression (RCADS-25)	0.87 (0.78-0.98)	0.02		
Baseline anxiety (RCADS-25, total score)	0.98 (0.95-1.01)	0.19		
Baseline somatization non-GI symptoms (CSI)	0.98 (0.96-1.00)	0.05		
Baseline problem focused coping potential (PBQ)	1.27 (0.92-1.76)	0.15		
Baseline emotion focused coping potential (PBQ)	0.92 (0.65-1.29)	0.62		
Baseline negative beliefs (PBQ)	0.41 (0.24-0.68)	0.00	0.38 (0.21-0.66)	0.001
Baseline problem focused coping (CCSC-R1)	1.24 (0.74-2.07)	0.42		
Baseline positive cognitive reframing (CCSC-R1)	1.08 (0.65-1.79)	0.77		
Baseline distraction strategies (CCSC-R1)	0.94 (0.44-2.04)	0.88		
Baseline avoidance strategies (CCSC-R1)	1.58 (0.83-3.01)	0.16		
Baseline support seeking strategies (CCSC-R1)	1.02 (0.65-1.60)	0.94		
Baseline QoL physical well-being (KIDSCREEN-52)	1.03 (0.99-1.06)	0.08		
Baseline QoL psychological well-being (KIDSCREEN-52)	1.00 (0.97-1.03)	0.85		
Baseline QoL moods & emotions (KIDSCREEN-52)	1.01 (0.99-1.04)	0.42		
Baseline QoL self-perception (KIDSCREEN-52)	1.03 (1.00-1.06)	0.02		
Baseline QoL autonomy (KIDSCREEN-52)	1.01 (0.98-1.04)	0.50		
Baseline QoL relations with parents & home life (KIDSCREEN-52)	1.01 (0.98-1.04)	0.69		
Baseline QoL social support & peers (KIDSCREEN-52)	0.99 (0.97-1.02)	0.55		
Baseline QoL school environment (KIDSCREEN-52)	1.02 (0.99-1.05)	0.20		
Baseline QoL social acceptance (bullying) (KIDSCREEN-52)	1.02 (0.99-1.05)	0.20		
Baseline QoL financial resources (KIDSCREEN-52)	0.99 (0.96-1.02)	0.47		
Treatment expectations child	1.03 (0.88-1.20)	0.69		
Treatment expectations mother	1.18 (0.95-1.45)	0.13		
Treatment expectations father	0.95 (0.78-1.15)	0.60		
Allocated treatment (CD vs iHT)	0.67 (0.38-1.17)	0.16	0.65 (0.35-1.20)	0.16

* For continuous predictors the OR should be interpreted as the change in OR with one unit increase in the predictor value.