**Table 3: Supplementary Information: Full Summary of Studies Included**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study and Country**  | **N (CD/UC/IBDU)*****% given if n not available in study***  | **Control group (n)** | **Age; mean (SD)*****Recruitment Age Range (RAR)***  | **Exclusion criteria**  | **Design** | **Psychological measures*****Parent (P), Young people (YP)*** | **Quality of evidence*****(GRADE)*** | **Disease related measures (including adherence)**  | **Significant outcomes** |
| ***Impacts***  | ***Risk factors*** |
| Benhayon et al 2013 (USA) (56) | 96 (96)*495 1st screening**187 2nd screening* | 19 healthy controls  | 14.4 (2.3)*RAR:9-17* | None | Cross sectional | P: CDI & CDRS-RYP: PSQI, API, SACRED | ⨁⨁◯◯ Low | PCDAI & CRP | * Greater sleep disturbance in depressed CD than healthy controls
 |  |
| Burke et al 1994 (USA) (37) | 36 (21/15/0) | 0 | 11.98 (2.67)*RAR: not available*  | Diagnosis <3 months | Cross sectional  | P: maternal psychiatric history; A-SADS-L, FILE, FRI YP: Kiddie-SADS-E, FRI | ⨁◯◯◯Very low | LGS |  | * Depressed YP less severe disease than non-depressed
* Mothers of depressed YP display more family conflict and less family cohesion
 |
| Castaneda et al 2013 (Finland) (59) | 34 (17/16/1) | 23 JIA  | 16.3 (1.7)*RAR:>13* | Coexisting psychiatric disorders | Cross sectional | YP: BDI, WMS-R, WAIS-R, TMT, CVLT | ⨁◯◯◯Very low | PGA, ESR, CRP, FC | * Preservative Repetition Errors greater in IBD but unrelated to DS
 |  |
| Clark et al 2014(USA) (27) | 153 (153/0/0)*765 1st screening**499 2nd screening* | 0 | 14.4 (2.6)*RAR: 9-17* | * IFX >2months
* Anti-TNF other than IFX
* Antidepressants
* Psychiatric disorders
 | Cross sectional  | P: CDI-P & K-SADS-PLYP: CDI C & K-SADS-PL  | ⨁⨁◯◯ Low | PCDAI, ESR |  | * PCDAI & SES strongest predictors of DS
* CS risk factor for DS
* IFX use did not predict DS
 |
| Cotton et al 2009 (USA) (42) | 66 (52/13/2) | 88 healthy controls  | 15.5 (2.1)*RAR: 11-19* | None | Cross sectional | YP: CDI-S, PeadsQL, SWB  | ⨁⨁◯◯ Low | LGS | * Higher levels of existential well-being associated with fewer DS
 | * IBD type not predictive of DS
 |
| Engstrom 1999 (Sweden) (41) | 20 (9/11/0) | 20 diabetes20 CTH20 healthy controls | 16.5*RAR: 9-16* | None  | Cross sectional | P: Interview, CBCL, Frisk well-being scaleC: CAS, Frisk well-being scale, CDI | ⨁◯◯◯Very low | None |  | * Duration of IBD not predictive of DS
 |
| Gold et al 2000 (USA) (28) | 36 (25/11/0) | 26 FGI | 13.3 +/-3.0 IBD*RAR: 8-18* | Colectomy  | Cross sectional | YP: CDI & CBCL | ⨁◯◯◯Very low | None | * Subjective illness perception correlates with DS
 | * Higher DS in lower income families
 |
| Gray et al 2012 (USA) (49) | 79 (80% CD) | 0 | 15.5 (1.4)*RAR: 13-17* | * Other chronic illness

CS >1mg/kg/d | Cross sectional | YP: CBCL YSR | ⨁⨁◯◯ Low | PCDAI, LCAI & HBIAdherence; MAM | * Anxiety/DS correlate with barriers to adherence
 |  |
| Gray et al 2013 (USA) (45) | 130 (100/30/0) | 0 | 15.64 (1.36)*RAR* : 13-17 | * Other chronic illness
* CS >1mg/kg/d
 | Cross sectional | YP: PIP, FAD, CBCLP: CBCL YSR | ⨁⨁◯◯ Low | Short PCDAI & LCAI |  | * Internalizing symptoms associated with parenting stress
 |
| Guilfoyle et al 2014 (USA) (46) | 93 (74/10/0) | 0 | 15.5 +/- 1.4*RAR* : 13-17 | * Not on 5ASA +/or thiopurine
* Comorbid chronic condition
 | Longitudinal | P: CDI-P, pediatric inventory for parents, Repeated at 6 months | ⨁⨁◯◯ Low | PCDAI & LCAI |  | * Parenting stress accounted for a significant variance in DS
 |
| Herzog et al 2013 (Switzerland) (33) | 126 (71/55/0) | Normative data  | 13.4 (3.2) CD*RAR: <16* | * None
 | Cross sectional | YP: CDI-C, SDQP: SDQ | ⨁⨁◯◯ Low | PCDAI & PUCAICRP |  | * CDI-C did not correlate with disease activity, gender, type or duration of IBD
 |
| Hommel et al 2008 (USA) (47) | 36 (86% CD) | 0 | 15.69 (1.37)*RAR: 13-17* | * Comorbid conditions

CS >1mg/kg/d | Cross sectional | PedsQL 4.0, CDI | ⨁◯◯◯Very low | PCDAI & LCAIAdherence: 6TGN, MAM, pill counts | * DS correlate inversely with adherence
 |  |
| Jones et al 2011 (USA) (60) | 23 (14/9/0) | 15 IBD – DS8 IBD + DS22 healthy controls without DS, 20 with DS | 13.5 (2.5)*RAR: 8-17* | * <1 week high dose steroids
 | Cross sectional | YP; K-SADS-PL, mood & feelings questionnaire | ⨁◯◯◯Very low | PCDAI, PUCAI, ESR, albumin | * IBD demonstrate greater pupillary responses to initial presentation of negative emotional stimuli regardless of DS and disease severity
 |  |
| Loftus et al 2011 (USA) (34) | 2144 (2144/0/0) | 10720 CD-free controls | 11.8*95% CI 11.6-12.0**RAR: not available* | * Enrolment into health plan for >6months
 | Retrospective cohort study | Data from US nationwide database | ⨁⨁◯◯ Low | None  | * YP with CD are twice as likely to receive a psychotropic drug compared with health controls
 | * Increased risk of anxiety with CS’s
* Increased age in females risk factor for anxiety
* Males <12 years had increased risk of DS
 |
| Mackner &Wallace 2005 (USA) (30) | 50 (76%/8%/16%) | 0 | 14.69 (1.92) *RAR: 11-17* | • IBD diagnosis >1 year  | Cross sectional | P: CBCL & FADYP: Piers Harris Self-concept scale, CDI, CSI | ⨁◯◯◯Very low | PCDAIAdherence: standard interview | * Adherence did not relate to DS
 | * No relationship between SES, ethnicity, IBD duration, IBD type or disease activity and DS
 |
| Mackner & Crandall 2005 (USA) (40) | 50 (76%/8%/16%) | 42 healthy controls | 14.69 (1.92)*RAR: 11-17* | • IBD diagnosis >1 year  | Cross sectional | YP: CBCL YSR, CDI, RCMAS, Piers Harris Self-concept scale, CSI | ⨁◯◯◯Very low | PCDAI & Physicians Global assessment  |  | * No relationship between IBD type, disease activity and DS
 |
| Mackner et al 2006 (USA) (24) | 50 (76%/8%/16%) | 42 healthy controls | 14.39 *RAR: 11-17* | • IBD diagnosis >1 year | Cross sectional | P: CBCL, FADYP: CBCL YSR | ⨁◯◯◯Very low | PCDAI |  | • Older age at diagnosis associated with increased somatic complaints, independent of IBD duration  |
| Mrakotsky et al 2013 (USA) (43) | 76 (30/36/0) | 0 | 13.6 (2.8)*RAR: 8-17* | Steroid group: <30mg/day or1 mg/kg/day corticosteroid <5daysRemission group: off steroids for >6months | Cross sectional | P: CDI-CP, CBCL YP: CDI-C, CBCL YSR | ⨁◯◯◯Very low | PCDAI, CSKNeuro-psychological assessment | * Sleep difficulties greater in CS group
 | * CS associated with greater internalizing symptoms
 |
| Odell et al 2011 (USA) (44) | 45 (36/9/0) | 0  | 15.4 (1.32)*RAR: 13-17* | * Other chronic illness

CS >1mg/kg/d | Cross sectional | P: PIP, CBCL, FADYP: CBCL YSR, CDI-C | ⨁◯◯◯Very low | PCDAI, LCAI | * Parent-report of YP externalizing behaviours contributed to more variance in family functioning than parental distress
 |  |
| Ondersma et al 1996 (USA) (35) | 56 (34/22/0) | 0 | 15.1 (1.8)*RAR: 11-17* | * Concomitant illnesses
 | Cross sectional | YP: RCMAS, CDI, LEC, SIQ, Positive & Negative Affect Schedule | ⨁◯◯◯Very low | FDI, ESR | * NA did not correlate with more frequent health care contacts
* NA correlated to subjective illness perception
 | * No relationship between ethnicity and DS
 |
| Pirinen et al 2014 (Finland) (57) | 157 (33%/52%/12%) | 0 | 15.4 (2.2)*RAR: not available* | None | Cross sectional | YP: CBCL YSR, SSR | ⨁◯◯◯Very low | None | * Sleep problems greater in IBD YP with anxious/

depressed mood |  |
| Reed-Knight et al 2013 (USA) (48) | 85 (64/21/0) | 0 | 14.76 (2.77)*RAR: 11-18* | None  | Cross sectional | P: BASC-2 | ⨁⨁◯◯ Low | PCDAI, PUCAI*Adherence*P: PMBS YP: MAM, AMBS | * Higher levels of attention and conduct problems negatively associated with adherence
 |  |
| Reed-Knight et al 2014 (USA) (36) | 78 (62/16/0) | 564 community sample | 13.79 (2.79)*RAR: 8-17.5* | None | Cross sectional | YP: CDI-C | ⨁⨁◯◯ Low | abbPCDAI, PUCAI, ESR & CRPAdherence: YP: MAM |  | * Greater DS in those with more severe disease activity measured clinically and by ESR
* No relationship between low dose CS/budesonide use and DS
 |
| Reigada et al 2011 (USA) (53) | 36 (27/9/0) | 0 | 15.3 (1.67*RAR: 12-17* | * Any previous bowel resection
* IBD< 6 months
 | Cross sectional | YP: SCARED, CES-D, IBD-specific anxiety scale, IMPACT III | ⨁◯◯◯Very low | Children’s somatization inventory  | * Anxiety/DS did not correlate with health-care contacts when disease activity controlled for
* IBD-specific anxiety associated with greater health care contact
 |  |
| Schuman et al 2013(USA) (29) | 122 (78.7%/21.3%/0) | 0 | 15.7 (1.3)*RAR: 13-17* | None  | Cross sectional | P: FAD, CBCLYP: CDI-C | ⨁◯◯◯Very low | LCAI, PCDAI | * Family affective

involvement significantly predicted DS  | * Lower family income associated with higher total CDI
* Disease severity predictor of DS
 |
| Srinath et al 2014 (USA) (51) | 163 (120/43/0)*765 1st screening**217 2nd screening* | 0 | 14.32 (2.36)*RAR: 9-17* | * DSM-IV condition
* Antidepressants in <1 month
* Substance misuse
* Current or <1 year psychotherapy
 | Cross sectional | P: CDRS, CDI-PYP: API, KSADS-PL, CDI-C, YSR | ⨁⨁◯◯ Low | PCDAI, PUCAESR, CRP, albumin, haematocrit | * DS can predict variance in abdominal pain
 |  |
| Szigethy et al 2004 (USA) (23) | 102 (74/28/0)25 CDI >12 19 K-SADA-PL | 0 | 14.8 (1.9)*RAR: 11-17* | None  | Cross sectional | CDI-C & K-SADA-PL | ⨁⨁◯◯ Low | PCDAI, CSK, ESR, hematocrit and albumin  |  | * DS correlated with older age at diagnosis
* CS’s and increased disease severity correlates with clinically significant CDI scores
* DS not predicted by IBD type or duration
 |
| Szigethy et al 2014 (USA) (26) | 226 (75% CD/na/na)765 1st screening  | 0 | 14.3 (SD 2.42)*RAR:9-17* | * DSM-IV condition
* Antidepressants in <1 month
* Recent suicide attempt
* History or substance misuse
* Current or <1 year psycho-therapy
 | Cross sectional | P: CDI-P, CDRS-RYP: CDI-C, CDRS-R, K-SADA-PL, BIPQ, SCARED, IMPACT III  | ⨁⨁◯◯ Low | PCDAI, PUCAI, API | * 3 sub-types of DS:

-1=mild -2=somatic-3=cognitive despair  | * No relationship between gender, anti-TNF therapy or age and DS, with no differences between sub-types
* Differences in sub-types 1 and 2 in IBD severity and biological markers
* Sub-type 3 associated with longer IBD duration and stoma
 |
| Väistö et al 2010 (Finland) (31) | 160 (33%/52%/12%) | 236 healthy controls | 15.4 (2.2)*RAR:10-18* | None | Cross sectional | YP: CBCL YSRP: CBCL | ⨁⨁◯◯ Low | Visual analogue scale of self-report disease |  | * Self-report severe disease activity associated with greater DS
* No relationship between IBD duration, IBD type or SES and DS
 |
| Virta et al 2014 (Finland) | 248 (121/127/0) | 992 healthy controls | *RAR:6-16* | None | Longitudinal | Scrutiny of 3 national registers. | ⨁⨁◯◯ Low |  |  | * Greater use of antidepressant use in IBD
 |

**Abbreviations**: abbPCDAI, Abbreviated Pediatric Crohn’s Disease Activity Index; AMBS, Adolescent medication barriers scale; Anti-TNF, Anti-Tumour necrosis factor; API, Abdominal Pain Index; A-SADS-L, Adult Schedule for Affective and Schizophrenia Lifetime Version; BASC-2, Behaviour Assessment Questionnaire ; BIPQ, Brief Illness Perception Questionnaire; BDI, Beck Depression Inventory; CAS, Child Assessment Schedule; CBCL, Child Behaviour Checklist; CBCL YSR, Child Behaviour Checklist Youth Self-Report; CD, Crohn’s disease; CDIT, Child & Parent CDI Total score; CS, Corticosteroid; CSDS, Clinically Significant Depressive Symptoms; CSI, The Coping Strategies Inventory; CDRS-R, The Children’s Depression Rating Scale-Revised; CDI-C/P, Children’s Depression Inventory-Child/Parent; CDI-S, Children’s Depression Inventory-Short; CES-D, The Center for Epidemiological Studies Depression Scale; CRP, C-Reactive Protein; CSK, Clinical Score of Kozarek; CVLT, The California Verbal learning Test; DS, Depressive symptoms; ESR, Erythrocyte Sedimentation Rate; FAD, McMaster Family Assessment Device; FC, Faecal calprotectin; FDI, Functional Disability Inventory; FGI, Functional Gastrointestinal complaints; FILE, Family Inventory of Life Events; FRI, Family relationship Index; HBI, Harvey Bradshaw Index; IFX, Infliximab; JIA, Juvenile Idiopathic Arthritis; K-SADA-PL, Kiddie-Schedule for Affective Disorders and Schizophrenia-Present and Lifetime Version; Kiddie-SADS, Kiddie-Schedule for Affective Disorders and Schizophrenia Epidemiological Version; IMPAT III, Self-report of health-related quality of life designed for youth with IBD; IBD-U, Inflammatory Bowel Disease-Unclassified; LGS, Lloyd-Still & Green Scale Disease severity scale; LCAI, Lichtiger Colitis Activity Index; LEC, Life Events Checklist; MAM, Medication Adherence Measure; NA, Negative Affectivity; PCDAI, Pediatric Crohn’s Disease Activity Index; PedsQL 4.0, Paediatric Quality of Life Inventory 4.0 Generic Core Scales; PIP, The Pediatric Inventory for Parents; PMBS, Parent Medication Barriers Scale; PSQI, Pittsburg Sleep Quality Index; PTSD, Post Traumatic Stress Disorder; PUCAI, Pediatric Ulcerative Colitis Activity Index; PSQI, Pittsburg Sleep Quality Index; RCMAS, Revised Children’s Manifest Anxiety Scale; SCARED, Screen for Child Anxiety Related Disorders; SCCAI, Simple Clinical Colitis Activity Index; SDQ, Strength and Difficulties Questionnaire; SF12, Short From-12; SIBDQ, Short Inflammatory Bowel Disease Questionnaire ; SIQ, Subjective Illness Questionnaire ; SCAS, Spence Children’s Anxiety scale; SSR, Sleep Self-Report; STATIC, State-Trait Anxiety Inventory for Children; SWB, Spiritual Well-being Scale; 6TGN, 6-Thioguanine Nucleotide; TMT, The Trail Making Test; UC, Ulcerative Colitis; WAIS-R, Wechsler Adult Intelligence Scale Revised; WMS-R Wechsler Memory Scale-Revised.