Somatisation in British Secondary school children: measurement, associations, impairment and health care use

Mar Vila Grifoll
Universitat Autònoma de Barcelona
2014

Doctoral thesis by published papers

Title: *Somatisation in British Secondary school children: measurement, associations, impairment and health care use*

UAB
Universitat Autònoma de Barcelona

Defendant: Mar Vila Grifoll

Supervisor: Professor Jordi E.Obiols. Professor in Psychopathology, Faculty of Psychology, UAB

Doctorate in Child and Adolescent Psychopathology
Department of Clinical and Health Psychology
Faculty of Psychology
Universitat Autònoma de Barcelona
Bellaterra, Barcelona, Spain

Year 2014

TABLE OF CONTENTS

INTRODUCTION

Chapter 10. Conclusions p.71

Chapter 11. Clinical implications p.72

Chapter 12. Future research p.74

Diagnostic criteria and use of standardised measures

Cross cultural differences

Early identification and prevention

Outcomes

Treatment

SUMMARY

Catalan

REFERENCES

APPENDICES

Appendix I. DSM-IV-TR and ICD-10: Dissociative (Conversion) and Somatoform Disorders

Appendix II. Highlights of changes from DSM-IV-TR to DSM-V

Appendix III. Somatising disorders: predisposing, precipitating and maintaining factors (table)

Appendix IV. Measures used for the study

Preface

After finishing my training in general psychiatry in Spain in 2004, and working for almost two years as a consultant in Barcelona, I was privileged enough to gain a fellowship from the Fundación Alicia Koplowitz to spend two years at the Academic Unit of Child and Adolescent Psychiatry, Imperial College London (2006-2008). This fellowship aims to provide specialist training in child and adolescent psychiatry for qualified Spanish psychiatrists at pioneering centres in the UK or the USA. During the fellowship I worked part-time doing clinical work at St Mary's Child and Adolescent Mental Health Service (Central and North West London NHS Foundation Trust) as an honorary clinical trainee, and part-time doing research at the Academic Unit of Child and Adolescent Psychiatry, Imperial College London.

Having had very little experience conducting research while in Spain, the fellowship was a great opportunity for me to learn and further develop my research skills. After just a few weeks in the post I was given a project on somatisation in a community sample of British school students and this is how I was introduced to the field of paediatric somatisation. After a few months I thought that this project could be a great opportunity to do my thesis at the Universitat Autònoma de Barcelona (UAB). After discussing this with Professor Elena Garralda, my supervisor while working at the Academic Unit of Child and Adolescent Psychiatry, I started the thesis under the supervision of Professor Jordi Obiols from the Universitat Autònoma de Barcelona (UAB).

After my fellowship finished in 2008 I had an honorary contract with Imperial College, which allowed me to continue working on the project and complete my thesis.

Acknowledgements

Papers on which the thesis is based

Paper number 1

Vila, M., Kramer, T., Hickey, N., Dattani, M., Jefferis, H., Singh, M., & Garralda, ME. 2009. Assessment of somatic symptoms in British secondary school children using the Children's Somatization Inventory (CSI). *Journal of Pediatric Psychology*, 34(9): 989-998.

Abstract

Objective To present normative and psychometric data on somatic symptoms using the Children's Somatization Inventory (CSI) in a nonclinical sample of British young people, and to assess associations with stress and functional impairment.

Methods A total of 1,173 students (11- to 16-years old) completed the CSI and self-report psychopathology measures.

Results The median CSI total score was 12 (5, 23). Headaches, feeling low in energy, sore muscles, faintness, and nausea were most frequent. Girls scored higher than boys, and respondents aged 13–14 years lower than younger children. The CSI showed good internal consistency and exploratory factor analysis yielded three factors: pain/weakness, gastrointestinal, and pseudoneurological. A quarter of respondents reported somatic symptoms were made worse by stress. CSI scores were moderately significantly correlated with impairment and emotional symptoms.

Conclusions The CSI, complemented by information on functional impairment and stress is an appropriate measure of recent somatic symptoms and somatization risk in young people for use in the UK.

Erratum in

Journal of Pediatric Psychology, 35(1):110.

In the second paragraph of the "Gender and Age Effects" section of the article, the sentence reading:

"However, young people living with both natural parents had higher CSI total scores [*mdn* = 11 (4, 21)] than those in other living situations [*mdn* = 15 (7, 30)] (U = 91,990, p < .001)."

should read:

"However, young people living with both natural parents had lower CSI total scores [*mdn* = 11 (4, 21)] than those in other living situations [*mdn* = 15 (7, 30)] (*U* = 91,990, *p* < .001)."

Paper number 2

Vila, M., Kramer, T., Obiols, JE., & Garralda, ME. 2012. Abdominal pain in British young people: associations, impairment and health care use. *Journal of Psychosomatic Research*, 73(6): 437-442.

Abstract

Objective To assess the frequency and associations of abdominal pain in a sample of British secondary school young people and to examine predictors of impairment and health care use.

Methods Cross-sectional study of young people aged 11–16 years that completed questionnaires documenting abdominal pain, related impairment and health care consultations. They also provided information detailing other physical symptoms, health problems and mental health status.

Results 1173 students completed questionnaires; 598 (53%) reported abdominal pains in the previous 3 months (15% > once a week). Pains were significantly linked to reporting medical illness, to high levels of a broad range of physical symptoms and with students deeming these symptoms to be stress/mood sensitive. They were also linked to depressive and other emotional and behavioural problems and with medical help seeking (seeing a health professional in the previous year and contact ever with mental health practitioners). Considerable impairment was reported by 36%; this was independently predicted by abdominal pain frequency, higher levels of concurrent physical symptoms and symptom stress/mood sensitivity. In 18% of students the abdominal pains had led to medical consultations; this was independently predicted by pain related impairment.

Conclusions Frequent abdominal pains are common in British secondary school adolescents; they are linked to emotional symptoms and are often impairing and lead to medical consultations. Impairment was associated not only to pain frequency but also to reporting

other physical symptoms and symptom stress/mood sensitivity, and impairment was a strong predictor of medical help seeking.

Paper number 3

Abstract

Background Frequent attendance to primary care services has shown an association with psychosocial factors in adult and child populations. Little is known about the psychosocial correlates of attendance in adolescents.

Aims of the study To study the contribution of psychosocial factors to frequent primary care attendance in a community sample of young British people.

Method The method used was a cross-sectional survey of 1,251 secondary school pupils, using self-report questionnaires for socio-demographic, physical and psychological health data.

Results A total of 1,116 pupils [mean age 13.51 years (SD 1.5), 52% female] completed questionnaires and provided information about contact with their general practitioner (GP) in the previous year; 30% were frequent attenders (C4 appointments). Frequent attenders were significantly younger; they were more likely to come from lower socioeconomic backgrounds, report significantly more past and current physical problems, have more hospital visits in the previous year, have more recent intense somatic symptoms made worse by stress and causing impairment, and have more days off school. Frequent attendance was also significantly associated with the presence of emotional symptoms and a history of mental health consultations. Logistic regression analysis identified seeing a hospital doctor, current illness, having days off school, a history of mental health consultations and younger age as independent predictors of frequent attendance.

Conclusion In addition to physical health problems, social factors and psychiatric difficulty are linked to and require attention in young people who are frequent attenders at primary care health services.

Context for the project and outline of the thesis

Context

This thesis is based on three papers I have published that used data from a project that surveyed a community sample of British secondary school children. I was not involved in conducting the survey; however, the data obtained from the survey offered a unique opportunity to gain further knowledge about the phenomenon of somatisation in a British community sample of adolescents.

The aims of paper number one were to assess somatic symptoms in the sample using the Children's Somatization Inventory (CSI), and study the psychometric properties of the instrument. Paper number two aimed to examine the frequency of, and associations with abdominal pain within the sample, as well as exploring the predictors of impairment and health care use associated with abdominal pain. Finally, the aim of paper number three was to explore the contribution of psychosocial factors to the frequency of primary care consultations made by young people.

Thesis outline

Somatisation, which comprises unexplained or functional medical symptoms, as well as somatoform syndromes and disorders, is a common presenting complaint among young people; however, comparatively little is known about its frequency or its impact upon this population. The published papers comprising this thesis describe work aimed at filling that gap and broadening our knowledge in this area by investigating the frequency, impact of, and psychological associations with somatic symptoms, as well as related medical help-seeking behaviour in a general population of British school students.

In chapter 1 I provide a brief introduction to somatisation, somatic symptoms and somatoform disorders in children and adolescents, including diagnostic operationalisations, prevalence, and theoretical models for understanding somatisation in this population. Chapter 2 reviews the literature on the associations between somatisation and socio-demographic, personality, genetic, family and cultural factors. Chapter 3 presents the evidence for the associations between somatisation and physical disease, other mental health symptoms, impairment, health service use and the long-term health outcomes of somatisation in childhood and adolescence. Chapter 4 reviews what is known about

measuring somatisation in young people. A synopsis of the thesis is presented in Chapter 5, with Chapter 6 outlining the method employed to conduct the survey that provided the data used to write the three published papers. Those papers comprise Chapter 7. Chapter 8 presents a summary of the results and the comparisons with the existing literature; Chapter 9 provides the methodological limitations with Chapter 10 outlining the conclusions derived from the findings of the three papers. Chapter 11 and 12 present the resultant clinical implications and research perspectives of those findings respectively.

INTRODUCTION

Chapter I. *Somatisation*

What is somatisation?

Somatisation is defined as the manifestation of psychological difficulty or distress through somatic symptoms; a tendency to experience and communicate somatic distress and symptoms unaccounted for by pathological findings, to attribute them to physical illness and to seek medical help [1]. *Murphy* characterises somatisation as a variety of processes that lead patients to seek medical help for physical symptoms that are misattributed to a physical disease [2]. *Kellner* defines somatisation as occurring when there are one or more physical complaints and appropriate medical evaluation reveals no explanatory physical pathology or patho-physiological mechanism; or when there is related physical pathology but the physical complaints or resulting social, educational or occupational impairments are grossly in excess of what would be expected from the physical findings [3].

An impaired ability to verbalise psychological distress is regarded as underpinning the behaviour of communicating distress through somatic symptoms [4], and since children have immature cognitive verbal skills and their vocabulary for emotional expression is limited, somatisation should be particularly common in childhood [5].

In the paediatric literature the phenomenon of somatisation in children and adolescents is often referred to as ***functional somatic symptoms (FSS)*** or ***medically unexplained symptoms (MUS)***, as they are commonly used to refer to recurrent but medically unexplained medical symptoms in this population. Throughout the thesis the terms somatisation, FSS and MUS will be used interchangeably.

Diagnosing Somatoform disorders

Somatisation is the central feature of a number of **DSM-IV-TR** and **ICD-10 diagnoses** [6, 7]**,** mainly classified under the label of **somatoform disorders** (see Appendix I)**.** The key diagnostic criteria for somatoform disorders are that the physical symptoms are not explained by a general medical condition and that they must cause clinically significant distress or impairment in social, educational, occupational or other areas of functioning.

Two main aspects that distinguish somatoform disorders from other psychiatric disorders include the fact that the presenting complaints are physical as opposed to psychological in nature, and that patients usually attribute the symptoms to a physical illness in spite of the lack of medical evidence [8].

Diagnosable somatoform disorders represent the severe end of a continuum that comprises unexplained 'functional' symptoms in the middle, and transient everyday aches and pains at the other end. These disorders are often encountered in medical settings as patients do not tend to seek psychiatric or psychological assistance. Patients only present to mental health professionals after repeated general practitioner (GP) visits, paediatric or other specialist assessments, and when medical investigations have taken place with no or minor findings; psychiatrists are often only involved in the relatively more rare and extreme cases [9].

The classification of somatoform disorders according to DSM-IV-TR and ICD-10 diagnostic criteria have been found to be insufficiently useful for therapeutic and scientific purposes in both adult and paediatric populations, mainly due to their **heterogeneous classification** [10-13]. Hence, in order to improve their validity the classification and definition of these disorders has changed in the recently published **DSM-V** [14] (see Appendix II), and are currently being revised for the 11th edition of the World Health Organisation ICD diagnostic manual **(ICD-11)** which is currently due to be published in 2015. Some authors have suggested that incorporating a dimensional approach that reflects both somatic and psychological symptom severity has the potential to improve predictive validity and clinical utility [15-17].

Moreover, the ICD and DSM diagnostic criteria for somatoform disorders were initially established for adults and are currently applied to children despite the lack of a child-specific research base or developmentally appropriate alternative system [9, 18]. Several authors have claimed that a radical review of the language and conceptualisation of somatoform disorders in paediatric populations is needed, including an awareness of differences in presentation throughout development [19, 20].

At present, somatoform disorders in DSM-IV-TR and ICD-10 diagnostic manuals are classified as follows (see Appendix I):

1. **Somatisation disorder**

   It is important to mention that although commonly somatisation syndromes both in adult and paediatric populations do not reach the diagnostic threshold for a somatisation disorder, they might still be clinically significant and functionally impairing [21, 22].

2. **Persistent somatoform pain disorder**

3. **Hypochondriasis**

4. **Body dysmorphic disorder**

5. **Undifferentiated somatoform disorder**

6. **Somatoform disorder not otherwise specified**

7. **Somatoform autonomic dysfunction** (not coded in DSM-IV-TR)

8. **Conversion disorder** (which is not classified as a somatoform disorder in ICD-10 but part of a different category of **Dissociative disorders**)

9. **Chronic fatigue syndrome (CFS)** (not coded in DSM-IV-TR) (CFS is not classified as a somatoform disorder in ICD-10, but part of a different category of **Other neurotic disorders** and referred in ICD-10 as **Neurasthenia**):

   Chronic fatigue syndrome is the official definition of the *Oxford criteria* and the *CDC (Centres for disease control and prevention) criteria* [23, 24], which has been adopted by the *Association for Child Psychology and Psychiatry (ACPP) Working Group (now called ACAMH)* and the *UK Royal Colleges of Physicians, Psychiatrists and General Practice* [25], and has largely replaced the ICD-10 neurasthenia categories.

It is relevant to highlight that in all somatoform disorders the origin of the pain is not under voluntary control**.** This serves to differentiate these types of disorders from **factitious** and **malingering syndromes** and **disorders** in which the production of the symptoms is intentional and conscious [6].

Somatoform disorders in children and adolescents

Although somatic pain is a common problem among the paediatric population, it is often self-limiting and does not lead to functional impairment or medical health-seeking [26]. It is only in a small group of children that the pain may be chronic, severe and recurrent, usually related to psychological factors, and with associated significant

impairment and disruption to daily life leading to medical consultations; it is in this group that the symptoms might meet criteria for the diagnosis of a **somatoform disorder** [19]. *Campo and colleagues* defined **'paediatric somatisers'** as children who were described by their parents or caretakers as often complaining of aches and pains and having a history of visiting the doctor where the doctor found nothing wrong. Paediatric somatisers were more likely to be identified as suffering from emotional and behavioural difficulties, to be described by parents as being afraid of new situations and prone to worry and separation concerns [27].

The most common somatoform disorder in children and adolescents is **persistent somatoform pain disorder**, with abdominal pains and headaches the most prevalent symptoms [28, 29]. Two related disorders, **conversion (dissociative) disorder** and **chronic fatigue syndrome (neuroasthenia)**, are also prevalent in young people.

Eminson highlights that psychiatric classifications do not include a category called **adjustment disorder**, which represents a single or a few somatic symptoms that are short-lived, often develop with an identifiable psychosocial stressor, and are associated with levels of functional impairment that would not approach the levels of a somatoform disorder. *Eminson* reports that these conditions constitute an 'adjustment reaction' experienced as physical symptoms, which clinically could account for the largest group of children experiencing unexplained physical symptoms and is readily recognisable in primary care and paediatric settings [30].

At the opposite end of the spectrum, **somatisation disorder** requires several years of experiencing symptoms, with symptoms being largely atypical of children and adolescents and it is rarely an applicable diagnosis for the paediatric population. Moreover, children are less able to initiate health-care seeking behaviour, and it is the beliefs and attitudes of their parents that will determine whether health care consultations are initiated. Most authors suggest that more developmentally appropriate and less restrictive criteria should be developed for children, as the sexual and reproductive symptoms of somatisation disorder are developmentally inappropriate for pre-pubertal children [9, 30].

The prevalence of somatic symptoms and somatoform disorders in children and adolescents

Studies examining the prevalence of paediatric functional pain have often yielded **inconsistent findings** making it difficult to make general conclusions regarding the pervasiveness of symptoms and disorders. This is mainly due to the use of **different methodologies** and **limitations** such as the use of different and inappropriate measures, differences in operational definitions of pain, pain intensity, frequency and duration, and the use of inappropriate samples for epidemiological studies [31, 32]. The lack of consistency between studies in terms of pain definition highlights the need to further develop and apply a set of standardised criteria when examining the epidemiology of functional pain in children and adolescents [32]. Although precise definitions vary, the *International Association for the Study of Pain (IASP)* typically defines chronic pain as pain without an apparent biological value lasting more than 3 months.

Somatic complaints are not uncommon in children and adolescents; in the general population 2-10% of children are documented as having aches and pains that are mostly unexplained [33, 34]. In a general population survey (The Ontorio Child Health Study) *Offord and colleagues* found this to be the case in 11% of girls and 4% of boys aged 12-16 years old [35]. Surveys from various countries have found that approximately one in four children complain of at least one set of somatic symptoms weekly or fortnightly, with recurrent and troublesome somatic symptoms occurring in 2-5% of children and adolescents [8]. The most common complaints in the paediatric population are headaches, stomach-aches and musculoskeletal pains [8, 26, 36, 37].

Prevalence rates for different pain symptoms vary substantially in community studies. Headaches appear to be the most commonly reported somatic symptoms, with 10-30% of children and adolescents in community samples reporting frequent or at least weekly headaches [38-40]. Recurrent abdominal pain is also extremely common, with studies reporting recurrent abdominal pain in 10-25% of school-aged children and adolescents [39, 41-43]. Limb pain, aching muscles or 'growing pains' are also habitual in paediatric samples, with frequent or at least weekly limb pains being reported in approximately 5-20% of school-aged populations [31, 39, 41]. Medically unexplained chest pain is not uncommon either, with frequent or at least weekly chest pain reported in 7-15% of school-aged subjects [39]. Fatigue is also a commonly endorsed complaint with

approximately 15% of adolescents complaining of daily fatigue, and one third to one half endorsing the symptom on a weekly basis [44].

In a systematic review of chronic and recurrent pain prevalence in child and adolescent community samples, *King and colleagues* found that prevalence rates ranged substantially [32] i.e., headache (8-83%), abdominal pain (4-53%), back pain (14-24%), musculoskeletal pain (4-40%) and other pains (5-88%). Prevalence rates for headaches over the past month or 3-month period varied from 26-69% (median=47%), weekly headache prevalence rates varied from 6-31% (median=23%) and prevalence rates for daily headache ranged from 1-9% (median=5.1%). With regards to recurrent abdominal pain (RAP), prevalence rates for RAP (i.e., at least 3 episodes of abdominal pain severe enough to limit the child's functioning over at least 3-months) ranged from 4-41% (median=12%), and weekly abdominal pain prevalence rates ranged from 8-22% (median=19%). Studies reporting 1-month prevalence rates of back pain ranged from 18-24% (median=21%), with the prevalence of weekly or at least weekly back pain ranging from 9-25% (median=21%).

Garber and colleagues examined a Nashville community sample of 540 children and adolescents aged 7-17 years old, with nearly half the sample reporting at least one physical symptom during the preceding 2-weeks. The most commonly reported symptoms were headaches (25%), low energy (23%), sore muscles (21%) and abdominal discomfort (at least 17%) [39]. In the Great Smoky Mountains studies, *Costello and colleagues* assessed young people in North Carolina identified through the public school system at 9, 11 and 13 years of age, and found headaches to be the commonest of somatic complaints (10%), followed by stomach-aches (3%) and musculoskeletal pains (2%). In this study, the authors reported prevalence rates for symptoms that lasted for at least one hour, and occurred at least once a week during the preceding 3-months [45, 46].

In a community sample of British young people aged 11-16 years old, *Eminson* [47] reported a life-time prevalence of 39% for joint pains, 31% for headaches, 30% for chest pain and 29% for abdominal pains; the rates are higher in this study because lifetime prevalence was the unit of measurement. A large British community study carried out in late 1970 with younger children, indicated that 3% of children had recurrent headaches and 9% suffered from recurrent stomach-aches [48].

In Spanish pre-schoolers aged 3-5 years old, frequent somatic complaints were found in 20% of the sample [49] and in a Nordic sample of school children aged 7-12 years old,

25% reported psychosomatic symptoms [50]. An epidemiological Danish study of children aged 5-7 years old showed a 23% 1-year prevalence of functional somatic symptoms [37].

Despite the figures reported above, somatisation is frequently **poly-symptomatic** and somatic symptoms appear to cluster in the paediatric population [39, 51, 52]. In the study by *Garber and colleagues,* 15% of young people reported 4 or more symptoms in the previous 2 weeks [39], whereas *Meesters and colleagues* found that more than 10% of their sample complained of at least two somatic symptoms during the same period of time [53]. In the systematic review by *King and colleagues* involving community paediatric samples, they found the prevalence of multiple pains ranging from 4-49% [32]. In another epidemiological study with Dutch children aged 0 to 18-years old, half the respondents reported having multiple pains [26], whereas in a Danish population study of 5-7 year old children, 9% presented with multi-symptomatic functional somatic complaints [37].

Most research on somatoform disorders in the paediatric population has been done on children with **persistent somatoform pain disorder**; in particular stomach-aches and headaches [8, 29], as pain disorders are generally more common than any other somatoform disorders in this group. *The German Early Developmental Stages of Psychopathology project* [54, 55] has documented the prevalence of somatoform disorders amongst a sample of 3021 subjects aged 14-24 year-old. They found that more than 12% of the population suffered from at least one somatoform disorder during their lifetime, although specific DSM-IV somatoform disorders were relatively rare with a lifetime rate of 2.7%. The most prevalent specific disorder was somatoform pain disorder (lifetime 1.7%; 12-months 0.9%), while others such as conversion disorder was quite rare (0.4% and 0.2% respectively). Only one subject fulfilled diagnostic criteria for hypochondriasis and no case met full criteria for somatisation disorder. However, considerably more of the sample met criteria for clinically significant somatoform syndromes with an estimated lifetime prevalence of 10.7%, with USDS (undifferentiated somatoform/dissociative syndrome) being the most prevalent subtype (9%). Chronic fatigue syndrome was not assessed in this study.

Theoretical models for understanding somatisation in children and adolescents

Child researchers from multiple disciplines have investigated many theories in their search to explain the mechanisms influencing the origin and progression of FSS in children and adolescents [31, 56, 57]. For example, **psychodynamic theory** views somatisation as a

psychological defence as people with FSS are unable to express distressing feelings (defending against the awareness of unpleasant affects, conflict or memories), but express emotional distress through physical symptoms instead. This is thought to be the result from early emotional deprivation. The primary gain is that unpleasant feelings are kept from conscious awareness. The symptoms also provide secondary gain through the avoidance of undesired responsibilities. **Attachment theory** frames somatisation as a way for the child to maintain close proximity to the attachment figure. The child's expression of physical discomfort acts as a care-eliciting function from the attachment figure. From a **social learning theory** perspective the child may model a family member whom he/she sees as receiving attention due to illness, and may imitate their symptoms. As well as the symptoms, illness beliefs and the response to illness may be learnt from family members. A child learns various behaviours from close family members through modelling, which in turn impacts on their formation of beliefs and attitudes about illness. Beliefs about illness usually develop within family and culture. The expression of FSS may be reinforced by special attention from parents or by being excused from disagreeable tasks, such as completing chores at home or taking a test at school (operant conditioning). A **systemic model** proposed by *Minuchin and colleagues* focuses on how the family environment is involved in the development and maintenance of symptoms in chronically ill children [58]. Families in which FSS develop are purported to have dysfunctional transactional characteristics such as enmeshment (i.e., where personal boundaries are diffuse, sub-systems undifferentiated and over-concern for others lead to a loss of autonomous development), overprotection, rigidity and lack of conflict resolution. The child's 'illness' maintains a delicate homeostasis in the family and is reinforced by the avoidance of conflict. Problems in family communication have been reported and physical symptoms may serve a communicative function, serving as a 'plea for help'. The **cognitive psychobiological theory** delineates FSS as a consequence of physiological reaction to emotional arousal. For example, children with FSS may have heightened preoccupation with, or sensitivity to, physical sensations. With distorted information processing and negative cognitions, children with FSS may frame symptoms as a reason for serious concern, and this leads to amplification or misinterpretation of common physiological signals and bodily sensations which may in turn be one of the main processes in the development of FSS. **Coping and stress response theories** outline that children's cognitive and behavioural responses to chronic pain influence their level of pain and

psychological adjustment. The disability-stress-coping model is structured in a risk-resistance framework. The manner in which children cope with such stressors has a great impact on FSS, pain intensity and internalising symptomatology [59].

Current models adopt a **multifactorial approach** considering **biopsychosocial factors** in which different mechanisms are not mutually exclusive but all relevant in explaining the complexities of paediatric somatisation [31]. For instance, both *Eminson* and *Beck* categorise the working model for the study of paediatric somatisation based on child, family, social and environmental factors [19, 56] (see Appendix III).

Eminson highlights that **developmental considerations** are important for how somatoform and related syndromes and disorders present [19]. Children and adolescents are dependants and largely reliant on adults for significant aspects of 'illness behaviour'. This behaviour includes the way in which symptoms are responded to, including the extent to which medical consultations and lifestyle alterations are undertaken. Parents and carers are powerful in responding to (or ignoring) children's physical complaints, attributing significance (or reassurance) to such complaints, facilitating (or otherwise) their use of healthcare facilities, and their involvement in (or withdrawal from) normal life activities. Other developmental factors, especially levels of cognitive and verbal competence, have long been recognised as important determinants of the ability to verbally express emotional distress. Early in development, children are less sophisticated in their understanding and less skilled in direct verbal expression of psychological distress, therefore, it is suggested they are more likely to express their feelings in other more indirect ways [19].

To conclude, a **developmental perspective** on somatisation suggests that functional somatic symptoms may begin with a sensitive, anxious or emotionally reactive child who often perceives more threat and danger (be it real or imagined) in the environment compared to his or her same-age peers. In response to this perceived threat the child may exhibit more signs of physiological reactivity than other children, due in part to a heightened awareness of bodily sensations. The child might then be more likely to use FSS to signal caregivers to help cope with distress *(attachment theory).* On the other hand, a sensitive child may feel rejected by the parent, or may be more prone to emotional over-arousal in a parent-child relationship ridden by conflict. In such an acrimonious climate, where emotional repression is accepted, the child may begin to internalise feelings and express FSS

more frequently *(psychodynamic theory)*. A child's expression of FSS might be exacerbated by vicarious learning through observation of parental illness behaviour *(modelling theory)*, reinforced by special attention or other rewards *(social learning theory)*, or maintained by family conflict *(family systems theory)*. This effect might be stronger in socially disadvantaged homes with few financial and social resources, which could potentially increase stress and conflict in the home *(contextualism)* [56].

To summarise, it can be concluded that somatic symptoms are common in the paediatric population, are often poly-symptomatic but are experienced at different levels of frequency, intensity and duration. Most common symptoms are headaches, stomach-aches and musculoskeletal pains. The most consistent prevalence rate for children suffering from somatic symptoms is probably close to one in four; but having a mixture of symptoms that are bothersome is probably close to about one in twenty; however, differences in methodologies between studies makes it difficult to compare results. That said, somatoform disorders in children and adolescents are rare, with pain disorder being the most common disorder. Theoretical models suggest a multifactorial approach to the phenomenon of paediatric somatisation.

Chapter 2. *Somatisation and psychosocial factors*

Age

Age is often an important factor influencing the type of somatic symptoms reported by paediatric populations. The expression of pain symptoms by children and adolescents appears to follow a **developmental sequence**, and are initially mainly **mono-symptomatic** but tend to become **poly-symptomatic** with increased age [27, 31, 35, 60, 61]. Recurrent abdominal pain and headaches appear to be the most prominent physical complaints in pre-pubertal children, with reports of limb pain, aching muscles, fatigue and neurological symptoms increasing with age [9].

Among patients consulting paediatricians, unexplained physical symptoms are more common in school-aged than pre-school children [56], with research showing that somatisation may peak in late childhood or early adolescence [39].

Some authors report that abdominal symptoms increase in frequency from 3 to 9 years of age and then steadily decrease into adolescence [62-64], whereas others do not find age-related differences [65, 66]. The converse is likely to be true of headaches, which appear considerably less common in pre-school compared to older children [8] and adolescents. Headache prevalence increases with age in young people across most studies [63, 67, 68], although some only observe the trend in girls [69, 70]. *Oster* reported that recurrent abdominal pain peaked in prevalence at age 9, with headaches peaking at age 12. Pseudo-neurological symptoms (conversion and dissociative disorders), back pain and musculoskeletal pain show an increasing prevalence with age throughout adolescence [32, 54]. Most pain and undifferentiated somatoform disorders start in childhood or early adolescence; however, conversion disorder tends to arise later, with a median age of onset of 16 [54].

Gender

Somatic symptoms and somatoform disorders generally occur more commonly in females than males, with girls reporting more symptoms as adolescence proceeds, and boys reporting fewer symptoms [32, 36, 38, 39, 41, 53, 54]. However, epidemiological research presents conflicting findings on gender and functional somatic symptoms as some report no

pre-pubertal gender differences in the prevalence of FSS [27, 50], whereas others report higher frequencies in females throughout all ages. The latter finding is consistently reported in samples of adolescents and adults [39, 70-72]; with some reporting that females tend to report more than twice as many FSS as males [60].

The majority of studies report that headaches, stomach-aches and musculoskeletal and limb pain are more prevalent in girls; however, sex differences are not as pronounced in children with back pain [32, 52]. Pseudo-neurological symptoms show a female preponderance, regardless of age, in clinical samples [31, 73]. The prevalence of chronic pain tends to increase with age and is significantly higher for girls with a marked increase in reporting chronic pain occurring between the ages of 12 and 14 years old; with girls also being more prone to report multiple and severe pain [26].

In females, pain disorder shows the steepest age of onset increase between 11 and 19 years, with more than 50% reporting an onset before the age of 14, whereas among males it tends to be before the age of 13 [54] .

Some studies explain gender differences from a socialisation point of view, suggesting that boys are socialised to suppress pain whereas girls might be rewarded when expressing pain [54]. Others suggest that increased symptom reporting in girls is associated with the onset and progress of puberty and menarche [38, 74, 75]. *Eminson* also states that the excess of symptoms in older girls might be related to reporting painful periods, rather than simply to the age of onset of menarche [19]. Overall, research suggests that pain, somatic symptoms in general, and depression increase systematically with pubertal development in girls [76].

The associations between pubertal status and physical symptoms may be understood in the context of physiological and cognitive-social changes emerging during adolescence. Hormonal influences on mood and behaviour during adolescence have been well documented [77, 78]; however, studies providing convincing evidence for causality between hormones and physical symptoms are limited. Nonetheless, hormonal alteration or a particular event marking puberty (i.e., menarche for girls), have long been suspected as a trigger for some physical symptoms [75].

As youngsters mature, cognitive awareness of bodily changes and sensory information increase, contributing to a heightened sense of self-monitoring of physical symptoms. Society often expects physically mature adolescents to assume higher levels of

social responsibility, which may produce distress in young people, especially when they are not equipped with the cognitive and social skills to handle such expectations. The ensuing emotional burden may place youngsters at risk for experiencing physical symptoms. In both genders, on-time maturation emerges as a protective factor against physical symptoms as on-time developers consistently report fewer symptoms than either their late- or early-maturing counterparts. Early-maturing individuals have been shown to be more vulnerable to psychological adjustment problems [79, 80]; therefore, an increased tendency for physical symptoms in early pubertal adolescents is not surprising. However, this seems to be the case for girls rather than boys [75].

Personality characteristics, temperamental traits and psychological processes

Studies have found that children with medically unexplained symptoms are more anxious, perfectionistic, shy, self-conscious and apprehensive or highly-strung, fussy and excitable compared to controls [5, 19, 41]. Others have found that they tend to be insecure and sensitive, more temperamentally difficult and more likely to be withdrawn in new situations [81, 82]. A strong theme in the literature has been the observation of the 'good, high-achieving, compliant' child [19]. It is also a common theme that those children and young people who perceive their self-competence as low, and report more social relationship difficulties have been found to have higher levels of somatic symptoms [30, 36, 53].

Research shows that poor emotional awareness and the frequency of negative affect both predict child reported somatic symptoms [83]. Additionally, parental reports of emotional regulation difficulties in their children and early child temperament features, such as irregular feeding and sleeping, have been associated with parents' reports of child somatic symptoms and child somatic complaints later in life [83-85].

A recent Danish longitudinal birth cohort study investigating the markers of early regulatory problems as predicators of childhood FSS, found that infant regulatory problems (i.e., at least 2 or 3 problems of feeding, sleeping or tactile reactivity during the first 10-months of life) predicted impairing functional somatic symptoms at 5-7 years of age. Possible mechanisms discussed in the study included the child's hypersensitivity to sensory stimuli and an early programming of autonomic hyper-reactivity [85].

Walker and colleagues reported that children who are unhappy and lack competence in at least one area of functioning are at increased risk for FSS in the face of stressful situations [85-89]. Children who fear failure in social or academic realms appear less able to cope effectively with negative life stressors, and consequently experience uncomfortable somatic symptoms [56].

Somatisers are therefore likely to be fearful of novelty and prone to separation concerns and worry. Behavioural inhibition to the unfamiliar may represent a stable trait vulnerability that activates neural circuits generating stress responses to potentially threatening or uncertain stimuli in children who are at heightened risk of developing anxiety disorders and exhibit more somatic symptoms than non-inhibited peers. A predisposition to being anxious and novelty-averse may make children vulnerable to reacting negatively to somatic symptoms and sensations, including the somatic symptoms commonly associated with emotional distress [27].

Various **psychological processes** have been suggested to explain the phenomenon of somatisation, although most of the research comes from the adult literature [5]:

1. *Dissociation.* It represents a failure to integrate different elements of consciousness, producing restriction of conscious awareness to certain themes of immediate emotional importance. The usual connectedness between physical and psychological experiences available to most people is either reduced or non-existent.
2. *Alexithimia.* Difficulties in identifying and describing feelings, and in distinguishing between feelings and the bodily sensations of emotional arousal.
3. *Somatic attribution.* Increasing interest is directed at cognitive styles of appraising physical symptoms that may underlie the somatisation of distress.
4. *Introspection.* An enhanced tendency to focus on internal states, encompassing both emotions and physical sensations.

Overall, research supports the idea that children and adolescents with high levels of FSS use poor coping strategies characterised by disengagement, rumination over pain, avoidance, anger, cognitive interference or some combination of all these processes. The coping strategies that children adopt when suffering from pain can play an important role in the maintenance of that pain. *Walker and colleagues* report that young people classified as

avoidant copers are characterised by poor mastery efforts, and withdrawal from interpersonal relationships when dealing with pain. They appear to 'give up' as they catastrophise and disengage from efforts to manage the pain, and rarely use self-encouragement or distraction. Moreover, they isolate themselves from others and try not to let anyone know how they are feeling. This group of children view their pain as very serious but their pain efficacy as quite low. Thus, they appraise the pain as a significant threat that exceeds their coping resources. *Avoidant copers* also tend to have the highest scores on functional disability and depressive symptoms. **Dependent copers** are similar to avoidant copers in their poor mastery efforts. However, the groups differ in their approach to using interpersonal relationships as strategies to cope with pain. Compared to avoidant copers, *dependent copers* report more support-seeking and visible pain behaviour. This group reports both catastrophizing and support-seeking, high levels of disability but very low pain efficacy, and such children have significantly lower levels of depression than self-isolating avoidant copers. Conversely, **self-reliant copers** are characterised by high pain mastery efforts but an avoidance of social contact during pain episodes. They also have significantly higher levels of pain efficacy than the other two groups. And finally, **engaged copers** are similar to self-reliant copers in that their profile reflects efforts to gain mastery over pain, however they also frequently seek social support. Both avoidant and dependent copers have relatively higher levels of symptoms and disability compared to the other two groups [90].

Genetic, social and family factors

Few studies have explored the **genetic contributions** to the development of somatisation [9]. However, it has been suggested that genetic factors may play a part in sensitivity to pain and other bodily sensations, although little hard evidence exists [19]. *Fowler and colleagues* studied the genetic and environmental influences on disabling fatigue in a community sample of twins aged 8-17 years old [91]. Their results suggest that short duration fatigue (disabling fatigue of more than one week) in children and adolescents is heritable (67%), but that prolonged fatigue (disabling fatigue of more than one month) is mainly environmental.

Some researchers have reported an association between paediatric somatisation and lower socioeconomic status, urban residence, dysfunctional family status and lower

parental educational level [27, 38, 56, 92, 93]. However, these associations may not be clear-cut as other studies have found these factors also tend to interact with demographic variables such as gender and age [32].

Empirical evidence supports the hypothesis that **adverse events** or **stressors** in the home or at school increase FSS in the paediatric population [56]. A common association is frequently demonstrated between adverse acute and chronic psychosocial and family factors (i.e., non-intact families, lower levels of parental education, poor family support, parental disharmony and family problems, or the death of a parent) and FSS, as well as health service use in the paediatric population [19, 30]. Longitudinal data suggests that daily stressors in school and family contexts produce greater somatic distress in children with low social competence, and that social rewards maintain FSS, especially when children have low self-esteem [56].

The role of **common psychosocial factors** (i.e., worries about parents, family tension or illness, changing schools or transferring to secondary school, concerns about school and educational performance, bullying and poor attainment at school, difficulties in getting along with peers and teachers and lack of friends) in precipitating or exacerbating FSS in young people is well recognised [30, 94]. Once children have stopped attending school they can become acutely anxious when the issue of returning to school is approached [8]. High academic pressures in a child with high self-expectations might also contribute to and precipitate these symptoms. These children are often sensitive to social interactions and have high educational expectations and this stress may manifest as an inability to perform educationally thus making school absence worse [95, 96].

Disrupted early-life experiences and **poor parental care** (including abuse, neglect and conditional caretaking) are also associated with increased symptom reports in children and adolescents, and are found in the histories of adults with excessive unexplained physical symptoms [19]. Many retrospective studies of adults with somatoform disorders have demonstrated a link between childhood neglect and abusive or traumatic experiences and later unexplained symptoms, psychosomatic disorders and health service use. However, it has proved more difficult to demonstrate the same links in child and adolescent samples [9, 30, 31, 56]. In rare cases paediatric somatisation will be an expression of profound family disorganisation or dysfunction associated with sexual abuse, or an expression of fabricated

illness leading to the child being presented repeatedly for remedial assessment and care (Munchausen disorder) [29].

It is well established that **parental attitudes** and **behaviours** greatly influence children's psychiatric adjustment and the same is true for somatisation [5]. Intergenerational transmission and parental influences on child somatisation behaviour have been consistently described in the literature. For instance, there is evidence for the clustering of somatisation and illness in the families of children who somatise [5, 33, 72, 97]. Moreover, children with somatisation have an excess of relatives with chronic physical illness, disability and other psychiatric disorders [9, 31, 41, 48, 56, 98, 99]. Familial modelling and contingent reinforcement of illness has also been observed in families. The presence of similar symptomatology in the parents of children who somatise may serve to focus the child's attention on bodily fluctuations and sensations. Parental reinforcement of symptoms and discouragement of coping is also likely to play a part in the onset and/or maintenance of symptoms. Parental concerns about illness or a parent's health focus may be a possible influence on child somatisation, which then makes it more likely for parents to seek medical reassurance and consultation for their children [96].

Parents or caregivers are the **ultimate decision-makers** about the responses to a child's symptoms and illness behaviour, and they decide whether a child's complaints are sufficiently severe to allow him/her to be judged sick, and if so, whether they should be treated as sick by missing school, being given medicine or taken to a health professional. Most parents find it relatively easy to decide when a physical illness has come to an end and when the child can resume normal life. However, for some these decision-making processes become difficult, resulting in problems encouraging a child to ignore his or her symptoms and return to ordinary activities [19]. Family beliefs about the medical causation of a child's symptoms can militate against efforts towards rehabilitation and recovery. These can be an expression of a persistent and generalised tendency to believe in physical explanations for the symptoms in the absence of medical evidence. It is very important to explore these beliefs in the assessment of somatisation and address them appropriately as they can jeopardize treatment and therefore the resolution of these conditions [8].

There are high rates of **mood disorders (anxiety and depression)** in parents of somatising children (parental symptoms in a number of cases predate the onset of child symptoms) [8, 30, 33, 48, 56, 97, 100, 101]. Tendencies towards 'overprotection' and fears

of separation, maternal hyper-responsiveness to interactions around health issues and maternal emotional over-involvement with physical symptoms have all been reported [102, 103]. Research also shows that higher levels of maternal distress are associated with greater mother-child discordance in the reporting of symptoms (somatic and depressive), with mothers reporting more symptoms than their children [104]. Somatic symptoms might also be an expression of 'conditional caretaking', that is, some parents may respond differentially to physical and emotional distress, with preferential responses to the former, which the child quickly learns. For children with higher levels of emotional distress from pain, maladaptive parental responses (i.e., criticism, discounting of pain, overprotectiveness, increased attention to pain, and granting of special privileges) are associated with increased disability and somatic symptoms [19, 84, 88, 105-108].

Ramchandani and colleagues assessed whether parental psychological and physical factors in the child's first year of life were associated with recurrent abdominal pain (RAP) in children at age 6 ¾ years. Both maternal and paternal anxieties were associated with later childhood RAP. These findings highlight the potential importance of addressing parental anxiety in families in which children present with RAP [84]. In a Danish longitudinal birth cohort study, maternal psychiatric illness (i.e., mother admitted to hospital and diagnosed with a psychiatric illness) during the first year of a child's life was associated with the child's later reporting of functional somatic symptoms [85].

Cultural factors

The potential influences of **culture, race** and **ethnicity** on the development of somatisation have not yet been adequately studied in the paediatric population [31]. Cultural factors are likely to affect beliefs about illness and the ways in which psychological distress may present somatically [19]. Attitudes to the medical profession, to health and to the benefits or otherwise, of normal school and social activities, vary widely and have powerful shaping effects on parents and children [19]. So far cultural differences have been found in the rates of somatic complaints in children and adolescents, but not necessarily in the types of complaints [109]. Although the reasons for the discrepancies in rates are not clear, the findings indicate either that the meaning of physical symptoms varies across cultures or that cultural acceptance of reporting these types of symptoms differs [36].

Some studies in adult populations report that in **developing countries** there are prevailing beliefs that emotional distress can be expressed in somatic terms; furthermore, this contrasts with patients from **developed countries** who communicate their distress in psychological terms [110]. There are studies with **minority ethnic groups** that report these groups are also more likely to present with somatic rather than psychological symptoms in the primary care setting [111, 112]. This suggests that **non-Western cultures** not only lack words for anxiety and depression, but also that individuals in these cultures experience emotions in an undifferentiated way [110]. However, there is growing evidence demonstrating that in the USA and the UK, at least half of all patients in primary care settings with a diagnosable psychiatric disorder initially present with somatic rather than psychological symptoms [113, 114], which suggests that somatisation is not restricted to individuals from non-Western cultures. Another possible explanation is that there are individuals who, irrespective of their cultural origins, lack the language to express emotional distress; the term alexithymia is used to describe this phenomenon [115].

Recent research has identified somatisation as a **universal phenomenon**. A WHO (World Health Organisation) study looking at somatisation presentations in primary care in subjects aged 18 to 65 years old in 14 countries (Turkey, Greece, Germany, The Netherlands, Italy, India, Nigeria, China, Japan, France, Brazil, Chile, the UK and United States) found that somatisation symptoms were common across all these countries, were frequently associated with comorbid depressive and anxiety disorders, and were moderately associated with low levels of education and disability [116]. However, the symptom rates were much higher in the South American countries. This study also emphasised that although headaches, musculoskeletal pain and abdominal pains were overall the most commonly reported somatic symptoms, there are some culturally and geographically specific symptoms i.e., 'numbness' and 'feelings of heat' in Africa; 'burning hands and feet' in India; and 'fatigue' in Western countries.

Farooq and colleagues investigated the comparative rates of somatic complaints in Asian and Caucasian patients aged 16 to 65 years old from a primary care setting in the UK, and explored the factors associated with increased rates of somatisation. Their main finding was that Asian patients reported significantly more somatic and depressive symptoms than Caucasian patients and ethnicity was the statistically most important variable determining this result [110].

Despite all the above, there are a number of methodological difficulties associated with cross-cultural comparisons which hampers the comparison between studies, including the fact that research instruments which are developed in one culture and applied to another culture, need to be properly validated [112].

To conclude, research shows that females generally experience more FSS than males, and prevalence rates of FSS tend to increase with age, with the exception of abdominal pain which tends to be more prevalent in younger children. Moreover, younger children tend to suffer from mono-symptomatic complaints, with the number of symptoms often increasing with age. Studies have found that children with FSS are often anxious, perfectionistic, sensitive and more temperamentally difficult and use poor coping strategies when dealing with pain. Research indicates that genetic factors might be significant in somatisation, although little evidence exists so far. However, associations with psychosocial adversity and family factors are consistent in various studies which also report high prevalence of illness, mental health problems and somatisation in family members of children with FSS. Studying somatisation in the paediatric population requires extensive consideration of family and parental influences on both the expression of and response to symptoms, as well as illness and consultation behaviours. The potential influences of culture, race and ethnicity on the development of somatisation have not yet been adequately studied in the paediatric population and methodological difficulties associated with cross-cultural comparisons hamper the results. However, recent research in the adult population suggests that somatisation is a universal phenomenon.

Chapter 3. *Somatisation and other health factors*

Associations with physical disease

Although the onset of somatic symptoms/somatoform disorders is **often insidious**, sometimes symptoms are triggered by **specific and acute events**, such as physical illness, medical treatment, an injury or an accident [31, 94]. For example, severe abdominal pains may start after an acute gastrointestinal infection; loss of sensation or motility in a limb may be preceded by an injury and its treatment with immobilisation; and chronic fatigue might be precipitated by a 'flu' type illness with aches, pains and fatigue [28].

There is a high prevalence of **concurrent medical illness** in children with impairing FSS, which supports previous findings that personal experience of illness in childhood may be a precursor to or predictor of somatisation [31, 71, 106]. Somatic symptoms/somatoform disorders can coexist with organic conditions, and when this is the case it is necessary to establish which symptoms are congruent with the illness and which are more likely attributable to the psychosocial stressors or somatoform disorder [95].

Associations with other mental health symptoms and disorders

Many children with somatisation do not have associated psychiatric comorbidity, but between a third and a half do, with **emotional spectrum disorders (anxiety and depression)** being the most common, and externalising problems less common [5, 31, 117]. Emotional symptoms and disorders are often comorbid with both unexplained physical symptoms and somatoform disorders [28]. In some cases the psychiatric disorder precedes the development of impairing functional symptoms, but more commonly these develop during the course of the somatoform syndrome/disorder [29, 95]. Many studies have demonstrated that children with a greater number of somatic symptoms are also likely to have higher levels of mood and anxiety symptoms and disorders [30, 36, 39, 53]. Somatic scores have also been shown to be significantly associated with neuroticism and fatigue after school, and negatively correlated with perceived self-competence [36, 39, 53].

In **pre-school aged** samples a preponderance of **behavioural difficulties** in somatising children has been demonstrated [19, 31, 43, 48]; however findings also suggest an association with anxiety and emotional symptoms in this group [37]. In a Spanish study of

children aged 3 to 6 years old, thoughts of death, disorders such as generalized anxiety and those typical of externalising behaviours (including hyperactivity, oppositionality and conduct problems) were found to co-occur with somatic symptoms [49].

In a review by *Eminson* it was reported that some studies show that somatic complaints are strongly associated with emotional disorders for girls, in particular with stomach-ache, headache and musculoskeletal pains, but with disruptive disorders (Oppositional Defiant Disorder and Attention Deficit and Hyperactivity disorder) for boys [30].

Children with recurrent abdominal pain (RAP) have consistently been reported to be significantly more likely to receive a psychiatric disorder diagnosis, mainly anxiety and depression, and to experience higher levels of anxiety and depressive symptoms, other somatic complaints, and evidence of temperamental harm avoidance [42]. Research shows that anxiety disorders are significantly more likely to precede RAP in patients with associated anxiety [42, 97].

Shared risk factors for the development of somatisation and emotional disorders in children may include stress sensitivity, a probable biological vulnerability in the child, mood and somatisation disorders within the family, parental over-involvement, and possibly a limited psychological 'mindedness' in relation to physical symptoms, and all these may account for the common co-morbidity between them [118].

Associations with impairment

Research on adult populations with chronic pain has demonstrated **severe impairment** and **public health consequences** [119, 120]. However, work on recurrent and chronic pain in young people has, in general, focused more on assessing the pain and less on its functional consequences and medical help seeking behaviour.

Only a minority of children with somatic complaints report the pain to be severe and disabling, leading to impairment in the child's life by affecting development, school and social adjustment [26, 27, 121-123]. Intuitively, it is likely that greater pain intensity or chronicity might be associated with poorer functioning. However, a range of other factors can affect impairment, including the young person's adaptation to pain, their affective state and specific beliefs about pain and family factors. A common finding from studies of adults

with chronic pain is that psychosocial and contextual factors can contribute to impairment above and beyond pain frequency and intensity [124].

Research with children and young people has established that higher pain intensity and worse depression predict poorer functioning in this population [54, 122-126]. *Ando and colleagues* have recently reported an association between a higher number of somatic complaints, poorer mental health and academic impairment in adolescents, with the association between somatic symptoms and perceived academic impairment being mediated by poor mental health. Additionally, in a clinical sample of young people with a variety of chronic pain conditions, findings indicated that chronic pain had a substantial impact on the children's lives, and depression was strongly associated with functional impairment [120]. Research also shows that children whose parents are overly protective or critical of their children's pain may also experience more disability, in particular those children with higher levels of emotional distress [127].

Somatisation in childhood and adolescence can result in disability and functional impairment, including difficulties in social relationships and school attendance [31, 42]. Research shows that children with FSS have more problems in day-care, fewer hobbies and report greater impact from their symptoms on daily life and leisure activities [128, 129]. FSS are also associated with frequent and prolonged absences from day-care and/or school in paediatric, psychiatric and community samples [49, 72, 130, 131]. Moreover, missing school can have adverse consequences for youth, including strain on or loss of peer relationships, social isolation and poor academic achievement [56]. Children with impairing symptoms are more likely to present with poly-symptomatic complaints and to have other adverse experiences in their lives such as a physical disease, poorer general health and have parents reporting worries and family burden due to the FSS [39, 71, 125].

Campo and colleagues assessed parental perceptions of health and school functioning in children classified as paediatric somatisers. Affected children were more likely to be considered sickly and health-impaired by parents and caretakers and more likely to be absent from school, to perform poorly academically, to experience emotional and behavioural difficulties, and to be frequent users of health and mental health services. Both general poor school performance and poor attainment, relative to teachers' perceptions of the young person's ability, were also associated with more somatic symptoms [27]. In a sample of more than 1000 German school students aged 10 to 18, 50% reported suffering

from headaches, 36% from stomach pain, 31% from back pain and 15% from orofacial pain. Rates of severe and very severe impairment related to the pain ranged between 8% and 22%. The authors found positive associations between pain experienced and impairment, doctor consultations and analgesic consumption [132]. *Rask and colleagues* found impairment in 4.5% of a community sample of 3000 Danish children with functional somatic symptoms, aged 5-7 (23% had a one year prevalence of FSS) [71]. *Lieb and colleagues* reported marked impairment (e.g., unable to work, go to school or manage the household on at least one day in the past month) in 4% of 14-24 year olds with any DSM-IV somatoform conditions; this increased to 7% in the presence of a comorbid mental disorder [54]. In a British school sample of adolescents *Eminson and colleagues* found that those reporting a higher number of physical symptoms also reported more distress about their illness i.e., worry about illness, concern about pain and health habits, hypochondriacal beliefs, thanatophobia (fear of death), disease phobia, bodily preoccupations and effects of symptoms and more treatment experience [47].

Associations with health service use

It is acknowledged that children and adolescents presenting with somatic symptoms in **primary care settings** is a common presentation for psychiatric distress, and particularly emotional disorders [133, 134]. Children and young people with somatoform syndromes/disorders tend to present repeatedly to primary care practitioners or paediatricians, rather than psychiatrists, because their presenting symptoms are mainly physical and their families tend to attribute such symptoms to organic, non-psychological causes [135]. Less severe somatisation cases are relatively well managed by primary care physicians and paediatricians, with mental health professionals being more likely involved in the more extreme (but relatively rare) cases [9].

Approximately 10% of children attending GP (general practice) or paediatric clinics are reported to have medically unexplained medical symptoms [95, 136]. However, when a broader definition is used (i.e., children presenting with any kind of physical presentations where doctors identify associated or contributing psychological factors, such as stress-exacerbating asthma), psychosomatic problems are seen in 25-50% of patients [8]. Children reported as somatisers are more likely to be frequent users of both general and mental health services [54]. In the study by *Campo and colleagues*, somatisers were significantly

more likely to visit a doctor more than four times in the previous 6-months, to have a history of at least one previous inpatient admission and to have used mental health services in the past [27].

Recurrent abdominal pain may generate more health service use than other somatic symptoms, being responsible for 2-4% of all paediatric or primary care visits in a 1-year survey, compared to headaches being responsible for 1-2% of visits [137-139]. Only rarely is an organic cause identified for RAP and in 80% of cases doctors diagnose the pain as being medically unexplained or 'functional' in origin. Medical consultation rates for children with abdominal pain in community studies from Germany, USA and Malaysia, range from 10% to 50%, reflecting differing samples, methodology and access to services across countries [124, 140, 141].

The level of impairment experienced has been found to be a key predictor of health service use by young people with somatic complaints [54, 123, 132, 140, 142]. *Rask and colleagues* found that 31% of children with FSS consulted health services. Being a consulter was significantly associated with a multi-symptomatic presentation, parental worries about symptoms, symptom impact and an increased rate of past health care use [143]. In another study by *Hyams and colleagues,* 8% of students had seen a physician for abdominal pain in the previous year, and those visits were correlated with abdominal pain severity, frequency, duration and impairment [140]. Moreover, in another study with urban school children in Malaysia, 45% of consulters presented with abdominal pain; and those children with severe abdominal pain and impairment were more likely to be consulters [142].

Patients with FSS are at greater risk of numerous and unnecessary (potentially harmful) medical investigations and treatments, as well as using health care services to excess, before the psychological nature of their problem is identified. Multiple investigations and treatments tend to reinforce the beliefs of patients and their families that there is an underlying physical cause for the symptoms [95]. Collaboration between mental health professionals and primary health providers and paediatricians is essential to ensure good assessments are conducted and appropriate treatment implemented [31, 39, 135].

Long-term health outcomes

Findings from adult studies provide information on the course and outcome of somatoform disorders. According to these studies, most adults with somatoform disorders

experience their first symptoms during adolescence; the symptoms tend to have a chronic course and are associated with long-term psychosocial impairment [55, 144-146].

Information on somatoform disorders among non-referred children and adolescents is very scarce, especially information about their course and outcome; however, research shows that in high-scoring children, there is a higher chance of FSS persisting over time into adulthood [146]. *Essau and colleagues* examined the course of somatoform and related disorders in 523 German, non-referred adolescents aged 12-17 over a 15-month period. The results showed that approximately 36% of the adolescents with disorders at baseline, continued to have the same disorders at follow-up. Factors related to chronicity included gender (female), comorbid depressive disorders, parental psychiatric disorders and negative life-events. Children with chronic somatoform disorders had a higher number of pain symptoms and greater impairment than those with transient disorders [144]. Similarly, *Dunn and colleagues* studied the 3-year trajectories of pain (back pain, facial pain, headache and stomach pain) among 11-14 years old adolescents in the general population. Across the 4 types of pain, 12% of the sample had a 'persistent pain' trajectory for at least one condition. This group was predominantly female, had the highest levels of somatisation and depression at the start and end of the study period, and were the least likely to be satisfied with their life [147]. In another longitudinal population study to determine the trajectories of recurrent pain in Canadian adolescents followed from 12 to 19 years of age, results showed that being female, having a parent with chronic pain, having low self-esteem and anxiety/depression at age 10-11, was predictive of high levels of pain across time, and pain trajectories that increased over time [52]. *Dhossche and colleagues* found that in a sample of 700 11-18 years old followed over 6-years, adolescents with specific functional somatic symptoms at baseline tended to report the same symptoms at 6-years follow-up, in addition to other symptoms suggesting that there is considerable continuity both of a general and specific somatising tendency [148].

Most research on the long-term outcomes of somatic symptoms and disorders have studied samples with abdominal pain. *Hotopf and colleagues* [145] followed a cohort from birth to 36-years and found that medically unexplained symptoms and psychiatric disorders in later life appeared related to prior experiences of illness in the family and to previous un-explained symptoms in the child (abdominal pain). Work by the same group and others have suggested that children with persistent abdominal pain are at increased risk of psychiatric

disorders in adulthood (in particular depression and anxiety) as well as poorer social functioning [35, 99, 101, 149, 150].

Persistency of RAP in children overtime has been associated to paternal psychopathology as well as to other psychosocial correlates. In a follow-up study by *Ramchandani and colleagues*, it was reported that children with RAP at 6-years of age had higher rates of abdominal pain, school absence and anxiety disorders after one year, and that maternal anxiety was the most consistent predictor of subsequent adverse outcomes for these children [151]. In another study in which a group of children aged 6 to 18 years with abdominal pain were followed-up for 5 years, 14% of the patients continued to suffer from high levels of symptoms and impairment after 5 years. At baseline this long-term risk group had significantly more anxiety, depression, lower perceived self-worth, and experienced more negative life events [122]. Some studies have also shown that patients with RAP during childhood are more likely to meet the criteria for IBS (irritable bowel syndrome) during adolescence and adulthood [108].

Other researchers have investigated the course of other somatoform disorders. For instance, *Rangel and colleagues* studied 25 children with severe chronic fatigue syndrome and followed them up for a mean of four years. Two thirds of the children recovered from the symptoms with a mean duration of illness to recovery being 38-months. However, parental failure to acknowledge the possibility that psychological factors could be contributing to the maintenance of the symptoms was associated with a poorer outcome, as was an insidious onset rather than a clear association with a particular stressor [152]. In another study with adolescents with a diagnosis of conversion disorder, 8% recovered completely by the 4-year follow-up period of investigation. Factors that predicted poorer outcome included a poly-symptomatic presentation, pseudo-seizures, chronicity of symptoms, comorbid psychiatric or medical disorders, poor capacity to gain insight, severe internal conflict and serious family dysfunction [153].

In summary, the onset of FSS in children is often insidious and comorbidity with organic conditions is not rare. Approximately 30% to 50% of children with somatisation suffer from associated psychiatric comorbidity, mainly anxiety or depression. In younger children, and particularly in boys, a preponderance of behavioural difficulties has also been demonstrated. Only a minority of children with FSS report the pain to be impairing in

different aspects of their life, mainly with school and peer relationships. Different factors have been reported to contribute to impairment in addition to pain variables, in particular adverse psychosocial factors and depression. Approximately 10% of children attending GP and paediatric clinics are reported to suffer from FSS, with abdominal pain being the most frequent presenting complaint. Consultations are often associated not only to the frequency and severity of pain, but also to functional impairment. Close collaboration between mental health professionals and primary health providers is often essential in dealing with children who often present to health services because of FSS, with psychiatrists only needing to be directly involved with the more severe and complex cases. Most adults with somatoform disorders report experiencing their first symptoms during childhood and adolescence; however, information on course and outcomes among non-referred young people is scarce. Research consistently describes a subgroup of children that continue to experience pain over time. Factors related to chronicity include being female, the presence of comorbid psychiatric disorders, low self-esteem, parental psychiatric disorders, poor insight into the contribution of psychological factors and negative life events. Although most research on long-term outcomes shows that children with FSS often recover from symptoms, it also demonstrates that this group of patients are at increased risk for adult psychiatric disorders, in particular anxiety and depression.

Chapter 4. *Measuring somatisation*

Instruments to measure physical symptoms and associated functional impairment, symptom diaries and severity rating scales may all be helpful in the assessment of somatic symptoms and somatoform disorders and for monitoring progress during treatment. They can be used to obtain symptom levels at baseline and at completion of treatment in order to evaluate its efficacy. To date, there has been little cross-study consistency in the use of measures to assess somatic symptoms, which has hampered the comparison between studies [31, 154].

A number of questionnaires have been developed to systematically assess the presence of multiple somatic symptoms. However, *Garralda* highlights that these questionnaires tend to fail to assess in a satisfactory way four essential aspects of somatisation: i) the associated physical or psychiatric pathology that may account for the physical symptoms; ii) the severity of impairment caused by the symptoms; iii) whether psychological factors could influence the physical symptoms; and iv) the degree of medical help-seeking [5].

Some instruments used to assess multiple somatic symptoms in both clinical and non-clinical samples of children and young people are:

Children's Somatization Inventory (CSI-35) [97]

This is a self-report questionnaire (although there is also a parent version) comprising 35 items requiring children to report the extent to which they have experienced each physical symptom in the previous two weeks (0=not at all, 1=a little, 2=somewhat, 3=a lot, 4=a whole lot). It measures both the frequency and intensity of symptoms. The **Total CSI score** (maximum 140) is the sum of all items reflecting both the range and intensity of symptoms, and the **Somatization score** is the sum of the "a lot" or a "whole lot" responses to the 26 items corresponding to the DSM-III-R Somatisation disorder symptoms criteria. It can be used with children as young as 7 years old. This instrument has been shown to have good validity and reliability in both clinical and community samples of children and adolescents (please read under methods below) [36, 39, 53, 90, 133].

Children's Somatization Inventory (CSI-24) [155]

More recent studies in the paediatric population have used the CSI-24, which is also a self-report questionnaire comprising only 24 items. This instrument has proven to be a refinement of the original version and is suggested as preferable to the CSI-35. This is because several studies identified 11 statistically weak items from the original CSI-35 that could be dropped to make the instrument more appropriate for young people, while maintaining its measurements properties. The reason being the original CSI-35 questionnaire included items that were part of the DSM-III-R symptom criteria for somatisation disorder in adults [156], but that were extremely rare in children. The CSI-24 correlates .99 with the CSI-35, has shown to have good reliability (*Cronbach alpha=.88*) and generally good psychometric properties in both clinical and non-clinical samples, less respondent burden and to include items that are more appropriate for youth [157-161].

Brief Symptom Inventory (BSI) [162, 163]

This is a popular measure of psychopathology designed to assess levels of psychiatric symptoms and distress. It is a 53-item self-report inventory in which participants rate the extent to which they have been bothered (0 ="not at all" to 4="extremely") by various symptoms in the past week. It can be used by individuals aged 13 years and older. The BSI has nine subscales designed to assess individual symptom groups: somatisation (SOM, e.g., "Faintness or dizziness"), obsessive-compulsive (OC, e.g., "Having to check and double-check what you do"), interpersonal sensitivity (IS, e.g., "Feeling inferior to others"), depression (DEP, e.g., "Feeling no interest in things"), anxiety (ANX, e.g., "Feeling tense or keyed up"), hostility (HOS, e.g., "Having urges to break or smash things"), phobic anxiety (PHB, e.g., "Feeling uneasy in crowds, such as shopping or at a movie"), paranoid ideation (PAR, e.g., "Others not giving you proper credit for your achievements"), and psychoticism (PSY, e.g., "The idea that something is wrong with your mind"). The BSI also includes three scales that capture global psychological distress. Several studies have proven the good validity and reliability of the BSI in clinical and non-clinical adolescent samples [164-166].

Recently *Derogatis* has elaborated a new version of this instrument: the BSI-18, which has only been tested in adult populations so far [167]. This instrument presents only three scales or dimensions (with six items each) from the previous instrument, using the same response scale: Somatisation – distress caused by the perception of bodily

dysfunction; Depression – symptoms of disaffection and dysphoric mood, and Anxiety – symptoms of nervousness, tension, motor restlessness, apprehension and panic states. The selection of these three scales complies with two specific fundamental criteria outlined by *Derogatis* (2001): (i) the verification that approximately 80% of psychological disorders belong to depressive and anxiety disorders, and (ii) the fact that the presence of elevated symptoms and somatic manifestations, which on many occasions provoke depressive and anxiety disorders, are not detected in primary care. The BSI-18 also offers a measure of general distress.

The Somatic Complaint List (SCL)

This instrument was developed with the aim of identifying how often children and adolescents experience and feel pain. The questionnaire was developed using responses given by teachers to the question of what are children's most common health complaints. It also contains items comparable to those present in the CSI. The SCL consists of 11 items and asks participants to rate on a 3-point scale (1 = never, 2 = sometimes, 3 = often) the frequency with which they experience certain bodily complaints, such as a stomach-ache, in the last 4 weeks. Two of the items are positively formulated and are thus reversely scored. This questionnaire has demonstrated to have good psychometric properties with good reliability (Cronbach alpha > .75) in both non-clinical and clinical samples [168, 169].

Children's Psychosomatic Symptom Checklist (C-PSC)

This is an instrument that was adapted from the adult Psychosomatic symptom checklist questionnaire. It is a self-report scale, containing 12 common psychosomatic complaints in children. Children are asked to rate each symptom in terms of "how often" it occurs and "how bad" it is when it does occur. Good psychometric properties have been demonstrated with good reliability (Cronbach alpha >.80) and validity with moderate correlations with anxiety and depression in community samples [170].

The Soma Assessment Interview (SAI) [37, 143, 171]

This is a recently developed interview, parent-report measure, of functional somatic symptoms in children aged 5-10 years old, which also includes items of associated impairment. The interviewer uses a structured question format to examine whether the

child has experienced any of 20 different physical complaints ("no"; "yes, a little"; "yes, a lot") during the past year. It is relatively quick to complete and a preliminary assessment of its validity and feasibility in both clinical and non-clinical samples shows promising results. Good inter-assessor reliability for the FSS assessment within the SAI has been demonstrated (kappa coefficient=0.86). Discriminative and convergent validity with independent measures of somatic complaints are also good, with significant associations reported with the CSI and the somatic question in the SDQ (Strengths and Difficulties Questionnaire), and low associations reported with children with well-defined physical illness. The SAI's validity has been further supported by a substantial agreement between detection of FSS using the SAI and an independent medical record diagnosis of functional somatic symptoms (FSS) in clinical samples (sensitivity=89%).

Symptom diaries using Likert rating scales (often rated from 0-10)

These are used to assess the severity of key symptoms and are helpful to map frequency, severity and contingencies of symptoms, and document changes over time following treatment. By using a symptom diary to document severity and frequency of symptoms over time, a chart can be plotted which can visually show the patient that there has been improvement even before this is noticed subjectively, which then may help to maintain therapeutic motivation [8].

Various studies have shown a low level of concordance between parents' and children's reports of somatic complaints [39, 53, 148, 172]. This highlights that parents may be unaware of their children's subjective experience of pain and physical discomfort which is why it is very important that questionnaires are filled in by children and young people. However, other studies have shown that some parents may endorse more somatic symptoms in their children than the children themselves, and that this might be attributed to cultural differences in symptom expression as some cultures might find it more socially acceptable to report bodily as opposed to emotional problems [36]; this has also been shown to be linked to parental anxiety [104]. A critical issue for the future will be to determine which informant is the better predictor of other important attributes such as psychopathology and competence, as well as health care utilization [39].

Chapter 5. *Thesis synopsis*

Psychosomatic pathology is common in the paediatric population. Many children present with somatic symptoms that are often transient and non-impairing and do not need medical care; however, there is a subgroup whose symptoms are chronic, impairing, leading to health-seeking behaviour and associated with psychiatric pathology. This group of children constitute a real health concern if not identified and treated properly, as symptoms can persist into adolescence and adulthood with severe personal, economic and public health consequences. Moreover, it is of interest to see to what extent these severe cases are at one end of a spectrum that the literature suggests is very common in the general population.

The three papers and thus this thesis, was motivated by a need to know more about the phenomenon of paediatric somatisation in British general population by using the **CSI-35 (Children's Somatization Inventory)** and studying its psychometric properties. Moreover, we wanted to study the associations of the somatic symptoms, and abdominal pain in particular, to impairment and health-seeking related behaviour in young people and to further explore the contribution of somatisation to adolescents who are frequent primary care attenders. As far as we are aware this is the first time the CSI-35 has been used in a non-clinical sample of British young people.

Children who present with somatic complaints tend to report more than one symptom. There has been little consistency in the use of instruments used to assess children with poly-symptomatic presentations and most measures that asses somatic symptoms focus on individual symptoms or are based on interviews that are difficult and/or expensive to undertake with very large samples. Moreover, associations with psychological symptoms and impairment are especially marked in subjects with multiple somatic complaints and therefore when studying somatisation it is important to use assessment tools that enquire about a variety of bodily symptoms [173]. **The Children's Somatization Inventory (CSI)** [97] is one such instrument, and given the frequent multi-symptomatic nature of the somatic problems and the CSI's good psychometric properties and use across countries, we chose this instrument for our study.

In the UK the CSI has only so far been used with clinical samples and it has identified high levels of symptoms in young people attending primary health care, as well as those with somatoform disorders such as chronic fatigue syndrome [133, 134, 174]. However, the number of symptoms reported by *Kramer and Garralda* in psychologically healthy young people attending primary care was lower than the number reported by *Garber and colleagues* in an American general population sample, indicating a need to gather CSI data on young people from the general population in the UK [39, 133]. Additionally, as the CSI had not previously been used with British non-clinical samples, there was no normative data or information regarding its psychometric properties for a British general population sample.

The CSI does not assess **(i) impairment, (ii) perceived links between somatic symptoms and stress,** or **(iii) medical help seeking**, all of which are central to the concept of somatisation. Consequently *Kramer and Garralda* added a section to the CSI on these topics and found that a substantial percentage of primary care attendees, especially those with co-morbid psychiatric disorders, reported both impairment and links with stress [133]. Therefore, in the survey that provided the data for this thesis, an impairment scale, adapted from *Kramer and Garralda* was added to the CSI [133]; furthermore, a measure of the perceived links between somatic symptoms and stress was also added, and medical help seeking behaviour was equally documented.

Paper 1 investigates the use of the CSI in a new population and documents the frequency of the physical symptoms and their impact in terms of functional impairment and medical help seeking in British young people. This was the first time that impairment and perceptions of stress were studied in a British general population in the context of CSI identified somatic symptoms.

In addition to exploring the use of the CSI in a new population, and since abdominal pains are one of the most commonly reported functional symptoms in children and young people, this was singled out and studied in this sample. Although acute and recurrent abdominal pain is one of the main presentations in children attending primary care services in the UK [175], there has been little work on the prevalence rates, impairment and medical help seeking behaviour associated with abdominal pain in British adolescent community samples. Therefore Paper 2 explored the relationship between abdominal pain and other

symptoms reported by the CSI, as well as investigating its associations with stress and psychological problems, impairment and medical help seeking.

Research indicates that frequent attenders account for a large proportion of contacts with general practice; it has been estimated that the top 10% of frequent attenders account for 30-50% of all such contacts [176]. However, research in this area has mainly focused on adult populations and has consistently shown that frequent primary care attenders experience psychosocial disadvantage, have high rates of physical disease, an excess of psychiatric difficulties, high levels of somatisation, and high rates of using other health services [177-183]. Research on frequent attendance in childhood and young people is rare by comparison and has tended to focus on young school children [176, 184]. Adolescent primary health care attendance has been neglected, perhaps because adolescents are perceived to rarely attend. This perception is misguided since national statistics indicate that in the UK, 50-70% of young people attend their general practitioner with an approximate average of two consultations per year [184, 185]. High rates of psychiatric disorder and emotional symptoms have been reported amongst adolescent primary care attenders, therefore it may be expected that this association will be particularly marked in those who attend frequently [133, 134, 186-189]. Given that medical help seeking is a key feature of somatisation, it seems likely that adolescents with functional somatic symptoms will be over represented amongst frequent attenders to primary care. However, very little work has been done on the contribution of functional somatic symptoms, alongside other psychosocial problems, to the frequency of general practice consultations amongst young people, indicating a gap in our knowledge. Therefore this was the focus of Paper 3.

Aims

Paper number 1: ASSESSMENT OF SOMATIC SYMPTOMS IN BRITISH SECONDARY SCHOOL CHILDREN USING THE CHILDREN'S SOMATIZATION INVENTORY (CSI)

The current study had several aims: firstly to gather normative data for British community adolescents using the CSI; secondly to describe the psychometric properties of the CSI including its factor structure; thirdly to examine the CSI construct and discriminant validity (through associations with self-reported emotional and behavioral symptoms) and

finally to explore the links between somatic symptoms, functional impairment and the effect of stress.

Paper number 2: ABDOMINAL PAIN IN BRITISH YOUNG PEOPLE: ASSOCIATIONS, IMPAIRMENT AND HEALTH CARE USE

The aims of this study were: firstly to study the prevalence of abdominal pain in this community sample of young people and its demographic, physical and psychological associations; secondly to examine its impact on daily activities and health service use and finally to determine predictors of impairment and health service use.

Paper number 3: ADOLESCENTS WHO ARE FREQUENT ATTENDERS TO PRIMARY CARE: CONTRIBUTION OF PSYCHOSOCIAL FACTORS

This study aimed at identifying young people reporting above average levels of attendance to primary health care (≥4 appointments to the GP in the previous year) and to document the contribution of physical, psychiatric and psychosocial factors, including somatisation, to frequent attendance.

Chapter 6. *Method*

This section outlines the method of the original survey which generated the data that was then analysed to produce the three published papers.

Participants

The thesis is based on a cross-sectional community study of British secondary school children. Participants were pupils attending a co-educational secondary school serving a metropolitan area in southeast England during March 2004. This comprised 1251 young people aged 11 to 16 and three 17 years olds, with a median age of 13 years (IQ 12-15). A total of 1173 pupils (94% of the school population) completed the questionnaires. Gender was equally represented (51% girls and 49% boys), and the majority of young people (91%) self-reported a White British ethnicity.

Measures (see Appendix IV)

Self-reported demographic information (age, gender, ethnicity, family composition, parental occupation and main breadwinner) was recorded on a form designed for the survey. Information was also collected on days missed of school over the last 12 months, medical illness (i.e., *list any serious illnesses or health problems you have had in the past or at the moment*) and health service use (i.e., *approximately how many times have you seen your family doctor in the last year* (0, 1-3, 4-6, 7-9, more than 10); *have you seen anybody else about physical health problems in the last year* (yes, no; if 'yes': hospital doctor or other); and *have you ever seen a counsellor, psychologist or psychiatrist* (yes, no)). **Frequent attendance** was defined as having seen the GP at least 4 times in the previous year.

Additionally, specific information on abdominal pain was requested. A question asked if the young person had experienced stomach aches that lasted at least 1 hour in the previous 3 months. If the answer was positive, further questions were asked about the frequency of the pain (i.e., *less than once a week, once a week or more than once a week*) and the impairment associated with the pain in four global dimensions: *the ability to enjoy yourself, to go to school, to see friends, and the impact on any other activities*; each question

was answered on a 3-point severity scale (0=not at all, 1=yes, a little, 2=yes) and scores were summed to generate a **total impairment score** (range 0-8). Finally, a question asked if the young person had seen a doctor or other health professional about the stomach pain (yes, no).

The *Children's Somatization Inventory (CSI-35)*-**Self-report version** [97] (the instrument has been described in detail in Chapter 4) was used to collect information about concurrent physical symptoms. This tool was chosen because it is a self-report questionnaire that assesses multi-somatic symptoms, can be used with children as young as 7 years of age, and it is quick and easy to complete. This questionnaire has proven to have good reliability (*Cronbach alpha equal or >.90*) and validity in different studies (good construct validity with moderate significant correlations with self-reported anxiety and depression), in both clinical and community samples [36, 39, 53, 133]. To assess **associated functional impairment** respondents were asked the extent to which any of the somatic symptoms on the CSI-35 impacted upon four global dimensions: *the ability to concentrate, to enjoy activities, to go to school and to see friends.* Each question was answered on a 3-point severity scale (0=not at all, 1=yes, a bit, 2=yes, a lot) to produce a **total impairment score** ranging from 0-8. The coefficient alpha for this scale was .80. One final global question was added asking whether the somatic symptoms were **made worse by stress, worry or anxiety** (0=no, 1=yes, 2=don't know).

The *Moods and Feelings Questionnaire (MFQ)*-**Self-report version** [21] was used to ascertain the presence of depressive symptoms. This is a 34-item screening measure for depressive disorder for use with 8-18 year olds. The presence of symptoms is rated over the previous two weeks on a 3-point scale ('not true', 'sometimes true', 'true'). This results in a continuous score with a range from 0 to 68. Its validity as a screening tool for general population samples has been established and its internal consistency *(Cronbach's alpha)* exceeds .90 [134, 190-192].

The *Strengths and Difficulties Questionnaire* (SDQ)-**Self-report version** [193, 194] was used to screen for emotional and behavioural problems. This is a well-validated behavioural screening tool for 11-17 year olds enquiring about the presence over the

previous 6-months, of 25 positive and negative attributes in young people. Each item is scored on a 3-point scale ('not true', 'somewhat true', 'certainly true') generating five sub-scales: conduct problems, hyperactivity, emotional problems, peer problems and prosocial behaviour as well as a total difficulties score (sum of all sub-scales except prosocial). The internal consistency for the various self-reported SDQ scales are generally satisfactory and good concurrent validity has also been demonstrated [195-198].

Procedure

Ethical approval for conducting the survey was obtained from the local NHS research ethics committee, the school where the study was conducted, and the local education authority. All eligible pupils and parents received letters and information sheets inviting participation and providing the opportunity to opt out of the survey. Those wishing to participate did not need to provide written consent; their completion of the study questionnaires was taken as proof of consent. A pilot study was conducted to establish whether students understood the questions, and to test the administration logistics.

On the index study day, younger students (aged 11-13 years) completed the questionnaires during a 1 hour lesson; while students aged 14-16 years used a 35 minute lesson to minimise lost time. The teachers supervised questionnaire completion and noted any students who were absent. A second assessment day was arranged for those pupils initially absent, and the same format was used.

Statistical analysis was carried out using SPSS v15 for the first and third paper, and SPSS v17 for the second paper.

HUESOS
ÑNORMALES

BOX

DIENTES
CONCORTES
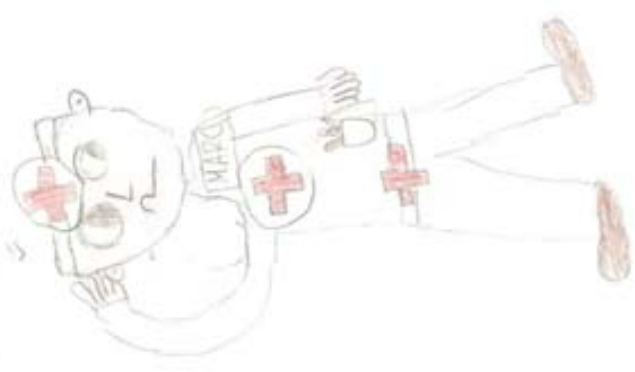
RAÚL 9 años

PAPERS

Chapter 7. *Papers*

Paper number 1: ASSESSMENT OF SOMATIC SYMPTOMS IN BRITISH SECONDARY SCHOOL CHILDREN USING THE CHILDREN'S SOMATIZATION INVENTORY (CSI)

Plus Erratum

Paper number 2: ABDOMINAL PAIN IN BRITISH YOUNG PEOPLE: ASSOCIATIONS, IMPAIRMENT AND HEALTH CARE USE

Paper number 3: ADOLESCENTS WHO ARE FREQUENT ATTENDERS TO PRIMARY CARE: CONTRIBUTION OF PSYCHOSOCIAL FACTORS

Assessment of Somatic Symptoms in British Secondary School Children Using the Children's Somatization Inventory (CSI)

Mar Vila, LMS, Tami Kramer, MBBCH, MRCPSYCH, Nicole Hickey, MSc, Meera Dattani, MBBS, Helen Jefferis, MBBS, Mandeep Singh, MBBS, and M. Elena Garralda, FRCPSYCH, FRCPCH

Imperial College London

Objective   To present normative and psychometric data on somatic symptoms using the Children's Somatization Inventory (CSI) in a nonclinical sample of British young people, and to assess associations with stress and functional impairment.   **Methods**   A total of 1,173 students (11- to 16-years old) completed the CSI and self-report psychopathology measures.   **Results**   The median CSI total score was 12 (5, 23). Headaches, feeling low in energy, sore muscles, faintness, and nausea were most frequent. Girls scored higher than boys, and respondents aged 13–14 years lower than younger children. The CSI showed good internal consistency and exploratory factor analysis yielded three factors: pain/weakness, gastrointestinal, and pseudo-neurological. A quarter of respondents reported somatic symptoms were made worse by stress. CSI scores were moderately significantly correlated with impairment and emotional symptoms.   **Conclusions**   The CSI, complemented by information on functional impairment and stress is an appropriate measure of recent somatic symptoms and somatization risk in young people for use in the UK.

Key words   adolescents; children; somatic symptoms; somatization.

Introduction

Somatic symptoms are common in children and adolescents. In the general population, 2–10% of children are documented as having recurrent pains, gastro-intestinal symptoms, or described as sickly (Apley, 1975; Goodman & McGrath, 1991; Offord et al., 1987). Symptoms are often medically unexplained and linked to psychological problems (Campo & Fritsch, 1994; Garralda, 1996) and girls tend to report more symptoms than boys, particularly in adolescence (Campo, Jansen-McWilliams, Comer, & Kelleher, 1999; Eminson, Benjamin, Shortall, & Woods, 1996). Even though symptoms are often medically unexplained, they can lead to considerable impairment in the child's life, affecting development, school and social adjustment (Campo et al., 1999; Konijnenberg et al., 2005; Roth-Isigkeit, Thyen, Stoven, Schwarzenberger, & Schumucker, 2005).

Frequent somatic complaints tend to be associated with emotional symptoms and constitute the basis for the concept of somatization—when physical symptoms are regarded as an expression of psychological distress—and

for DSM-IV's and ICD-10's somatoform disorders (American Psychiatric Association, 1994; World Health Organization, 1992). Some somatic symptoms are considered particularly indicative of somatization: the presence of 13 or more of these symptoms was a requirement for DSM-III-R somatization disorder (American Psychiatric Association, 1987); the number of symptoms required was later reduced to eight in DSM-IV. DSM-IV categorizes symptoms into four domains: pain, gastro-intestinal, pseudoneurological, and sexual.

Previous studies have reported associations between somatic and emotional symptoms and disorders in children; some have also found links with disruptive behavior disorders, especially in younger boys (Campo et al., 1999; Dhossche, Ferdinand, van der Ende, & Verhulst, 2001; Egger, Costello, Erkanli, Erkanli, & Angold, 1999; Garralda, 1996; Taylor, Szatmari, Boyle, & Offord, 1996). Associations with psychological symptoms are especially marked in subjects with multiple somatic complaints (Escobar, Burnam, Karno, Forsythe, & Golding, 1987), and in the study of the somatization of distress it is

therefore important to use assessment tools that enquire about a variety of bodily symptoms.

The Children's Somatization Inventory (CSI) (Walker & Greene, 1989) has previously been used to assess somatic symptoms in children and adolescents. It has provided normative data for both clinical and nonclinical samples across different countries. Three studies have examined nonclinical samples (Table I). Garber, Walker, and Zeman (1991) assessed somatization in 540 American young people from Grades 2–12 (Garber et al., 1991). The CSI had good internal consistency ($\alpha = .92$) and the mean somatization score (the sum of ''a lot'' or a ''whole lot'' responses to the 26 items in DSM-III-R somatization disorder) for the whole sample was 1.94 (SD 3.05); 15.4% of the children reported four or more symptoms and 1.1% reported 13 or more somatic complaints. Factor analysis yielded four factors: pseudoneurological symptoms, cardiovascular symptoms, gastrointestinal symptoms, and pain/weakness symptoms. The more frequent complaints were headaches, low energy, sore muscles, nausea, or upset stomach. The CSI also showed good construct validity with moderate significant correlations with self-reported anxiety ($r = .43$), depression ($r = .37$), and perceived competence ($r = -.27$). Litcher and colleagues (Litcher et al., 2001) used the CSI with a community sample of 600, 10- to 12-year-olds in the Ukraine. The mean CSI total score was 16.40 (SD 16.11) and the internal consistency was also good ($\alpha = .94$). They identified four factors which they labeled as Garber et al. (1991) had done, although some of the items loaded differently on the four factors. Again the CSI was moderately correlated with the child reported anxiety, depression, perceived competence, global health and fatigue after school, and with parent rated child health and psychological functioning. In the Netherlands, Meesters et al. (Meesters, Muris, Ghys, Reumerman, & Rooijmans, 2003) assessed somatization in 476 school children aged 10- to 16-years old. Their mean CSI total score was 10.16 (SD 10.36),

and there was satisfactory internal consistency ($\alpha = .90$). A factor analysis yielded three factors: pain/weakness, gastrointestinal, and pseudoneurological. The construct validity of the CSI was established via significant but moderate positive correlations with child and parent reports of psychopathology (anxiety and depression) and personality.

In Britain, the CSI has only been used with clinical samples. It has identified high levels of symptoms in young people attending primary health care and in those with somatoform disorders such as chronic fatigue syndrome (Garralda, Rangel, Levin, Roberts, & Ukoumunne, 1999; Kramer & Garralda, 1998; Yates, Kramer, & Garralda, 2004). However, the number of symptoms reported by Kramer and Garralda (1998) in psychologically healthy young people attending primary care was lower than reported by Garber et al. (1991) in an American general population sample, indicating a need to gather general population data in the UK.

The CSI does not assess impairment (of leisure, social activity, or school attendance) or perceived links between somatic symptoms and stress, which are central to the concept of somatization. These links are endorsed by a number of young people with functional somatic symptoms (Beck, 2008) and may be mediated by unhelpful coping strategies (Walker, Freeman Baber, Garber, & Smith, 2008). Kramer and Garralda (1998) added a section to the CSI on these topics and found that a substantial percentage of primary care attendees, especially those with comorbid psychiatric disorders, reported both impairment and links with stress.

To the best of our knowledge, this is the first time that impairment and perceptions of stress have been studied in the general population in the context of CSI identified somatic symptoms. The current study has several aims; first, to gather normative CSI data for British nonclinical adolescents; second, to describe the psychometric properties of the CSI including its factor structure; third, to examine construct and discriminant validity (through associations with self-reported emotional and behavioral symptoms); and finally, to explore the links between somatic symptoms, functional impairment, and the effect of stress using the scale developed by Kramer and Garralda (1998).

Table I. Mean CSI Total Scores in Comparable Age Groups from Nonclinical Samples

	Age range (years)	CSI total score	
		M	(SD)
Nashville, USA[a] ($n = 540$)	10–12	20.17	(14.1)
Ukraine[b] ($n = 600$)	10–12	16.40	(16.1)
The Netherlands[c] ($n = 479$)	10–16	10.16	(10.4)
Current study			
($n = 316$)	11–12	18.51	(17.9)
(whole sample $N = 1,039$)	11–17	16.98	(17.1)

[a]Reported in Litcher et al. (2001).
[b]Litcher et al. (2001) used the CSI-37.
[c]Meesters et al. (2003).

Methods
Participants

Participants were pupils ($N = 1,251$) attending a co-educational secondary school serving a metropolitan area in south east England during March 2004. This comprised young people aged 11- to 16- and three

17-year-olds, with a mean age of 13.5 (SD 1.5) A total of 1,173 pupils (94% of the school population) completed the questionnaires: 22 during the pilot study, 1,132 on the index day, and 19/41 absentees subsequently; 56 declined to participate and 22 were absent on both data collection days. The genders were equally represented (girls 51% and boys 49%), and the majority (91%) self-reported a White British ethnicity.

Measures

Self-reported demographic information (age, gender, ethnicity, family composition, and parental occupation) were recorded on a record form designed for this study. The occupation of the family's primary financial provider was subsequently coded by the researchers according to the Office of National Statistics' Standard Occupational Classification (Office of National Statistics, 2000).

The CSI (Walker & Greene, 1989), is a self-report questionnaire comprising 35 items requiring individuals to report the extent to which they experienced each symptom in the previous two weeks (0 = not at all, 1 = a little, 2 = somewhat, 3 = a lot, 4 = a whole lot). Two scores are derived: the CSI total score (maximum 140) is the sum of all items reflecting both the range and intensity of experienced symptoms. The somatization score (maximum 26) is the sum of "a lot" or a "whole lot" responses to the 26 items in DSM-III-R somatization disorder. The CSI has previously been shown to have adequate good internal reliability with coefficient α's in excess of .90, and adequate construct validity via moderate correlations (.20 to .43) with child-reported measures of anxiety and depression (Garber et al., 1991; Litcher et al., 2001; Meesters et al., 2003). We also ascertained the proportion of young people reporting 13 and 7 symptoms from the somatization score as these are the number of symptoms recognized as necessary for the diagnosis of Somatization disorder (after excluding sexual symptoms which are not covered in the CSI) in DSM-III-R and DSM-IV diagnostic criteria, respectively. In addition, we present the proportion of children reporting four symptoms as this is the number of symptoms suggested by Escobar (Escobar et al., 1987) for the diagnosis of "somatization syndrome," and a cut-off point accordingly used in the original studies on the CSI (Garber et al., 1991).

To assess associated functional impairment, respondents were asked the extent to which any of the somatic symptoms impacted upon four global capacities: the ability to concentrate, to enjoy activities, to go to school, and to see friends. These are the domains used in previous studies to assess the impairment-related CSI somatic symptoms in clinical samples (Kramer & Garralda, 1998).

Each question was answered on a 3-point severity scale [0 = not at all, 1 = somewhat, 2 = a lot (range 0–8)]. The coefficient α for this scale was .80. One final global question was added asking whether the somatic symptoms were made worse by stress, worry, or anxiety; which was answered 0 = no, 1 = yes, 2 = don't know.

The Moods and Feelings Questionnaire (MFQ)-Self-report version (Angold, Costello, Pickles, & Winder, 1987) is a 34-item screening measure for depressive disorder symptoms for use with 8- to 18-year-olds. Respondents report the presence of moods and feelings over the previous 2 weeks on a 3-point scale; "not true," "sometimes true," and "true." This results in a continuous score with a range from 0 to 68. Its validity as a screening tool for clinical (Kent, Vostanis, & Feehan, 1997; Wood, Kroll, Moore, & Harrington, 1995) and general population samples (Cooper & Goodyer, 1993; Sund, Larsson, & Wichstrom, 2001) has been established. Internal consistency for both clinical and nonclinical samples exceed .90.

The Strengths and Difficulties Questionnaire (SDQ)–Self-report version (Goodman, 1997, 1999; Goodman, Meltzer, & Bailey, 1998) is a well validated 25-item behavioral screening questionnaire for young people aged 4–16 years. Each item is scored on a 3-point scale ("not true," "somewhat true," and "certainly true") for the previous 6 months generating five sub-scales: conduct problems, hyperactivity, emotional problems, peer problems and prosocial behavior, and a total difficulties score (sum of all sub-scales except prosocial). The internal consistency coefficients (Cronbach's α's) for the various self-reported SDQ scales are generally satisfactory. The Cronbach α for the SDQ total score has been found to be .73, for the SDQ emotional .66 (mean Inter-Item Correlation .28), for the SDQ conduct .61 (mean Inter-Item Correlation 0.24), for the SDQ hyperactivity–inattention .66 (mean Inter-Item Correlation 0.27), for the SDQ peer problems .54 (mean Inter-Item Correlation .18) and for the SDQ prosocial behaviour .62 (mean Inter-Item Correlation .25). Previous studies have used the SDQ in community samples of children and adolescents and reported internal consistencies using the Cronbach α coefficients between .30 and .78. Good concurrent validity has been demonstrated using different features such as clinical vs nonclinical status and different measures like the Child Behavior Checklist, the Children's Depression Inventory, the Revised Children's Manifest Anxiety and the Conner's Parent Symptom Questionnaire (Du, Kou, & Coghill, 2008; Goodman, 2001; Koskelainen, Sourander, & Kaljonen, 2000; Muris, Meesters, & van den Berg, 2003; van Widenfelt, Goedhart, Treffers, & Goodman, 2003).

Procedure

Ethical approval was obtained from the local NHS research ethics committee, and the school and local education authority gave permission to approach parents and students. All eligible pupils and parents received letters and information sheets inviting their participation and providing the opportunity to opt out of the study. Information about the study was also presented in the school bulletin, which every family received directly from the school. Those wishing to participate did not need to provide written consent; their completion of the study questionnaires on the data collection day was taken as proof of consent. A pilot study was conducted to establish whether young people could understand and respond appropriately to the questionnaires, and to test the administration logistics.

On the index study day, younger pupils (aged 11–13 years) completed the questionnaires during a 1 hr lesson; while students aged 14–16 years utilized a 35 min lesson, as this minimized lost time for those preparing for exams. The teachers supervised questionnaire completion and noted who was absent, as well as the age and gender of pupils who declined to participate in the study. A second assessment day was arranged to obtain questionnaires from those initially absent; the same format was used.

Data Analysis

The age and gender of participating and nonparticipating students were compared to establish sample bias. Descriptive statistics were used to analyze the characteristics of the sample and the questionnaire data. Due to the skewness and kurtosis results for the independent and dependent measures falling outside the range of normality (−3 to 3 and −8 to 8, respectively) it was necessary to use nonparametric statistics (Mann–Whitney and Kruskal–Wallis) to establish statistical significance (although mean and SD results are also presented to facilitate comparison with previous studies). Age and gender effects on the CSI were also examined. Associations between the CSI, the MFQ, the SDQ and functional impairment scale were assessed via one-tailed nonparametric correlational tests (Spearman rank), while response to stress was assessed using Kruskal–Wallis test. Internal reliability was assessed using Cronbach's α. Following data screening, exploratory factor analysis (EFA), using principle axis factoring and both varimax and oblimin rotation, was used to explore the factor structure of the CSI. Statistical analysis was carried out using SPSS v15 for Windows.

Results
Demographic Data

There were no age or gender differences between the 1,173 participating students and the combined 78 nonparticipating.

Over two-thirds of participants (71%) lived with two natural parents. Half the sample (54%) was from professional occupation families (based on the parent with the highest rated occupation), 43% were from skilled nonmanual and manual occupation families and the remaining 3% of parents were unemployed.

The Children's Somatization Inventory

The distribution of the CSI total scores showed a large positive skew; the median CSI total score for the 35-items was 12 (5, 23), while the median CSI somatization score was 0 (0,1). To facilitate comparison with previous nonclinical studies in other countries, the mean scores reported for comparable age sub-groups within each study are presented in Table I. The results indicate that, with the exception of Meesters et al.'s (2003) study, mean scores were generally comparable across different cultures.

Overall, the most frequently endorsed symptoms were headaches (66%), low in energy (49%), sore muscles (49%), faintness (45%), nausea (44%), stomach pain (43%), hot and cold spells (42%), pain in the heart (41%), weakness (41%), and lower back pain (40%). Restricting frequency to those who reported experiencing symptoms "a lot" or "a whole lot" the following items were most frequently endorsed: headaches (13%), nausea (12%), sore muscles (11%), low energy (11%), lower back pain (11%), hot and cold spells (10%), stomach pains (9%), and weakness (8%). One-third of the respondents (37%) reported at least one frequent somatization symptom; four or more symptoms were endorsed by 12% of respondents; 7 or more symptoms by 4% of the sample; and 13 or more symptoms by 0.8% of the sample.

Gender and Age Effects

Girls had a significantly higher median score [14.5 (7, 27)] than boys [8 (8, 19)] on the CSI total ($U = 91,888$, $p < .001$) with an effect size of −.21. With age divided in three groups (11–12 years, $n = 316$; 13–14 years, $n = 434$; 15–16 years, $n = 280$) there was an overall statistically significant effect of age [$H(2) = 6.19$, $p = .045$] but post hoc tests (using a Bonferroni correction so that a .0167 level of significance was used) revealed significantly higher scores in the 11- to 12-year-old group [mdn 14 (6, 24)] than the 13- to 14-year-old group [(mdn 11 (5, 21)]

Table II. Median CSI total scores and the proportion of cases with ≥4 symptoms in the age and gender groups

	CSI total score Mdn (interquartile)	Kruskal–Wallis	≥4 symptoms (%, n)	Chi-square
Girls (years)				
11–12	17 (7.5, 30)		21.3 (n = 42)	
13–14	13 (7, 23)	ns	15.7 (n = 37)	ns
15–16	15 (7, 28.5)		23.8 (n = 38)	
Boys (years)				
11–12	10 (5, 20)		12.6 (n = 19)	
13–14	8 (4, 18.25)	ns	13.7 (n = 35)	ns
15–16	7 (3, 17)		11.3 (n = 19)	

$(U = 61,245.5, p = .012)$ with an effect size of .09. Due to the violation of the normality assumption it was not possible to examine the Age × Gender interaction nonparametrically. However, we did examine the CSI total scores and the proportion of cases with ≥4 symptoms among the girls and boys separately within the three age groups (Table II) but found no significant group differences.

There were no significant differences in the CSI total scores of young people from White British origin and in those from other ethnic groups, nor when those from families with professional occupations were compared with the rest. However, young people living with both natural parents had higher CSI total scores [$mdn = 11$ (4, 21)] than those in other living situations [$mdn = 15$ (7, 30)] $(U = 91,990, p < .001)$.

Internal Consistency and Exploratory Factor Analysis

Data screening revealed an α coefficient of .93 for the 35-item CSI and a mean item-total correlation of .51, with a range between .67 and .33. There was also adequate item variance, but 12 of the CSI items did not meet the criteria for normality (skewness outside −3 to +3, kurtosis outside −8 to +8). Therefore, all items were subjected to logarithm transformation and examined again for normality. Six items (constipation, blindness, dizziness, paralysis, difficulty urinating, and pain urinating) still did not meet the criteria for normality and were thus excluded from the subsequent analyses.

The resultant 29-item CSI displayed moderate inter-item correlations, the Kaiser–Meyer–Olkin measure of sampling adequacy was .94, and Bartlett's test of sphericity was significant [$\chi^2(406) = 9,676.52, p < .001$].

Principle axis factoring was used with both varimax and direct oblimin rotations (the latter because correlations between factors was anticipated). The initial eigen values suggested a five-factor solution accounting for 11, 10, 8,

Table III. Summary of Exploratory Factor Analysis for the CSI Using Varimax Rotation

	Pseudo-neurological	Pain/Weakness	Gastrointestinal
Double vision	.66	.09	.17
Blurred vision	.62	.14	.27
Trouble walking	.55	.24	.27
Memory loss	.54	.19	.23
Deafness	.53	.21	.04
Seizures or convulsions	.53	.13	.24
Heart beating too fast	.44	.26	.24
Pain arms or legs	.23	.74	.20
Pain in knees, elbows or other joints	.23	.69	.22
Sore muscles	.13	.48	.20
Pains in lower back	.20	.42	.22
Nausea or upset stomach	.20	.16	.74
Pain in stomach or abdomen	.19	.20	.65
Food making you feel sick	.26	.25	.60
Feeling bloated or gassy	.20	.26	.50
Vomiting	.23	.12	.45
Headaches	.13	.17	.45
Eigen values	5.9	1.5	1.3
Percentage of variance (Rotated sums of squared loadings)	15.2	14.7	11.2

6, and 5%, but this model was clinically unsatisfactory. As two previous studies found a four-factor solution to be preferential we also tested a four-factor solution. However, it was not clinically satisfactory either, so 2-, 3-, 5-, and 6-factor solutions were tested. At each stage, items with primary factor loadings <.40 or secondary loadings >.30 were removed from the solution and the remaining factors retested until a ''clean'' solution was identified.

A three-factor solution comprising 17-items and accounting for 41% of the variance was considered the most parsimonious model. The varimax rotation factor loadings are presented in Table III. As anticipated, the three factors were moderately correlated (Table IV).

The three-factor solution closely resembles that reported by Meesters et al. (2003); therefore, the same factor labels were used. The overall median 17-item CSI total score was 6 (2, 13). Internal consistency for the 17-item CSI was α = .88, and for each of the three factors: Pseudoneurological α = .82, Pain/weakness α = .75, and Gastrointestinal α = .80. Correlations between the 17-item CSI Total score and each factor ranged from .70 to .86. Finally, the 35- and 17-item CSI's were highly significantly correlated ($r = .93$, $p < .001$)

Table IV. Correlations Between the CSI, three CSI factors, Moods and Feelings Questionnaire (MFQ), Strengths and Difficulties Questionnaire (SDQ) and CSI Impairment

	1	2	3	4	5	6	7	8	9	10	11
1. CSI total	–										
2. CSI somatization	.70**	–									
3. F1 Pseudoneurological	.70**	.56**	–								
4. F2 Pain/weakness	.82**	.53**	.44**	–							
5. F3 Gastrointestinal	.81**	.59**	.48**	.47**	–						
6. MFQ	.67**	.48**	.51**	.46**	.55**	–					
7. SDQ: Total	.47**	.40**	.41**	.30**	.38**	.57**	–				
8. SDQ: Emotion	.50**	.40**	.36**	.30**	.49**	.56**	.67**	–			
9. SDQ: Conduct	.25**	.24**	.25**	.20**	.18**	.30**	.67**	.17**	–		
10. SDQ: Hyperactivity	.26**	.20**	.26**	.17**	.17**	.27**	.69**	.17**	.48**	–	
11. CSI: Impairment	.62**	.46**	.41**	.41**	.63**	.46**	.28**	.34**	.14**	.12**	–

Factor 1 = Pseudoneurological, Factor 2 = Pain/weakness, Factor 3 = Gastrointestinal.
**p ≤.01.

Associations Between Somatic and Emotional/Behavioral Symptoms

The overall median MFQ score was 14 (6, 25) [mean 17.2 (SD 14.4)]. The median SDQ total difficulties score was 12 (9, 17) [mean 12.9 (SD 5.4)] and the median SDQ sub-scale scores were: emotional problems 3 (2, 5) [mean 3.51 (SD 2.3)], conduct problems 2 (1, 4) [mean 2.8 (SD 2)], hyperactivity problems 5 (3, 6) [mean 4.8 (SD 2.3)], peer relationship problems 1 (1, 3) [mean 1.9 (SD 1.7)], and prosocial behavior 7 (6, 8) [mean 6.9 (SD 1.9)].

Table IV presents the correlations between the CSI total and somatization scores and the three factors derived from the exploratory factor analysis, the MFQ, and the SDQ scores. For this analysis, we have used the SDQ total difficulties score and the emotional, conduct, and hyperactivity subscale scores, as they represent emotional and behavioral problems more directly. The results indicate good positive correlations with self-reported depressive symptoms (MFQ), and moderate positive correlations with the emotion sub-scale of the SDQ. There were weak correlations with the conduct and hyperactivity sub-scales of the SDQ.

The proportion of young people reporting any impairment from somatic symptoms in everyday activities ranged from 47% of the sample (443/941) in relation to their ability to concentrate, by 41% (387/946) regarding reduced capacity for enjoyment, 30% (278/939) in terms of not going to school, and 24% (227/937) with regards to seeing friends. Considerable impairment in the ability to enjoy activities and the ability to concentrate was reported by 10% and 9% of the sample respectively, with 5% and 4% respectively reporting considerable impairment with regards to seeing friends or going to school. The total

impairment score was moderately correlated with the CSI total score and the somatization score as well as with the three factors (Table IV).

Of the 920 young people who answered this question, 231 (25%) reported the somatic symptoms were made worse by stress, anxiety or worry, 327 (36%) were unsure, and 362 (39%) did not report an association. Statistical analysis (Table V) revealed a main effect for response to stress [H(2) = 179.14, p ≤ .001] with post hoc analyses (using a Bonferroni correction with the level of significance at p = .0167) indicating that those who perceived a negative effect of stress on somatic symptoms yielded significantly higher scores on the CSI total score than either of the other two groups, while those who were unsure of the effect also scored significantly higher than those who perceived no effect.

As presented in Table V, there was also a statistically significant association between reports of stress affecting somatic symptoms and higher MFQ, SDQ-emotional scores and impairment.

Discussion

We used the CSI in a British sample of secondary school students and identified rates of physical symptoms generally comparable to those reported in other countries (Garber et al., 1991; Litcher et al., 2001). The CSI had good internal consistency and factor analysis identified three main factors: pseudoneurological, pain/weakness, and gastrointestinal. A quarter of the sample reported symptoms were made worse by stress, and at least 10% reported marked impairment from symptoms. There were moderate correlations between CSI total and somatization scores and reported impairment, stress links, and

Table V. Association Between Beliefs About Symptoms being made Worse by Stress, and Somatic and Emotional Symptoms

| | Symptoms get worse with stress | | | |
	No $n = 362$ Mdn (interquartile)	Uncertain $n = 327$ Mdn (interquartile)	Yes $n = 231$ Mdn (interquartile)	Kruskal Wallis (H) ANOVA (F)
CSI total score	7 (3, 15)$_{ab}$	14 (8, 25)$_{ac}$	25 (13, 39)$_{bc}$	$H(2) = 177.7$***
CSI somatization score	0 (0, 1)$_{ab}$	0 (0, 2)$_{ac}$	1 (0, 4)$_{bc}$	$H(2) = 97.99$***
CSI impairment	0 (0, 1)$_{ab}$	2 (0, 3)$_{ac}$	3 (1, 4)$_{bc}$	$H(2) = 210.1$***
MFQ scores	8 (3, 16)$_{ab}$	17 (10, 27)$_{ac}$	26 (14, 39)$_{bc}$	$H(2) = 201.86$***
SDQ emotional	2 (1, 4) $_{ab}$	4 (2, 5)$_{ac}$	5 (3, 7)$_{bc}$	$H(2) = 135.66$***

Medians (Mdn) that share subscripts differ significantly ($p \leq .0021$) on Mann–Whitney comparisons.
***$p < .001$

emotional symptoms. This suggests that multi-symptomatic complaints can be an expression of somatization and confirms the CSI as a useful measure with good construct and discriminate validity for studying somatic symptoms and somatization in young people.

Frequency of Symptoms, Age and Gender Effects, and Cross-country Comparisons

The CSI total and somatization results obtained in the current study were generally comparable to those described in American and Ukrainian populations (Garber et al., 1991; Litcher et al., 2001). However, the total number of symptoms in the present study was higher than in Meesters et al. (2003) suggesting better physical well being or less somatization in the Netherlands. Further work might seek to replicate this finding and examine possible explanations. For example, school stresses are often connected to the somatization of distress (Garralda, 1999) which could reflect differences in academic demand and pressure across different national curricula and educational systems.

The most common and recurring CSI symptoms were also similar to those reported in studies from other countries, as were the gender effects with higher scores in girls. Biological factors, such as menstruation, and psychological changes linked to the increased rate of emotional symptoms following puberty in girls are thought to contribute to higher levels of symptoms in girls (Eminson et al., 1996). Findings related to age have been less clear-cut (Campo et al., 1999; Garber et al., 1991; Offord et al., 1987; Perquin et al., 2000). In our sample, the mid-adolescent group had the lowest CSI total scores, but this was only significant in comparison with the younger age group. Different educational demands could contribute to this: participants in the middle age-group may be less stressed than the younger group needing to adapt to a new school. The increased somatic symptoms in children from non-intact families are similarly likely to reflect higher stress levels in these young people.

Internal Consistency and Factor Analysis

The high internal consistency was consistent with previous studies (Garber et al., 1991; Litcher et al., 2001; Meesters et al., 2003) and the results of the exploratory factor analysis revealed a three-factor model that corresponds to the structure Meesters et al. (2003) reported as underpinning the CSI within a Dutch sample, the only other western European nonclinical sample. These factors closely correspond to three out of the four DSM-IV Somatization disorder symptom domains, the fourth domain that includes sexual symptoms is less appropriate for children and adolescents. This may be an argument for future versions of the Diagnostic and Statistical Manual providing a separate developmentally appropriate category of Somatization disorder for children and adolescents.

In the current study, the exploratory factor analysis resulted in a shorter CSI version containing 17 items: this was highly correlated with the 35-item CSI and had good construct validity as evidenced by significant positive correlations with both MFQ and the emotional sub-scale of the SDQ. Walker et al. (Walker, Beck, Garber, & Lambert, 2008) have recently investigated the dimensionality of the CSI in a sample of pediatric patients with abdominal pain and found a CSI-24 version to be reliable and a psychometrically sound refinement, with a large factor representing the presence of multiple symptoms explaining almost 30% of total variance and a weak gastrointestinal second factor. Further work is required to clarify the relative merits of focusing on a strong general CSI factor representing a continuum of symptom reporting rather than separate symptom clusters, and the use of shortened CSI versions in both general and clinical populations.

Association with Stress, Emotional Symptoms, and Impairment

Consistent with previous studies, we found significant positive correlations between somatic and emotional

symptoms indicating adequate construct validity of the CSI (Egger et al., 1999; Garber et al., 1991; Garralda, 1996; Taylor et al., 1996), and low correlations with behavioral symptoms indicative of adequate discriminant validity.

In addition, a quarter of respondents recognized a link between somatic symptoms and stress, whilst a further third were uncertain. These two groups had higher CSI, MFQ and SDQ total and emotional scores than young people denying psychosomatic links of this kind, which is in line with the notion of increased stress reactivity in children with functional somatic symptoms (Beck, 2008). Overall, the findings suggest that higher CSI scores are more likely to be an expression of the somatization of distress, and that asking about the effect of stress on somatic complaints is a helpful screening tool for young people at high risk for somatization.

Subjective impairment on domains such as enjoyment and concentration was reported by one in ten respondents, while one in twenty reported impairment in domains such as seeing friends and going to school. This order of impairing effects of somatic symptoms is a replication of the only other study to use these impairment items (Kramer & Garralda, 1998) and may be secondary to the use of suboptimal symptom coping strategies (Walker, Freeman Baber et al., 2008). Impairment levels correlated significantly with the number of physical and emotional symptoms, and with perceptions that symptoms got worse with stress. This indicates that for a substantial minority of young people somatic symptoms are impairing and, therefore, clinically relevant. The addition of impairment screening questions to the CSI might help explore these issues further.

Strengths and Limitations

The strengths of the study included the size of the sample, the largest nonclinical sample using the CSI so far, and the good response rate, providing representative data on a whole UK school population. By studying the psychometric properties of the CSI, examining links with emotional and behavioral symptoms, and adding information about impairment and possible links with stress, the study confirms and expands the possible uses of the CSI to the study of somatization in nonclinical samples of young people.

An intrinsic limitation of the CSI is that it does not provide information on possible medical explanations for symptoms. Further work is required to establish whether symptoms reported on the CSI are an expression of organic problems. Furthermore, we relied on self-report data and although children and adolescents are regarded as better informants than parents when reporting emotional or internalizing experiences (Achenbach,

McConaughy, & Howell, 1987), Garber, Van Slyke, and Walker (1998) found discordant reports of somatic and depressive symptoms between mothers and children with chronic abdominal pain, with mothers reporting a greater number of symptoms.

Although the SDQ scores were comparable to national data (SDQ, 2001), the mean MFQ depressive symptom scores were higher than expected compared to other surveys (Cooper & Goodyer, 1993; Sund et al., 2001; Yates et al., 2004) suggesting either a tendency to over-report symptoms or a high risk for depression in this sample. Given the strong associations between depressive and somatic symptoms this may have led to an over-estimation of somatic symptoms. Finally, even though in our study CSI total symptoms were not linked to ethnicity or socioeconomic family status, there was a predominance of White ethnicity and professional occupations in our sample and the results may not be generalizable to more diversified cultural and socioeconomic groups. Therefore, it will be necessary to validate the findings in a more diverse, ethnically and socioeconomically representative sample.

In summary, using the CSI with a sample of British secondary school young people we have identified rates of somatic symptoms generally comparable to those in other countries. We have confirmed adequate psychometric properties of the instrument in this sample. When complemented by measures of impairment and perceived association with stress, the CSI provides a good basis for the study of somatization in children and adolescents.

References

Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Pychological Bulletin, 101*, 213–232.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., revised ed.). Washington: American Psychiatric Association.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington: American Psychiatric Association.

Angold, A., Costello, E. J., Pickles, A., & Winder, F. (1987). *The development of a questionnaire for use in epidemiological studies of depression in children and adolescents*. London: Medical Research Council Child Psychiatry Unit.

Apley, J. (1975). *The Child with abdominal pains* (2nd ed.). Oxford: Blackwell Science.

Beck, J. E. (2008). A developmental perspective on functional somatic symptoms. *Journal of Pediatric Psychology, 33*, 547–562.

Campo, J. V., & Fritsch, S. L. (1994). Somatization in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 33*, 1223–1235.

Campo, J. V., Jansen-McWilliams, L., Comer, D. M., & Kelleher, K. J. (1999). Somatization in pediatric primary care: Association with psychopathology, functional impairment, and use of services. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*, 1093–1101.

Cooper, P. J., & Goodyer, I. (1993). A community study of depression in adolescent girls. I: Estimates of symptom and syndrome prevalence. *British Journal of Psychiatry, 163*, 369–374.

Dhossche, D., Ferdinand, R., van der Ende, J., & Verhulst, F. (2001). Outcome of self-reported functional-somatic symptoms in a community sample of adolescents. *Annals of Clinical Psychiatry, 13*, 191–199.

Du, Y., Kou, J., & Coghill, D. (2008). The validity, reliability and normative scores of the parent, teacher and self report versions of the Strengths and Difficulties Questionnaire in China. *Child and Adolescent Psychiatry and Mental Health, 2*, 1–15.

Egger, H. L., Costello, E. J., Erkanli, A., Erkanli, A., & Angold, A. (1999). Somatic complaints and psychopathology in children and adolescents: Stomach aches, musculoskeletal pains, and headaches. *Jorunal of the American Academy of Child and Adolescent Psychiatry, 38*, 852–860.

Eminson, M., Benjamin, S., Shortall, A., & Woods, T. (1996). Physical symptoms and illness attitudes in adolescents: An epidemiological study. *Journal of Child Psychology and Psychiatry, 37*, 519–528.

Escobar, J. I., Burnam, A., Karno, M., Forsythe, A., & Golding, J. (1987). Somatization in the community. *Archives of General Psychiatry, 44*, 713–718.

Garber, J., Van Slyke, D. A., & Walker, L. S. (1998). Concordance between mothers' and children's reports of somatic and emotional symptoms in patients with recurrent abdominal pain or emotional disorders. *Journal of Abnormal child Psychology, 26*, 381–391.

Garber, J., Walker, L. S., & Zeman, J. (1991). Somatization symptoms in a community sample of children and adolescents: Further validation of the Children's Somatization Inventory. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3*, 588–595.

Garralda, E., Rangel, L., Levin, M., Roberts, H., & Ukoumunne, O. (1999). Psychiatric adjustment in adolescents with a history of chronic fatigue syndrome. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*, 1515–1521.

Garralda, M. E. (1996). Somatisation in children. *Journal of Child Psychology and Psychiatry, 37*, 13–33.

Garralda, M. E. (1999). Practitioner review: Assessment and management of somatisation in childhood and adolescence: A practical perspective. *Journal of Child Psychology and Psychiatry, 40*, 1159–1167.

Goodman, J. E., & McGrath, P. J. (1991). The epidemiology of pain in children and adolescents: A review. *Pain, 46*, 247–264.

Goodman, R. (1997). The Strenghts and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*, 581–586.

Goodman, R. (1999). The extended version of the Strengths and Difficulties Questionnaire as a guide to child psychiatric caseness and consequent burden. *Journal of Child Psychology and Psychiatry, 40*, 791–801.

Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1337–1345.

Goodman, R., Meltzer, H., & Bailey, V. (1998). The Strengths and Difficulties Questionnaire: A pilot study on the validity of the self-report version. *European Child and Adolescent Psychiatry, 7*, 125–130.

Kent, L., Vostanis, P., & Feehan, C. (1997). Detection of major and minor depression in children and adolescents: Evaluation of the Mood and Feelings Questionnaire. *Journal of Child Psychology and Psychiatry, 38*, 565–573.

Konijnenberg, A. Y., Uiterwaal, C., Kimpen, J., van der Hoeven, J., Buitelaar, J. K., & de Graeff-Meeder, E. R. (2005). Children with unexplained chronic pain: Substantial impairment in everyday life. *Archives of disease in childhood, 90*, 680–686.

Koskelainen, M., Sourander, A., & Kaljonen, A. (2000). The Strengths and Difficulties Questionnaire among

Finnish school-aged children and adolescents. *European Child and Adolescent Psychiatry, 9,* 277–284.

Kramer, T., & Garralda, M. E. (1998). Psychiatric disorders in adolescents in primary care. *British Journal of Psychiatry, 173,* 508–513.

Litcher, L., Bromet, E., Carlson, G., Gilbert, T., Panina, N., Golovakha, E., et al. (2001). Ukrainian application of the Children's Somatization Inventory: Psychometric properties and associations with internalizing symptoms. *Journal of Abnormal child Psychology, 29,* 165–175.

Meesters, C., Muris, P., Ghys, A., Reumerman, T., & Rooijmans, M. (2003). The Children's Somatization Inventory: Further evidence for its reliability and validity in a pediatric and a community sample of dutch children and adolescents. *Journal of Pediatric Psychology, 28,* 413–422.

Muris, P., Meesters, C., & van den Berg. (2003). The Streghts and Difficulties Questionnaire (SDQ): Further evidence for its reliability and validity in a community sample of Dutch children and adolescents. *European Child and Adolescent Psychiatry, 12,* 1–8.

Office of National Statistics. (2000). *Standard occupational classification, volume 1.* London: The Stationery Office.

Offord, D. R., Boyle, M. H., Szatmari, P., Rae-Grant, N. I., Links, P. S., Cadman, D. T., et al. (1987). Ontario child health study. II. Six-month prevalence of disorder and rates of service utilization. *Archives of General Psychiatry, 44,* 832–836.

Perquin, C. W., Hazebroek-Kampschreur, A., Hunfeld, J., Bohnen, A. M., van Suijlekom-Smit, L., Passchier, J., et al. (2000). Pain in children and adolescents: A common experience. *Pain, 87,* 51–58.

Roth-Isigkeit, A., Thyen, U., Stoven, H., Schwarzenberger, J., & Schumucker, P. (2005). Pain among children and adolescents: Restrictions in daily living and triggering factors. *Pediatrics, 115,* e152–e162.

SDQ. (2001). SDQ normative data for UK. SDQ [On-line]. Retrieved July 2, 2008 from http://www.sdqinfo.com/b1.html.

Sund, A. M., Larsson, B., & Wichstrom, L. (2001). Depressive symptoms among young norwegian adolescents as measured by the Mood and Feelings Questionnaire (MFQ). *European Child and Adolescent Psychiatry, 10,* 222–229.

Taylor, D. C., Szatmari, P., Boyle, M. H., & Offord, D. R. (1996). Somatization and the vocabulary of everyday bodily experiences and concerns: A community study of adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 491–499.

van Widenfelt, B., Goedhart, A. W., Treffers, P., & Goodman, R. (2003). Dutch version of the Strengths and Difficulties Questionnaire (SDQ). *European Child and Adolescent Psychiatry, 12,* 281–289.

Walker, L. S., Beck, J., Garber, J., & Lambert, W. (2008). Children's Somatization Inventory: Psychometric properties of the revised form (CSI-24). *Journal of Pediatric Psychology, 9,* 1–11.

Walker, L. S., Freeman Baber, K., Garber, J., & Smith, CR. (2008). A typology of pain coping strategies in pediatric patients with chronic abdominal pain. *Pain, 137,* 266–275.

Walker, L. S., & Greene, J. W. (1989). Children with recurrent abdominal pain and their parents: More somatic complaints, anxiety, and depression than other patient families? *Journal of Pediatric Psychology, 14,* 231–243.

Wood, A., Kroll, L., Moore, A., & Harrington, R. (1995). Properties of the Mood and Feelings Questionnaire in adolescent psychiatric outpatients: A research note. *Journal of Child Psychology and Psychiatry, 36,* 327–334.

World Health Organization. (1992). *The ICD-10 Classification of Mental and Behavioural Disorders.* Geneva: World Health Organization.

Yates, P., Kramer, T., & Garralda, E. (2004). Depressive symptoms amongst adolescent primary care attenders. Levels and associations. *Social Psychiatry and Psychiatric Epidemiology, 39,* 588–594.

Erratum

Mar Vila, Tami Kramer, Nicole Hickey, Meera Dattani, Helen Jefferis, Mandeep Singh, and M. Elena Garralda. (2009). Assessment of Somatic Symptoms in British Secondary School Children Using the Children's Somatization Inventory (CSI). *Journal of Pediatric Psychology*, 34(9), 989–998.

In the second paragraph of the ''Gender and Age Effects'' section of the article, the sentence reading:

''However, young people living with both natural parents had higher CSI total scores [$mdn = 11$ (4, 21)] than those in other living situations [$mdn = 15$ (7, 30)] ($U = 91,990$, $p < .001$).''

should read:

''However, young people living with both natural parents had lower CSI total scores [$mdn = 11$ (4, 21)] than those in other living situations [$mdn = 15$ (7, 30)] ($U = 91,990$, $p < .001$).''

Abdominal pain in British young people: Associations, impairment and health care use

Mar Vila [a,*], Tami Kramer [a], Jordi E. Obiols [b], M. Elena Garralda [a]

[a] Academic Unit of Child and Adolescent Psychiatry, Imperial College London, UK
[b] Universitat Autonoma de Barcelona, Barcelona, Spain

ARTICLE INFO

ABSTRACT

Objective: To assess the frequency and associations of abdominal pain in a sample of British secondary school young people and to examine predictors of impairment and health care use.
Methods: Cross-sectional study of young people aged 11–16 years that completed questionnaires documenting abdominal pain, related impairment and health care consultations. They also provided information detailing other physical symptoms, health problems and mental health status.
Results: 1173 students completed questionnaires; 598 (53%) reported abdominal pains in the previous 3 months (15% >once a week). Pains were significantly linked to reporting medical illness, to high levels of a broad range of physical symptoms and with students deeming these symptoms to be stress/mood sensitive. They were also linked to depressive and other emotional and behavioural problems and with medical help seeking (seeing a health professional in the previous year and contact ever with mental health practitioners). Considerable impairment was reported by 36%; this was independently predicted by abdominal pain frequency, higher levels of concurrent physical symptoms and symptom stress/mood sensitivity. In 18% of students the abdominal pains had led to medical consultations; this was independently predicted by pain related impairment.
Conclusions: Frequent abdominal pains are common in British secondary school adolescents; they are linked to emotional symptoms and are often impairing and lead to medical consultations. Impairment was associated not only to pain frequency but also to reporting other physical symptoms and symptom stress/mood sensitivity, and impairment was a strong predictor of medical help seeking.

© 2012 Elsevier Inc. All rights reserved.

Introduction

Pain is a common problem among paediatric populations. Although often self-limiting, in some children it is chronic and recurrent, with significant impairment and disruption of daily life [1]. Most frequent are headaches, abdominal and musculoskeletal pains [2,3].

Abdominal pain is the most prevalent recurrent physical complaint in children [4], and a common reason why they consult primary care and paediatric services (2% to 4% of all paediatric or primary care visits in the USA and Netherlands) [5,6]. Only rarely is an organic cause identified for the pain [7,8] and in 80% of the cases the primary care doctor diagnoses the pain as "functional" or non-medically explained [5].

An excess of mood and/or behavioural symptoms and psychiatric co-morbidity in young people with abdominal pain has been documented [9,10] and longitudinal studies show that a number continue to have high levels of symptoms and impairment after one year, together with more anxiety, depression and low perceived self-worth [8,11].

Abdominal pain in childhood is associated with an increased risk of chronic pain syndrome, irritable bowel syndrome and psychiatric disorder in adulthood [12–14].

Research with adult populations with chronic pain has demonstrated severe personal, economic and public health consequences [15,16]. However, work on recurrent and chronic pain in young people has, in general, focused more on assessment of the pain and less on its functional consequences. There is still little research evidence on the functional impairment caused in children by – for the most part medically unexplained – chronic pain [17] and on the determinants of medical help seeking.

In community studies in Germany and the USA, rates of interference with normal activities from abdominal pain in young people range from 20 to 50%, reflecting study differences in age range and methodology to assess pain and impairment [18,19]. Research in clinical samples indicates that emotional symptoms may account for more functional disability than pain intensity itself [20,21].

Medical consultation rates in children with abdominal pain in community studies from Germany, USA and Malaysia, range from half to less than one in ten [18,19,22], also reflecting differing samples, methodology and possible accessibility of services across countries. These studies identified pain severity, loss of school and impairment as being likely to play a part in the decision to consult a medical practitioner.

* Corresponding author at: Academic Unit of Child and Adolescent Psychiatry, 3rd Floor QEQM Building, Imperial College, St. Mary's Campus, Norfolk Place, London W2 1PG, UK. Tel.: +44 207 886 1145; fax: +44 207 886 6299.
E-mail address: m.vila@imperial.ac.uk (M. Vila).

In the UK acute and recurrent abdominal pain is one of the main presentations in children attending primary care services [23]. Most research has been carried out on younger children [24,25] and little is known about frequency and associations in adolescents [26].

The aims of the present study were to study the prevalence of abdominal pain and its associations with physical, demographic and psychological variables among British secondary school young people; to examine the impact of abdominal pain on daily activities and health care consultations, and to determine predictors of impairment and health service use.

Methods

Participants

Participants were students (N = 1251) attending a co-educational secondary school serving a metropolitan area in south-east England during March 2004. The study was part of a broader investigation of physical and psychological health in young people [27].

Measures

Self-reported demographic information (age, gender, ethnicity, family composition, main breadwinner, parental occupation) was recorded on a form designed for this study. The occupation of the family's primary breadwinner was coded according to the Office of National Statistics' Standard Occupational Classification [28]. We also enquired about any serious current or past medical illnesses, the number of days missed of school over the last 12 months, the number of primary care health visits in the previous year, if they had seen another health professional about any physical health problems in the last year and if they had ever seen a psychiatrist, psychologist or counsellor.

We assessed abdominal pains using criteria from the Child and Adolescent Psychiatric Assessment (CAPA) [29] i.e. "stomach-aches that have lasted at least 1 h in the previous 3 months". We assessed frequency of abdominal pains over that period (<once a week, once a week, >once a week). Associated functional impairment was assessed using a modified questionnaire [30] and respondents were asked the extent to which the stomach-aches had impacted upon: ability to go to school, to enjoy themselves, to see friends and to engage in other activities. Each question was scored on a 3-point scale (0 = not at all; 1 = yes, a little; 2 = yes, a lot). Scores were summated to generate a total impairment score (range 0–8). We also asked the students if they had seen a doctor about the stomach-ache.

To collect information about concurrent physical symptoms we used the children's somatization inventory (CSI) [31], a self-report questionnaire comprising 35 physical symptoms and asking the extent to which they had been experienced in the previous two weeks (0 = not at all, 1 = a little, 2 = somewhat, 3 = a lot, 4 = a whole lot). The total CSI score (maximum 140) is the sum of all items reflecting both the range and intensity of symptoms. The CSI has been shown to have adequate internal reliability [27]. We added one question to enquire whether respondents thought that the physical symptoms reported on the CSI were made worse by stress, worry or anxiety, which we will refer to as "stress/mood sensitivity" (answers scored as 0 = no, 1 = yes, 2 = don't know).

To ascertain the presence of depressive symptoms we used the Moods and Feelings Questionnaire (MFQ)—self-report version [32], a 34-item screening measure for depressive disorder for use with 8–18 year olds. The presence of symptoms is rated over the previous two weeks on a 3-point scale ('not true', 'sometimes true', 'true'). This results in a continuous score with a range from 0 to 68. Its validity as a screening tool for general population [33] samples has been established and internal consistency (Cronbach's alpha) exceeds .90.

To screen for emotional and behavioural problems we used the Strengths and Difficulties Questionnaire (SDQ)—self-report version [34], a well validated behavioural screening tool enquiring about the presence over the previous 6 months of 25 positive and negative attributes in young people aged 11–17 years. Each item is scored on a 3-point scale ('not true', 'somewhat true', 'certainly true') generating five sub-scales: conduct problems, hyperactivity, emotional problems, peer problems and prosocial behaviour as well as a total difficulties score (sum of all sub-scales except prosocial). The internal consistency for the various self-reported SDQ scales is generally satisfactory and good concurrent validity has also been demonstrated [34].

Procedure

Ethical approval was obtained from the local research ethics committee, school and education authority. All eligible pupils and parents received letters and information sheets inviting participation and providing the opportunity to opt out of the study. Those wishing to participate did not need to provide written consent; their completion of the study questionnaires was taken as proof of consent. A pilot study was conducted to establish whether students understood the questionnaires.

On the study day, younger pupils (aged 11 to 13 years) completed the questionnaires during a one-hour lesson; students aged 14 to 16 years utilized a 35 min lesson. Teachers supervised questionnaire completion and noted absentees, as well as the age and gender of pupils who declined to participate. A second assessment day was arranged to obtain questionnaires from those initially absent.

Data analysis

Descriptive statistics were used to analyze the sample characteristics. Internal reliability of the total impairment score was assessed using Cronbach's alpha. To examine associations, bivariate analyses were performed using Chi-square test for categorical data and Mann–Whitney test and Spearman correlations for continuous data (due to the non-normal distribution of the data). Regression analyses were used to test the independent predictors of a) impairment and b) health-care consultations related to abdominal pain. Analyses were carried out using SPSS v17 for Windows. Not all participants completed all questions in the study forms, and the resulting denominators vary accordingly.

Since one of the symptoms in the CSI refers to abdominal pain ("pain in your stomach"), all statistically significant CSI findings were repeated excluding this item, but this did not modify the statistical significance of any of the results, therefore we present the results using the total CSI score.

Results

A total of 1173/1251 pupils (94% of the school population) completed questionnaires: 22 during the pilot study, 1132 on the index day, and 19/41 absentees subsequently; 56 declined to participate and 22 were absent on both data collection days. This comprised young people aged 11 to 16, and three 17 year olds, with a median age of 13 (IQR = 12–15) and an almost even gender distribution (51% females, 49% males). There were no age or gender differences between the 1173 participating students and the combined 78 non-participants.

The majority (91%) of participants self-reported a White British ethnicity. Over two-thirds (71%) lived with both natural parents, in 70% the fathers were the main breadwinners and 88% of the sample was from professional or skilled occupation families. The median number of school days missed during the previous year was 5 (IQR = 2–10).

Prevalence and associations of abdominal pains

A total of 1125/1173 participants (96% of all respondents/90% of the school population) answered the question "have you had stomach-aches in the last 3 months?" and this group will constitute the sample for the rest of the analysis. There were no differences in age, ethnicity or family composition between the 1125 respondents and the 48 non-respondents, but significantly more of the latter were male (80% non-respondents vs. 48% respondents) (X^2 (1) = 10.55, p = .001).

Experiencing stomach aches that had lasted at least 1 h in the previous three months was reported by 598/1125 (53%) of the students. Details on pain frequency were available from 583 students: in 415 (71%) pains had occurred <once a week, in 78 (13.5%) once a week, and in 90 (15.5%) >once a week.

There were no significant differences in age, ethnicity or socio-economic status between the young people reporting abdominal pains in the previous three months and the rest of the sample. Table 1 shows that the students with stomach-aches were more likely to be female and living in non-intact families, and they reported more days off school in the past year. They also reported more physical symptoms on the CSI, were more likely to affirm that these symptoms were stress and mood sensitive, and reported more past (but not current) medical illness.

In addition, students with stomach-aches had significantly more emotional and behavioural problems on the SDQ – particularly as reflected by total, emotional and peer relationship problem scores – and higher depressive MFQ scores.

Table 1 also details on general help seeking behaviour. Although there were no group differences in general practice attendance, reporting abdominal pain was associated with more health consultations (outside of primary care) about physical health in the previous year, and with ever having seen a mental health professional for a variety of reasons; most commonly family problems.

Impairment

Although some degree of impairment as a result of the abdominal pain (at least "a little" in one of the four areas explored) was reported by 496/560 (89%) of students reporting abdominal pains, in nearly half (n = 208) this was graded as mild ("a little" in one or two areas). Marked impairment ("a lot") in ability for enjoyment was reported by 15% (87/577), in interference with activities by 9% (52/569), with regards to seeing friends by 8% (47/567) and though missing school by 6% (34/585).

The median total impairment score was 3 (IQR = 1,4) (range 0–8) and 36% (197/546) of the students providing answers to all the impairment items had a total score above the median (≥4). The internal consistency of the total impairment scale was

found to be good (Cronbach's alpha coefficient = 0.68) and its validity supported by a positive significant correlation with the number of days off school in the previous year ($r = .211$, $p < .01$).

We examined associations between the total impairment score and socio-demographic variables, physical and psychological symptoms and health service use (Table 2). Total impairment was moderately positively correlated with the CSI total score, with smaller positive correlations with MFQ and total and emotional SDQ scores, and days off school. In addition, female gender, having frequent stomach-aches (at least once a week), reporting a current or past medical illness and having seen a general practitioner 4 or more times in the previous year were significantly linked to higher total impairment scores. Associations with age, ethnicity, family composition, parental occupation, SDQ peer problems, having seen another professional in the past year or having ever seen a mental health professional were not significant.

To examine the predictors of impairment we used linear regression analysis. The total impairment score was entered as the dependent variable and independent variables were those with i) statistically significant associations (Table 2), and ii) those that, although not statistically significant, could theoretically play a part in predicting total impairment. We did not include days missed off school as a possible predictor as it is an indicator of impairment; nor did we include health service use variables as they are also likely a consequence of impairment. Because of multicollinearity we did not include the SDQ total score either (its correlation with the SDQ emotional score was = .717). The factors included in the final model and entered into the multiple linear regression analysis (stepwise method) were: gender, frequency of abdominal pains, CSI total score, symptom stress/mood sensitivity, current and past illness, MFQ and SDQ emotional scores, age, ethnicity, family composition and job of breadwinner.

The final model outlined in Table 3 comprised three factors: greater frequency of abdominal pains, higher CSI total score, and increased symptom stress/mood sensitivity, which together accounted for 16.5% of the variance of impairment.

Table 1
Statistically significant differences between secondary school students reporting abdominal pains and the rest of the sample

	Abdominal pain % or median (IQR)	No abdominal pain % or median (IQR)	p
Socio-demographic variables			
Gender (female)	357/568 (63%)	196/500 (39%)	<.001[b]
Family composition (living with both natural parents)	409/597 (68%)	387/522 (74%)	.045[b]
Days off school in past year	6 (3–12) (n = 498)	4 (2–8) (n = 439)	<.001[a]
Physical problems			
Children's somatization inventory:			
a) Total score	17 (8–32) (n = 549)	7 (3–16) (n = 474)	<.001[a]
b) Symptoms worse with stress (stress/mood sensitivity)	164 /598 (27%)	63/395 (16%)	<.001[b]
Past medical illness	262/589 (44%)	173/515 (34%)	<.001[b]
Psychological			
Moods and Feelings questionnaire: Total Score	18 (9–29) (n = 586)	10 (3–19) (n = 507)	<.001[a]
Strengths and difficulties questionnaire			
Total	24 (21–27) (n = 537)	21 (18–25) (n = 447)	<.001[a]
Emotional	4 (2–6) (n = 579)	3 (1–4) (n = 500)	<.001[a]
Conduct	3 (2–4) (n = 576)	3 (2–4) (n = 498)	.047[a]
Hyperactivity	5 (4–6) (n = 584)	5 (4–6) (n = 496)	.014[a]
Peer problems	4 (4–5) (n = 579)	4 (3.75-5) (n = 494)	.001[a]
Health service use			
GP visits (4 or >)	190/592 (32%)	138/509 (27%)	.08[b]
Seen professional for any health problem in the past year	214/582 (37%)	154/508 (30%)	.02[b]
Ever seen mental health professional	89/583 (15%)	43/521 (8%)	<.001[b]

Note. Medians (inter-quartiles) or number (percentages).
[a] Mann Whitney test;
[b] Chi-square.

Table 2
Associations between 'total abdominal pain related impairment' and demographic, medical, psychological and health use variables

	Total impairment (median (IQR))/correlations	p
Socio-demographic variables		
Gender (n = 531)		
Female (n = 332)	3 (2–4)	<.001[a]
Male (n = 199)	2 (1–4)	
Days off school (n = 469)	.211[c]	
Physical problems		
Frequency of abdominal pains (n = 546)		
at least once a week (n = 157)	4 (2–4.5)	<.001[a]
< once a week (n = 389)	2 (1–4)	
Children's somatization inventory	.368[c]	
Total score (CSI) (n = 513)		
Symptoms get worse with stress (stress/mood sensitivity) (n = 477)		<.001[a]
Yes (n = 157)	4 (2–4)	
Other (No, don't know) (n = 320)	2 (1–4)	
Current medical illness (n = 560)		
Yes (n = 102)	3 (2–4.25)	.005[a]
No (n = 458)	2 (1–4)	
Past medical illness (n = 552)		
Yes (n = 249)	3 (1.5–4)	.04[a]
No (n = 303)	2 (1–4)	
Psychological		
Mood and Feelings Questionnaire total score (n = 549)	.280[c]	
Strengths and difficulties questionnaire scores		
Total (n = 502)	.229[c]	
Emotional (n = 542)	.241[c]	
Conduct (n = 540)	.085[b]	
Hyperactivity (n = 546)	.104[b]	
Health service use		
GP visits last year (n = 557)		
4 or > (n = 181)	3 (2–4)	.002[a]
<4 (n = 376)	2 (1–4)	

[a] Mann Whitney test; Spearman correlations, one-tailed, [b] $p < .05$, [c] $p \le .01$.

Medical consultations

Ninety four percent (564/598) of the students who reported abdominal pain in the last 3 months responded to the question "have you seen a doctor because of the abdominal pain?" and 104 (18%) responded positively.

We compared those having seen a health professional for abdominal pains (n = 104) and the rest of abdominal pain sufferers who had not seen a health professional (n = 460). As shown in Table 4, consulters had higher total impairment scores, missed more days of school in the previous year, had significantly higher CSI total scores, they were more likely to report having a current medical illness and had higher SDQ emotional scores.

Consulting and non-consulting abdominal pain sufferers did not differ on other socio-demographic variables apart from days missed of school, on abdominal pain frequency, symptom stress/mood sensitivity, depressive symptoms on the MFQ, SDQ total and behavioural sub-scores, past medical illness nor on prior mental health contact.

Logistic regression analysis was carried out for 'seeking medical consultation for abdominal pains' as the outcome variable. Because of multicollinearity we did not include the SDQ total score in the analysis (its correlation with the SDQ emotional score was = .717). We entered as independent variables i) factors that were statistically significantly associated with the outcome, and ii) variables that, although not statistically significant, could theoretically predict health service use. The factors included in the final analysis were: i) days off school and total impairment, that were entered using the enter method as they have consistently been shown to independently predict seeing a doctor for abdominal pain [18,22,35]; and ii) all the other variables (CSI total score, current medical illness, SDQ emotional, gender and age, ethnicity, job of breadwinner and family composition, MFQ, frequency of abdominal pains, stress/mood sensitivity and past medical illness) were entered using the conditional method.

The final model comprised only one factor, total abdominal pain related impairment. The Hosmer and Lemeshow test of the model's goodness-of-fit ($\chi^2 = 8.125$, df 8, $p = .421$) indicates the model fit the data adequately (Table 5).

Discussion

In our study, about half of the secondary school students experienced abdominal pains in the previous three months — nearly one in ten at least weekly. There were associations with female gender and other physical and psychological symptoms. A third of children reporting abdominal pain were substantially impaired by them and impairment was independently predicted by pain frequency, the presence of other physical symptoms and symptom stress/mood sensitivity (reporting physical symptoms to be made worse by stress, anxiety or worry). In nearly one in five pain had resulted in a medical consultation which was independently predicted by abdominal pain related impairment. These findings highlight the ubiquitousness of abdominal pains amongst adolescents in the general population, the commonly associated impairment and the contribution of the latter to medical consultations.

Our prevalence of abdominal pain is comparable to previous results from international community samples [18,19,36] and with a national survey [37] in which 29% of school children aged 11 to 16 years reported having ever had a lot of trouble with stomach pains. The high rates of associated physical symptoms and psychological problems have also been reported in previous studies [10,38].

Abdominal pain related impairment

In our sample, most students with abdominal pain reported related impairment. Impairment was rated as "severe" by between 6 and 15% with regards to their ability to enjoy themselves, interference

with other activities, seeing friends and going to school. These findings are intermediary between those in previous community samples in Germany and the USA and confirm that for a substantial minority, symptoms are not trivial and are indeed troublesome. This is given further support by the significantly higher number of days off school in the abdominal pain group and – given the continuities of recurrent abdominal pains into adulthood [13,39,40] – highlights abdominal pains as a symptom with the potential to adversely affect social and academic/professional performance over time.

We found impairment to be significantly associated to pain frequency, number of physical symptoms on the CSI and symptom stress/mood sensitivity, and to depressive and emotional symptoms. Previous surveys in community and clinical samples have similarly found impairment related to paediatric pain generally (not just that due to abdominal pain) to be linked not only to pain frequency and intensity, but also to the concurrent presence of psychological and other physical symptoms [20,21,41].

Whilst impairment is statistically significantly associated with depressive and emotional symptoms and somatic stress/mood sensitivity, depressive and emotional symptoms did not emerge as independent predictors of impairment in the regression analysis. This would seem to indicate that the contribution of emotional symptoms to impairment may be mediated by somatic stress/mood sensitivity, possibly indicating enhanced perceptions or amplification of the physical symptom experience.

Thus our findings show that in addition to pain frequency, it is the cumulative presence of physical symptoms other than abdominal pain and a somatic sensitivity to stress that contributes mostly to the impairment, issues deserving future clinical and research attention.

Table 4
Statistically significant differences between abdominal pain related medical help seeking and the rest of the sample in secondary school students with abdominal pain

	Not help seeking number (%) or median (IQR)	Help seeking number (%) or median (IQR)	*p*
Socio-demographic variables			
Median number of days off school in past year	5 (2–10) (n = 387)	7 (5–15) (n = 91)	<.001[a]
Physical problems			
Total impairment from abdominal pains	2 (1–4) (n = 389)	4 (2–5) (n = 157)	<.001[a]
Children's somatization inventory			
a) CSI total score	14 (7–31) (n = 426)	22 (13–33) (n = 98)	.001[a]
Current medical illness	68/463 (15%)	31/105 (30%)	.001[b]
Psychological			
Strengths and difficulties questionnaire			
Emotional	4 (2–6) (n = 451)	5 (3–6) (n = 102)	.013[a]

Note. Medians (inter-quartiles) or number (percentages).
[a] Mann–Whitney;
[b] Chi-square.

Table 3
Summary of linear regression analysis for variables predicting abdominal pain related total impairment scores (n = 462)

	B	S.E.	B	*p*
Constant	1.9	.14		
Children somatization inventory total score	.02	.005	.27	<.001
Frequency of abdominal pains	.59	.21	.15	.004
Symptoms getting worse with stress (yes) (stress/mood sensitivity)	.54	.19	.14	.005

Note. Nagelkerke's pseudo $R^2 = .168$.

Table 5
Logistic regression analysis of variables predicting abdominal pain related medical help seeking (n = 289)

	B	S.E.	Wald	df	*p*	OR (CI 95%)
Abdominal pain impairment score	.33	.086	14.77	1	<.001	1.391 (1.175–1.645)

Note. Nagelkerke's pseudo $R^2 = .158$.

Medical consultations

We found that 18% of the students with abdominal pain had consulted the doctor for the pain, confirming abdominal pains as a consistent reason for consultations. Consultation rates are intermediary between those reported in other countries (8% to 51%) [18,19], with variations likely to be related to different age ranges, time frame and definitions of health utilisation.

In line with previous studies, abdominal related impairment was an independent predictor of health consultations [18,22,35].

Emotional symptoms and somatic stress/emotional sensitivity failed to independently predict consultation but may have acted indirectly through their effects on abdominal pain related impairment which was indeed an independent predictor of medical consultations. This emphasizes the importance that impairment is carefully assessed during consultations for abdominal pains and that its determinants are better understood.

Strengths/limitations

Strengths include the large sample size and a high response rate (94%). The study fills a gap in the literature with regards to the frequency and associations of abdominal pains in a British high school population, and the detailed analysis of impairment and medical help seeking is novel and highly relevant for understanding the significance and implications of the symptoms.

The study has some limitations. First, we only collected data from the young people, not from parents or teachers. However, reports of somatic symptoms and functional disability are generally higher from children's than from parents' reports [42]; because of their subjectivity we believe that the assessment should be based primarily on students' responses. Secondly, we did not check medical records on physical health, health consultations or on a possible organic cause for the abdominal pain, nor did we enquire about links with menstruation, which could explain at least in part, the excess of the abdominal pains in girls. However, data from other epidemiological studies indicate that in only a small percentage would there have been a medical explanation for the pain [7,41]. Thirdly, the students reported the presence of abdominal pain retrospectively over a 3-months period, which may have lead to inaccuracies in reporting. Fourthly, we do not know whether non-participants, and indeed those that were absent on both collection days, suffered from more abdominal pains, thus underestimating rates. And fifthly, the results of this study may not be generalisable to more diversified cultural and socio-economic British populations.

Finally, although our study identifies a number of independent predictors of impairment and health care consultations, these only explained a small percentage of the variance, indicating that other factors play a part. These could include family stress, illness beliefs and attitudes, together with excessive attention to symptoms, and child individual factors such as tolerance to pain and coping strategies, as well as school and other stressors all of which deserve further scrutiny [2,38].

Conclusions

This study indicates that abdominal pains are common in a British general population of 11 to 16 year olds, that about one in ten experience frequent abdominal pains and that a considerable proportion experience substantial impairment leading to medical consultations.

The results highlight the importance of detailed assessment of pain related impairment as well as of other physical complains, of concurrent emotional and behavioural symptoms and of somatic stress/emotional sensitivity in children with abdominal pain who consult the doctor. Impairment could be an important trigger for further exploration of associated psychosocial problems and for considering the offer of specific treatment packages. Future research is needed into the determinants of impairment and in more heterogeneous samples.

Competing of interest statement

Acknowledgements

Appendix A

Table A1
Non-significant statistical differences between secondary school students reporting abdominal pains and the rest of the sample

	Abdominal pain % or median (IQR)	No abdominal pain % or median (IQR)	p
Socio-demographic			
Age	13 (12–15) (n=593)	14 (12–15) (n=525)	.83[a]
Ethnicity (White British)	552/594 (93%)	467/518 (90%)	.12[b]
Job breadwinner (professional/skilled)	437/494 (88%)	365/415 (88%)	.89[b]
Physical problems			
Current medical illness	107/597 (18%)	100/521 (19%)	.64[b]

Note. Medians (inter-quartiles) or number (percentages).
[a] Mann Whitney test;
[b] Chi-square.

Table A2
Non-significant associations between 'total abdominal pain related impairment' and demographic, medical, psychological and health service use variables

	Total impairment (Mdn (IQR))/correlations	p
Socio-demographic variables		
Age	.009[b]	.14
Ethnicity		
White British (n=516)	2 (1–4)	.8[a]
Other (n=41)	3 (1.5–4)	
Family composition		
Living with both natural parents (n=380)	2 (1–4)	.56[a]
Other (n=179)	3 (1–4)	
Job breadwinner		
Professional/skilled (n=410)	3 (1–4)	.26[a]
Other (n=53)	3 (2–4)	
Psychological		
Strengths and difficulties questionnaire scores		
Peer problem (n=541)	.019[b]	.33
Health service use		
Having seen another health professional in the previous year (n=546)		
Yes (n=203)	3 (2–4)	.094[a]
No (n=343)	2 (1–4)	
Ever seen mental health professional		
Yes (n=85)	3 (1–4)	.11[a]
No (n=461)	2 (1–4)	

[a] Mann Whitney test;
[b] Spearman correlations, one-tailed.

Table A3

Non-significant statistical differences between abdominal pain related medical help seeking and the rest of the sample in secondary school students with abdominal pain

	Not help seeking	Help seeking	p
	% or median (IQR)	% or median (IQR)	
Socio-demographic variables			
Gender (Female)	269/440 (61%)	69/100 (69%)	.18[b]
Age	13 (12–15) (n=460)	13 (12–15) (n=105)	.617[a]
Ethnicity (White British)	422/460 (92%)	102/105 (97%)	.08[b]
Family composition (Living with both natural parents)	316/463 (68%)	71/105 (67%)	.99[b]
Job breadwinner (Professional/skilled)	337/381 (88%)	75/86 (87%)	.89[b]
Physical problems			
Frequency of abdominal pains (at least once a week)	120/448 (27%)	37/103 (36%)	.08[b]
Children's somatization inventory a) Symptoms worse with stress (stress/mood sensitivity)	125/389 (32%)	34/95 (36%)	.59[b]
Past medical illness	189/457 (41%)	54/103 (52%)	.053[b]
Psychological			
Moods and feelings questionnaire: Total score	16 (9–29.25) (n=454)	20 (10.25-28.5) (n=104)	.317[a]
Strengths and difficulties questionnaire			
Total	23 (21–27) (n=421)	25 (22–28) (n=92)	.107[a]
Conduct	3 (2–4) (n=454)	3 (2–4) (n=97)	.459[a]
Hyperactivity	5 (4–6) (n=451)	5 (4–6) (n=105)	.351[a]
Peer problems	4 (4–5) (n=451)	5 (4–5) (n=101)	.518[a]
Health service use			
Ever seen mental health professional	69/453 (15%)	17/102 (17%)	.83[b]

Note. Medians (inter-quartiles) or number (percentages).
[a] Mann–Whitney;
[b] Chi-square.

References

[1] Konijnenberg AY, Uiterwaal CSPM, Kimpen JLL, van der Hoeven J, Buitelaar JK, de Graeff-Meeder ER. Children with unexplained chronic pain: substantial impairment in everyday life. Arch Dis Child 2005;90:680-6.
[2] Palermo TM. Impact of recurrent and chronic pain on child and family daily functioning: a critical review of the literature. J Dev Behav Pediatr 2000;21:58-69.
[3] Rask CU, Olsen EM, Elberling H, Christensen MF, Ornbol E, Fink P, et al. Functional somatic symptoms and associated impairment in 5–7 year-old children: the Copenhagen Child Cohort 2000. Eur J Epidemiol 2009;24:625-34.
[4] McGrath PA. Pain in children: nature, assessment and treatment. New York: Guildford Press; 1990.
[5] Spee L, van den Hurk A, van Leeuwen Y, Benninga MA, Bierma-Zeinstra S, Passchier J, et al. Childhood abdominal pain in primary care: design and patient selection of the HONEUR abdominal pain cohort. BMC Fam Pract 2010;11.
[6] Starfield B, Katz H, Gabriel A, Livingston G, Benson P, Hankin J, et al. Morbidity in children: a longitudinal view. N Engl J Med 1984;310:824-9.
[7] Apley J, Naish N. Recurrent abdominal pain: a field survey of 1000 school children. Arch Dis Child 1958;33:165-70.
[8] Walker LS, Garber J, Van Slyke DA, Greene JW. Long-term health outcomes in patients with recurrent abdominal pain. J Pediatr Psychol 1995;20:233-45.
[9] Dufton L. Anxiety and somatic complaints in children with recurrent abdominal pain and anxiety disorders. J Pediatr Psychol 2009;34:176-86.
[10] Garralda M. Unexplained physical complaints. Pediatr Clin North Am 2011;58:803-13.
[11] Ramchandani PG, Fazel M, Stein A, Wailes N, Hotopf M. The impact of recurrent abdominal pain: predictors of outcome in a large population cohort. Acta Paediatr 2007;96:697-701.
[12] Campo JV, Di Lorenzo C, Chiappetta L, Bridge J, Colborn K, Gartner C, et al. Adult outcomes of pediatric recurrent abdominal pain: do they just grow out of it? Pediatrics 2001;108:e1.
[13] Walker LS, Guite JW, Duke M, Barnard JA, Greene JW. Recurrent abdominal pain: a potential precursor of irritable bowel syndrome in adolescents and young people. J Pediatr 1998;132:1010-5.
[14] Hotopf M, Carr S, Mayou R, Wadsworth M, Wessely S. Why do children have chronic abdominal pain, and what happens to them when they grow up? Population based cohort study. Br Med J 1998;316:1196-200.
[15] Hunfeld JAM, Perquin CW, Duivenvoordenn HJ, Hazebroek-Kampschreur AJM, Passchier J, van Suijlekom-Smit LWA, et al. Chronic Pain and its impact on quality of life in adolescents and their families. J Pediatr Psychol 2001;26:145-53.
[16] Kashikar-Zuck S, Goldschneider KR, Powers SW, Vaught MH, Hershey AD. Depression and functional disability in chronic pediatric pain. Clin J Pain 2001;17:341-9.
[17] Meldrum M, Tsao J, Zeltzer LK. "Just be in pain and just move on": functioning limitations and strategies in the lives of children with chronic pain. J Pain Manag 2008;1:131-41.
[18] Hyams JS, Burke G, Davis PM, Rzepski B, Andrulonis PA. Abdominal pain and irritable bowel syndrome in adolescents: a community-based study. J Pediatr 1996;129:220-6.
[19] Roth-Isigkeit A, Thyen U, Stoven H, Schwarzenberger J, Schmucker P. Pain among children and adolescents: restrictions in daily living and triggering factors. Pediatrics 2005;115:152-62.
[20] Claar RL, Walker LS. Functional assessment of pediatric pain patients: psychometric properties of the functional disability inventory. Pain 2006;121:77-84.
[21] Gauntlett-Gilbert J, Eccleston C. Disability in adolescents with chronic pain: patterns and predictors across different domains of functioning. Pain 2007;131:132-41.
[22] Boey C, Goh K-L. Predictors of health-care consultation for recurrent abdominal pain among urban schoolchildren in Malaysia. J Gastroenterol Hepatol 2001;16:154-9.
[23] Royal College of General Practitioners. Curriculum Statement 8. In: Deighan M, Field S, editors. Care of children and young people. London; 2007.
[24] Ramchandani PG, Stein A, Hotopf M, Wiles N. Early parental and child predictors of recurrent abdominal pain at school age: results of a large population-based study. J Am Acad Child Adolesc Psychiatry 2006;45:729-36.
[25] Zuckerman B, Stevenson J, Bailey V. Stomachaches and headaches in a community sample of preschool children. Pediatrics 1987;79:677-82.
[26] El-Metwally A, Halder S, Thompson D, Macfarlane GJ, Jones GT. Predictors of abdominal pain in schoolchildren: a 4-year population-based prospective study. Arch Dis Child 2007;92:1094-8.
[27] Vila M, Kramer T, Hickey N, Dattani M, Jefferis H, Singh M, et al. Assessment of somatic symptoms in British secondary school children using the children's somatization inventory (CSI). J Pediatr Psychol 2009;34:989-98.
[28] Office of National Statistics. Standard occupational classification volume 1. London: The Stationery Office; 2000.
[29] Angold A, Prendergast M, Cox A, Harrington R, Simonoff E, Rutter M. The child and adolescent psychiatric assessment. Psychol Med 1995;25:739-53.
[30] Kramer T, Garralda M. Psychiatric disorders in adolescents in primary care. Br J Psychiatry 1998;173:508-13.
[31] Walker LS, Greene J. Children with recurrent abdominal pain and their parents: more somatic complaints, anxiety and depression than other patient families. J Pediatr Psychol 1989;14:231-43.
[32] Angold A, Costello EJ, Pickles A, Winder F. The development of a questionnaire for use in epidemiological studies of depression in children and adolescents. Medical Research Council Child Psychiatry Unit: London; 1987.
[33] Sund AM, Larsson B, Wichstrom L. Depressive symptoms among young Norwegian adolescents as measured by the Mood and Feelings Questionnaire (MFQ). Eur Child Adolesc Psychiatry 2001;10:222-9.
[34] Goodman R. Psychometric properties of the Strenghts and Difficulties Questionnaire. J Am Acad Child Psychiatry 2001;40:1337-45.
[35] Boey C, Goh K-L. Recurrent abdominal pain and consulting behaviour among children in a rural community in Malaysia. Dig Liver Dis 2001;33:140-4.
[36] Chitkara DK, Rawat DJ, Talley NJ. The epidemiology of childhood recurrent abdominal pain in Western countries: a systematic review. Am J Gastroenterol 2005;100:1868-75.
[37] Eminson M, Benjamin S, Shortall A, Woods T. Physical symptoms and illness attitudes in adolescents: an epidemiological study. J Child Psychol Psychiatry 1996;37:519-28.
[38] Eminson M. Medically unexplained symptoms in children and adolescents. Clin Psychol Rev 2007;27:855-71.
[39] Gieteling MJ, Bierma-Zeinstra SM, Passchier J, Berger MY. Prognosis of chronic or recurrent abdominal pain in children. J Pediatr Gastroenterol Nutr 2008;47:316-26.
[40] Mulvaney S, Warren Lambert E, Garber J, Walker LS. Trajectories of symptoms and impairment for pediatric patients wtih functional abdominal pain: a 5-year longitudinal study. J Am Acad Child Adolesc Psychiatry 2006;45:737-44.
[41] Campo JV, Jansen-McWilliams L, Comer DM, Kelleher K. Somatization in pediatric primary care: association with psychopathology, functional impairment, and use of services. J Am Acad Child Psychiatry 1999;38:1093-101.
[42] Czyzewski DI, Eakin MN, Lane MM, Jarrett M, Shulman RJ. Recurrent abdominal pain in primary and tertiary care: differences and similarities. Child Health Care 2007;36:137-53.

ORIGINAL PAPER

Adolescents who are frequent attenders to primary care: contribution of psychosocial factors

Mar Vila · Tami Kramer · Jordi E. Obiols ·
M. Elena Garralda

Abstract

Background Frequent attendance to primary care services has shown an association with psychosocial factors in adult and child populations. Little is known about the psychosocial correlates of attendance in adolescents.

Aims of the study To study the contribution of psychosocial factors to frequent primary care attendance in a community sample of young British people.

Method The method used was a cross-sectional survey of 1,251 secondary school pupils, using self-report questionnaires for socio-demographic, physical and psychological health data.

Results A total of 1,116 pupils [mean age 13.51 years (SD 1.5), 52% female] completed questionnaires and provided information about contact with their general practitioner (GP) in the previous year; 30% were frequent attenders ($\geq$4 appointments). Frequent attenders were significantly younger; they were more likely to come from lower socioeconomic backgrounds, report significantly more past and current physical problems, have more hospital visits in the previous year, have more recent intense somatic symptoms made worse by stress and causing impairment, and have more days off school. Frequent attendance was also significantly associated with the presence of emotional symptoms and a history of mental health consultations. Logistic regression analysis identified seeing a hospital doctor, current illness, having days off school, a history of mental health consultations and younger age as independent predictors of frequent attendance.

Conclusion In addition to physical health problems, social factors and psychiatric difficulty are linked to and require attention in young people who are frequent attenders at primary care health services.

Keywords Children · Adolescents · Frequent attenders · Primary care · Psychosocial factors · Somatisation

Introduction

Frequent attenders account for a large proportion of contacts with general practice. It has been estimated that the top 10% of frequent attenders account for 30–50% of all contacts [1]. It is important to understand the determinants of frequent attendance, as this can help towards provision of a focused and effective primary care service.

Previous research addressing adult patients has consistently shown that frequent attenders have high rates of physical disease with medical problems tending to be multiple, chronic and complex [2], and to be high users of other health services [3]. Adult frequent attenders also displayed an excess of psychiatric difficulty (mostly depression and anxiety [2]), high consumption of psychotropic and other medications [4], and psychosocial disadvantage (elderly, female, single, divorced or widowed, less educated and living in poor circumstances) [2, 4, 5], as well as high levels of somatisation and enhanced health-care costs [6–8].

Research on frequent attendance in childhood is rare by comparison and has tended to focus on younger children

M. Vila (✉) · T. Kramer · M. E. Garralda
Academic Unit of Child and Adolescent Psychiatry,
3rd Floor QEQM Building, Imperial College,
St.Mary's Campus, Norfolk Place, London W2 1PG, UK
e-mail: marvilag@hotmail.com

J. E. Obiols
Department of Clinical and Health Psychology,
Psychopathology and Neuropsychology Research Unit,
Universitat Autònoma de Barcelona, Edifici B, 08193,
Bellaterra, Barcelona, Spain

[1], probably due to the overall high rates of primary care attendance in this age group [9]. As with adults, frequent attendance has been linked to medical problems and other health services use, and to psychological and socio-demographic factors [10–13]. Psychiatric disorders, mostly of an emotional nature, have been documented in nearly a third of frequent primary care-attending school children and at a significantly higher rate than in non-attenders [14]. Indications are that the excess may be accounted for, in part, by children with emotional disorders who somatise distress [15].

Adolescent primary health care attendance has been neglected, perhaps because adolescents are perceived as low attenders. This perception is misguided since national statistics indicate that in the UK, 50–70% of young people consult their general practitioner (GP) with an approximate average of two consultations per year [9, 16]. High rates of psychiatric disorders and emotional symptoms have been reported amongst adolescent primary care attenders [10, 17–19] and it may be expected that this association will be particularly marked in those who attend frequently [17, 20, 21]. Furthermore, research shows that GPs recognise children and adolescents with severe psychiatric disorders, including severe depressive disorders; however, they tend to fail to identify the less severely affected and this could be a contributory factor to frequent attendance [19, 22, 23].

In this study, we aimed to identify young people reporting above-average levels of attendance at primary health care and to document the contribution of physical, psychiatric and psychosocial factors, hypothesising that all of these will contribute to the frequency of attendance.

Methods

Participants

Participants were all pupils ($n = 1{,}251$) in academic years 7–11 (corresponding to age range 11–16 years) attending a co-educational secondary school, serving a metropolitan area in the South of England during February 2004. The study was part of a broader investigation of physical and psychological health in young people [24]. Frequent attendance was defined as four or more visits to the GP in the last year, since this is twice the expected rate for young people in the UK and is also the cutoff used in a previous British study of frequent primary care attending schoolchildren, where it identified 21% of children accounting for 58% of attendances [25].

Measures

A proforma designed for the study gathered information on demographic data (age, gender, ethnicity, family composition and occupation of the main breadwinner, i.e. the adult living in the household with the highest income, as a measure of socioeconomic status) [26]. Information on whether pupils were studying for examinations and the number of school days missed in the previous year was also gathered. Data on patients experiencing any serious illnesses or health problems at the time of the study and in the past were collected and categorised according to Read Codes [27], as was health service use information (the number of GP visits in the previous year, having seen a hospital doctor in the previous year and having ever seen a counsellor, psychologist or psychiatrist).

To assess the presence of physical symptoms and somatisation (symptoms causing impairment and made worse by stress), we used the Children's Somatization Inventory (CSI) [28]. This is a self-report questionnaire on the presence of 35 symptoms experienced in the previous 2 weeks scored on a five-point intensity scale. The total score (maximum 140) is the sum of all items and reflects the range and intensity of all reported somatic complaints. To ascertain associated impairment we added four questions, scored on a three-point severity scale (maximum score 8), asking whether somatic symptoms impacted on daily activities (concentration, enjoyment, going to school and seeing friends). We also asked whether respondents thought their somatic symptoms were made worse by stress, worry or anxiety. The CSI has been found to have good internal reliability and validity [29].

Depressive symptoms were assessed using The Moods and Feelings Questionnaire (MFQ) [30]. This is a 34-item screening measure for depressive disorder symptoms for use with 8- to 18-year olds. Respondents report the presence of symptoms during the previous 2 weeks on a three-point scale, producing a score with a range from 0 to 68. The MFQ can be used to indicate if an individual is at risk of depression. Wood and colleagues [31] found that a cutoff score of 27 gave the best diagnostic confidence for identifying major depression in an adolescent sample attending psychiatric clinics, whereas Yates et al. [21] found that a cutoff of 17 was the optimal score to identify adolescents attending a GP practice, who were at high risk for depression. The MFQ questionnaire has been validated as a screening instrument for depression in adolescent clinical samples [32] and in the general population [33].

As a broad screen of psychopathology, young people completed The Strengths and Difficulties Questionnaire (SDQ)—self-report version [34]. This is a brief, well-validated behavioural screening tool that enquires about the presence of 25 positive and negative attributes over the previous 6 months. The SDQ generates a total score, as well as subscale scores on conduct problems, hyperactivity, emotional symptoms, peer problems and prosocial behaviour, and it has an impact score [35]. Score ranges are

classified as normal (N), borderline (B) and abnormal (A). For the self-completed SDQ, the score ranges are as follows: Total difficulties score (N 0–15, B 16–19, A 20–40), emotional symptoms score (N 0–5, B 6, A 7–10), conduct problems score (N 0–3, B 4, A 5–10), hyperactivity score (N 0–5, B 6, A 7–10), peer problems score (N 0–3, B 4–5, A 6–10) and prosocial behaviour score (N 6–10, B 5, A 0–4). The abnormal range for the Total difficulties score is used to identify likely 'cases' with mental health disorders [36].

Procedure

Ethical approval was obtained from the local NHS research ethics committee, and permission to approach parents and students from the school and local education authority. Pupils and parents received letters of information inviting their participation and offering the opportunity to opt out of the study. Those who wished to participate did not need to provide written consent; their completion of the questionnaires on the identified day was taken as proof of consent. On the index study day, younger pupils (aged 11–13 years) completed the questionnaires during a 1-h lesson; students aged 14–16 years utilised a 35-min lesson, as this minimised lost time for those preparing for examinations. The teachers supervised questionnaire completion and noted who was absent, as well as the age and gender of pupils who declined to participate in the study. A second assessment day was arranged to obtain questionnaires from those initially absent; the same format was used.

Data analysis

The age and gender of participating and non-participating students were compared to establish sample bias. Descriptive statistics (mean, median, percentages) were used, and pupils who attended general practice frequently and non-frequently were compared using non-parametric tests (Mann–Whitney test) for continuous data and chi square for categorical data. Logistic regression analysis was used to test the independent predictors of frequent attendance. The statistical level was set at $p < 0.05$. Statistical analysis was carried out using SPSS v15 for Windows.

Results

A total of 1,173 pupils (93.8% of the school population) completed the study questionnaires: 22 (1.8%) pupils were absent from school throughout the whole study and 56 (4.5%) opted out. There were no age or gender differences between the 1,173 participating students and the combined 78 non-participating ones. Only 1,116 respondents documented their GP attendance and of these 334 (30%) were frequent attenders (i.e. had seen their GP four or more times in the previous year). Of the remaining 782, 169 (15%) had not seen their GP at all in the previous year and 613 (55%) had visited the GP one to three times.

Socio-demographic characteristics

The mean age of the 1,116 participants was 13.5 years (SD 1.5). Gender was evenly distributed (52% females, $n = 547$) and most respondents (91.5%, $n = 1,012$) were ethnically White British, while others came from White non-British, Black English, African, Caribbean, Indian, Pakistani, Bangladeshi and Chinese backgrounds. Fathers were generally the main family breadwinners (70.5%, $n = 764$). Over two-thirds of participants (71%, $n = 791$) were living with two natural parents; others were living with single mothers (13.7%) or fathers (1.4%), were in a reconstituted family (12.3%) or were adopted (1.1%). Half the sample (54%, $n = 491$) came from families whose main breadwinner was in a professional occupation, the rest were in skilled occupations (34%, $n = 303$), manual skilled occupations (9%, $n = 82$), 2% ($n = 20$) were unemployed and 0.5% ($n = 5$) were house parents. Nearly half the students (40%, $n = 446$) were studying for external examinations (years 9 and 11); the median number of school days missed during the previous year was 5 (2, 10).

Health service use

Almost a quarter of the sample (23%; $n = 249$) had seen a hospital doctor in the past year, and 12% ($n = 128$) reported seeing a mental health specialist (counsellor, psychologist or psychiatrist) at sometime in their life. The most common reasons for the latter were family problems (32%; $n = 33$), followed by behavioural problems (9%; $n = 9$), bereavement (9%; $n = 9$), bullying (6%; $n = 6$), anxiety (5%; $n = 5$), depression (4%, $n = 4$) and a variety of other reasons (26%, $n = 27$) such as eating problems, ADHD or suicidal ideation.

Medical problems and somatic symptoms

Current serious illness or health problems were reported by 19% ($n = 206$) of the sample and past medical problems by 40% ($n = 432$). The most commonly reported current illnesses were respiratory (28%; $n = 58$), gastrointestinal (20%; $n = 42$) and a range of ill-defined signs or symptoms (e.g. poor appetite, aches and pains) (9%, $n = 18$); the most common *past* illnesses were respiratory (21%; $n = 91$), infection/parasitic (24%; $n = 104$) and injury/poisoning (14%; $n = 60$).

The median CSI total score, reflecting both the range and intensity of experienced physical symptoms, reported by the 1,013 young people who completed the questionnaire, was 12 (5, 23) and the median CSI impairment score was 1 (0, 3). Of the 901 (81%) young people answering the question on links between physical symptoms and stress, 227 (25%) reported that physical complaints were made worse by stress, worry or anxiety; 319 (35.5%) were unsure; and 355 (39.5%) denied an association.

Psychological characteristics

The median depressive symptom score on the MFQ for the 1,080 young people who completed this questionnaire was 14 (6, 26); the median SDQ Total difficulties score for the 1,102 subjects completing this was 12 (9, 16); the sub-score medians were 3 (2, 5) for emotional, 2 (1, 4) for conduct, 5 (3, 6) for hyperactivity, 1 (1, 3) for peer relationships and 7 (6, 8) for prosocial sub-scales.

Comparison between frequent attenders and non-frequent attenders

Table 1 outlines the results from the comparison between frequent and other practice attenders. Frequent attenders were significantly younger, from lower socioeconomic groups and with more school absence. They were significantly more likely to report past and current illnesses, more intensive physical symptoms on the CSI, symptom-related impairment and symptoms worsening with stress. They also had higher levels of depressive symptoms and higher total, emotional and conduct SDQ scores. More frequent practice attenders had seen a hospital doctor for physical health problems in the previous year, and more reported ever seeing a counsellor/psychiatrist or psychologist.

Regression analysis of factors associated with frequent attendance

Logistic regression analysis was used to explore the predictors of frequent general practice attendance (Table 2). All significant factors in Table 1 ($p \leq 0.05$) were included in the analysis. Multicollinearity was assessed (correlations ≥ 0.70) but not observed.

Initially, data were entered into a hierarchical regression model with socio-demographic factors entered first, followed by health, psychological factors and service use. All factors achieving significance ($p \leq 0.05$) were entered into a second hierarchical model to determine the best model predicting frequent attendance. The final model comprised five factors, accounting for 18% of the variance, indicating that having seen a hospital doctor, reporting a current illness, having ever seen a counsellor/psychiatrist or psychologist, number of days off school, and younger age independently predicted frequent general practice attendance (see Table 2). The Hosmer and Lemeshow test of the model's goodness of fit ($\chi^2 = 9.99$, $df = 8$, $p = 0.266$) indicated that the model fitted the data adequately.

Discussion

Summary of main findings

In this sample of young British people, frequent primary health care attendance (defined as having seen the GP 4 or more times in the previous year) was independently predicted by having a medical problem, prior hospital contacts, past consultations for mental health problems, younger age and school absence. This indicates that over and above physical health problems, psychosocial factors are of relevance for the frequency of primary care consultations of young people. In addition, there were associations with reduced socioeconomic status, experiencing emotional symptoms and having impairing physical symptoms aggravated by stress.

Comparison with existing literature

In our sample, the frequency of GP attendance and rates of hospital visits in the previous year were comparable to national statistics [16, 37]; 12% of young people reported having ever seen a mental health professional and these data were also broadly in line with epidemiological reports showing that 6.5 and 6–9% of children and young people attended mental health services in a 6-month and 1-year period, respectively [38, 39].

As with other age groups, the frequently attending group had an excess of depressive and emotional symptoms [40], as well as more physical symptoms that were impairing and made worse by stress. This suggests an increased tendency to somatise distress, possibly mediating the effects of emotional symptoms on the frequency of attendance.

In some frequently attending young people, emotional symptoms may have been secondary to the medical problems that took them to the GP, reflecting an increased risk for emotional problems associated with poor paediatric health [41]. However, the fact that previous mental health service use was an independent predictor of frequent attendance indicates that emotional difficulties were a concern for a number of young people representing a problem worthy of exploration and management at the GP surgery [25, 42].

Our findings confirm previous reports showing an excess of emotional disorders and depressive symptoms amongst adolescents attending general practice [17, 19], as well as

Table 1 Comparisons between frequent and non-frequent primary care attenders on socio-demographic and clinical features

	Frequent attenders	Non-frequent attenders	Statistical test	Significance p
Socio-demographics				
Gender				
Female	165/317 (52%)	382/742 (48%)	Chi square ($\chi^2(1) = 0.10$)	0.919
Ethnicity				
White British	302/331 (91%)	710/775 (91%)	Chi square ($\chi^2(1) = 0.01$)	0.931
Family Composition				
Both natural parents	225/333 (67%)	566/779 (72%)	Chi square ($\chi^2(1) = 2.70$)	0.100
Occupation				
Professional or skilled	232/274 (84%)	562/627 (89%)	Chi square ($\chi^2(1) = 4.02$)	0.045
Studying for external examinations[a] (yes)	127/334 (38%)	319/782 (40%)	Chi square ($\chi^2(1) = 0.64$)	0.425
Age[b]	13 (12, 15) ($n = 332$)	14 (12, 15) ($n = 778$)	Mann–Whitney ($U = 116,431$)	0.008
Median number of days off school[b]	7 (4, 15) ($n = 280$)	5 (2,8) ($n = 654$)	Mann–Whitney ($U = 64,875$)	<0.001
Physical				
Children's Somatization Inventory[b]				
CSI total score	13 (7, 28.7) ($n = 308$)	11 (4, 22) ($n = 705$)	Mann–Whitney ($U = 93,064$)	<0.001
CSI impairment	2 (0, 3.7) ($n = 288$)	1 (0, 3) ($n = 625$)	Mann–Whitney ($U = 78,432$)	0.001
Symptoms made worse with stress				
Yes	89/283 (31%)	138/618 (22%)		
Do not know	103/283 (36%)	216/618 (35%)		
No	91/283 (32%)	264/618 (43%)	Chi square ($\chi^2(2) = 12.02$)	0.002
Current illness (yes)	99/330 (30%)	107/776 (13%)	Chi square($\chi^2(1) = 39.08$)	<0.001
Past illness (yes)	59/326 (48%)	273/767 (35%)	Chi square ($\chi^2(1) = 16.08$)	<0.001
Psychological				
Moods and Feelings Questionnaire[b]	16 (8.2, 29) ($n = 328$)	13 (5, 24) ($n = 752$)	Mann–Whitney ($U = 106,179$)	<0.001
Strengths and Difficulties Questionnaire[b]				
Total	13 (10, 17) ($n = 330$)	12 (8, 16) ($n = 774$)	Mann–Whitney ($U = 109,906$)	<0.001
Emotional	4 (2, 6) ($n = 330$)	3 (2, 5) ($n = 774$)	Mann–Whitney ($U = 108,511$)	<0.001
Conduct	3 (2, 4) ($n = 330$)	2 (1, 4) ($n = 774$)	Mann–Whitney ($U = 116,767$)	0.022
Hyperactivity	5 (3, 7) ($n = 330$)	5 (3, 6) ($n = 774$)	Mann–Whitney ($U = 119,980$)	0.115
Health service use				
Seen a hospital doctor (yes)	120/323 (37%)	129/748 (17%)	Chi square ($\chi^2(1) = 49.98$)	<0.001
Ever seen mental health specialist (yes)	56/321 (17%)	72/770 (9%)	Chi square ($\chi^2(1) = 13.56$)	<0.001

[a] Studying for SATS or GCSEs

[b] Median with interquartiles in parentheses. The remaining data are categorical, citing both numerator and denominator with percentage in parentheses

high levels of psychiatric, behavioural and psychosomatic complains amongst those attending more frequently [21, 43]. Additionally, depressive symptoms might amplify the discomfort from physical complaints, leading to a greater sense of 'poor physical well-being and to higher GP consultations [17].

Concordant with findings from other age groups [2, 12], lower socioeconomic status was linked to frequent attendance, but was not an independent predictor suggesting that its contribution may have been mediated through the risk for poor physical and mental health associated with lower

socioeconomic status [44, 45]. The younger age of frequent attenders was a statistically significant finding, but the absolute age difference between groups was small and thus its clinical significance is uncertain. School absence was an independent predictor of frequent attendance and since we found links between this and the medical and psychiatric indicators, it seems likely to be a reflection of the days missed while attending the GP. Whereas the cost to some young people of missing school would have been appropriate where medical attention was required, for those whose attendance was a function of psychosocial distress it

Table 2 Logistic regression predicting frequent attendance at primary health-care services ($n = 874$)

	B	SE	Wald	df	Sig.	OR (CI 95%)
Age	−0.169	0.053	9.959	1	0.002	0.845 (0.761–0.938)
Days off school	0.064	0.010	37.638	1	0.000	1.067 (1.045–1.089)
Seen mental health specialist	0.512	0.231	4.940	1	0.026	1.669 (1.062–2.623)
Current illness	0.640	0.191	11.181	1	0.001	1.896 (1.303–2.758)
Seen hospital doctor	0.972	0.177	30.059	1	0.000	2.644 (1.868–3.743)

Nagelkerke's pseudo $R^2 = 0.176$

would seem less appropriate, unless their distress was addressed during the consultation.

Strengths and limitations

The strengths of the study are the large sample size, good response rates and the community nature of the sample providing details of frequency of attending in a range of geographically different general practices. Nevertheless, the study was carried out in a single school with predominantly White British young people from professional families; thus, our results may not be fully representative of more diversified cultural and socioeconomic populations.

We relied on self-reported data and while young people are the best informants for subjective data, we acknowledge that for younger children providing data about job of the main breadwinner or health service use might be unreliable. However, the range of physical problems and referral rates to specialist services are compatible with previous reports and national statistics [9, 16, 19, 37], therefore lending validity to the self-reports. Additionally, a tutor was present when pupils completed the questionnaires and invited questions on definitions of any words pupils did not understand. Nevertheless, corroborative evidence from parents and medical records would have strengthened these results. Some of the associations with frequent primary care attendance measured over the previous 12 months concerned physical and emotional symptoms experienced at the time of completing questionnaires and therefore not necessarily within the same temporal timescale. However, it is worth noting that on the final logistic regression analysis, none of these scores were significantly associated with primary care attendance. Although our study identifies a number of independent predictors of attendance, these explained a small percentage of the variance, indicating that other factors must play a part; these could include parental and young people's symptom tolerance and attitudes towards symptoms and help seeking [10, 11, 44].

Implications for future research or clinical practice

Our results indicate that a considerable proportion of adolescents visit the GP four or more times a year and that

in addition to physical health problems and specialist contacts, psychosocial factors including mood changes and somatisation (stress-related impairing physical symptoms) are relevant to understanding the frequency of attendance. This highlights young people with comparatively frequent attendance as a target group for exploring the presentation of emotional problems in primary care, and one for which the provision of effective psychological interventions would be essential [17, 18, 20].

References

1. Vedsted P, Christensen MB (2005) Frequent attenders in general practice care: a literature review with special reference to methodological considerations. Public Health 119:118–137
2. Gill D, Sharpe M (1999) Frequent consulters in general practice: a systematic review of studies of prevalence, associations and outcome. J Psychosom Res 47:115–130
3. Vedsted P, Fink P, Sorensen HT, Olesen F (2004) Physical, mental and social factors associated with frequent attendance in Danish general practice. A population-based cross-sectional study. Soc Sci Med 59:813–823
4. Schrire S (1986) Frequent attenders: a review. Fam Pract 3:272–275
5. Browne GB, Humphrey B, Pallister R, Browne J, Shetzer L (1982) Prevalence and characteristics of frequent attenders in a prepaid Canadian family practice. J Fam Pract 14:63–71
6. Clarke DM, Piterman L, Byrne CJ, Austin DW (2008) Somatic symptoms, hypochondriasis and psychological distress: a study of somatisation in Australian general practice. Med J Aust 189:560–564
7. Grabe HJ, Baumeister SE, John U, Freyberger HJ, Volzke H (2009) Association of mental distress with health care utilization and costs: a 5-year observation in a general population. Soc Psychiatry Psychiatr Epidemiol 44:835–844
8. Schilte AF, Portegijs PJM, Blankenstein AH, Knottnerus JA (2000) Somatisation in primary care: clinical judgement and standardised measurement compared. Soc Psychiatry Psychiatr Epidemiol 35:276–282
9. McCormick A, Fleming D, Charlton J (1995) Morbidity statistics from general practice: Fourth National Study 1991–1992. HMSO, London
10. Ferrin M, Gledhill J, Kramer T, Garralda ME (2009) Factors influencing primary care attendance in depressed adolescents. Soc Psychiatry Epidemiol 44:825–833

11. Little P, Somerville J, Williamson l, Warner G, Moore M, Wiles R, George S, Smiths A, Peveler R (2001) Family influences in a cross-sectional survey of higher child attendance. Br J Gen Pract 51:977–984

12. Saxena S, Majeed A, Jones M (1999) Socioeconomic differences in childhood consultation rates in general practice in England and Wales: prospective cohort study. Br Med J 318:642–646

13. Stojanovic-Spehar S, Blazekovic-Milakovic S, Bergman-Markovic B, Matijasevic I (2007) Preschool children as frequent attenders in primary health care in Croatia: retrospective study. Croat Med J 48:852–859

14. Bowman F, Garralda ME (1993) Psychiatric morbidity among children who are frequent attenders in general practice. Br J Gen Pract 43:6–9

15. Campo JV, Jansen-McWilliams L, Comer DM, Kelleher KJ (1999) Somatization in pediatric primary care: association with psychopathology, functional impairment, and use of services. J Am Acad Child Psychiatry 38:1093–1101

16. Department of Health (1992) General Household Survey. HMSO, London

17. Gledhill J, Garralda ME (2010) The short-term outcome of depressive disorder in adolescents attending primary care: a cohort study. Soc Psychiatry Psychiatr Epidemiol. doi:10.1007/s00127-010-0271-6 (in press)

18. Iliffe S, Williams G, Fernandez V, Vila M, Kramer T, Gledhill J, Miller L (2009) Treading a fine line: is diagnosing depression in young people just medicalising moodiness? Br J Gen Pract 56:156–157

19. Kramer T, Garralda ME (1998) Psychiatric disorders in adolescents in primary care. Br J Psychiatry 173:508–513

20. Haller DM, Sanci LA, Sawyer SM, Patton GC (2009) The identification of young people's emotional distress: a study in primary care. Br J Gen Pract 59:61–70

21. Yates P, Kramer T, Garralda E (2004) Depressive symptoms amongst adolescent primary care attenders. Soc Psychiatry Psychiatr Epidemiol 39:588–594

22. Angold A, Costello J, Farmer E, Burns B, Erkanli A (1999) Impaired but undiagnosed. J Am Acad Child Psychiatry 38:129–137

23. Iliffe S, Williams G, Fernandez V, Vila M, Kramer T, Gledhill J, Miller L (2008) General practitioners' understanding of depression in young people: qualitative study. Primary Health Care Res Develop 9:269–279

24. Vila M, Kramer T, Hickey N, Dattani M, Jefferis H, Singh M, Garralda ME (2009) Assessment of somatic symptoms in British secondary school children using the Children's Somatization Inventory (CSI). J Pediatr Psychol 34(9):989–998

25. Garralda ME, Bowman FM, Mandalia S (1999) Children with psychiatric disorders who are frequent attenders to primary care. Eur Child Adolesc Psychiatry 8:34–44

26. Office of National Statistics (2000) Standard Occupational Classification volume 1. The Stationery Office, London

27. Read JD (1990) Royal college of general practitioners members reference book. RCGP, London

28. Walker LS, Greene JW (1989) Children with recurrent abdominal pain and their parents: more somatic complaints, anxiety, and depression than other patient families? J Pediatr Psychol 14:231–243

29. Garber J, Walker LS, Zeman J (1991) Somatization symptoms in a community sample of children and adolescents: further validation of the Children's Somatization Inventory. Psychol Assess 3:588–595

30. Angold A, Costello EJ, Pickles A, Winder F (1987) The development of a questionnaire for use in epidemiological studies of depression in children and adolescents. Medical Research Council Child Psychiatry Unit, London

31. Wood A, Kroll L, Moore A, Harrington R (1995) Properties of The Moods and Feelings Questionnaire in adolescent psychiatric outpatients: a research note. J Child Psychol Psychiatry 36:327–334

32. Kent L, Vostanis P, Feehan C (1997) Detection of major and minor depression in children and adolescents: evaluation of The Mood and Feelings Questionnaire. J Child Psychol Psychiatry 38:565–573

33. Sund AM, Larsson B, Wichstrom L (2001) Depressive symptoms among young Norwegian adolescents as measured by The Mood and Feelings Questionnaire (MFQ). Eur Child Adolesc Psychiatry 10:222–229

34. Goodman R (1997) The Strengths and Difficulties Questionnaire: a research note. J Child Psychol Psychiatry 38:581–586

35. Goodman R, Meltzer H, Bailey V (1998) The Strengths and Difficulties Questionnaire: a pilot study on the validity of the self-report version. Eur Child Adolesc Psychiatry 7:125–130

36. (2008) Scoring the self-report Strengths and Difficulties Questionnaire. http://www.sdqinfo.com/ScoreSheets/e2.pdf.

37. Meltzer H, Gatward R, Goodman R, Ford F (2000) Mental health of children and adolescents in Great Britain. The Stationery Office, London

38. Kataoka SH, Zhang L, Wells KB (2002) Unmet need for mental health care among US children: variation by ethnicity and insurance status. Am J Psychiatry 159:1548–1555

39. Offord DR, Boyle M, Szatmari P, Rae-Grant NI, Links PSCDT (1987) Ontario Child Health study II. Six month prevalence of disorder and rates of service utilization. Arch Gen Psychiatry 44:832–836

40. Gill D, Dawes M, Sharpe M, Mayou R (1998) GP frequent consulters: their prevalence, natural history, and contribution to rising workload. Br J Gen Pract 48:1856–1857

41. Cadman D, Boyle M, Szatmari P, Offord DR (1987) Chronic Illness, disability, and mental and social well-being: findings of the Ontario child health study. Pediatrics 79:813

42. Garralda ME, Bailey D (1988) Child and family factors associated with referral to child psychiatrists. Br J Psychiatry 153:81–89

43. Kramer T, Iliffe S, Murray E, Waterman S (1997) Which adolescents attend the GP? Br J Gen Pract 327

44. Petersson C, Hakansson A (1996) High-consulting children indicate illness-prone families. A study of 38 rural and 38 urban Swedish children's health and use of medical care. Scand J Prim Health Care 14:71–78

45. Scaife B, Gill P, Heywood P, Neal R (2000) Socio-economic characteristics of adult frequent attenders in general practice: secondary analysis of data. Fam Pract 17:298–304
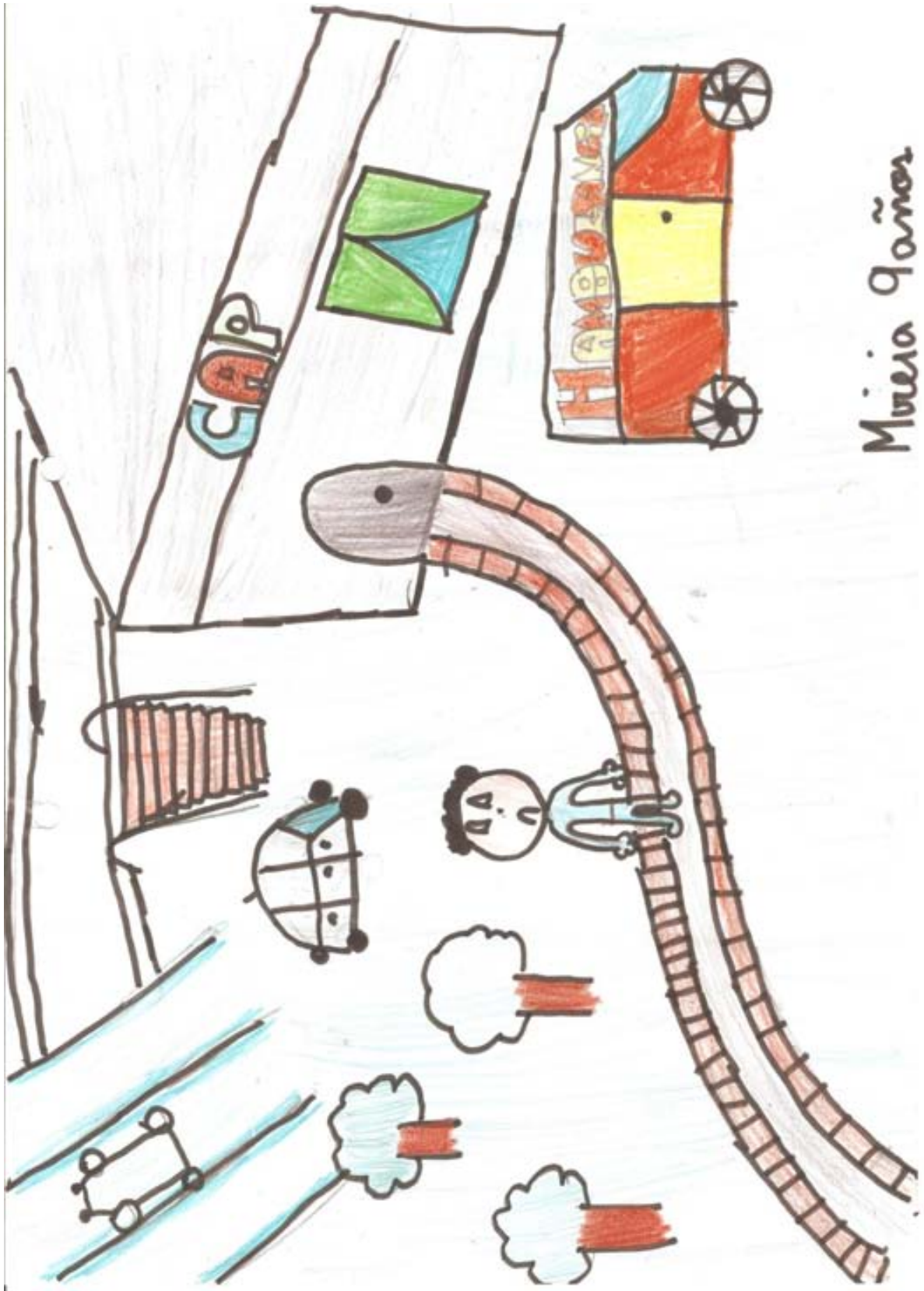
Mireia 9 años

DISCUSSION

The key contributions of this thesis are summarised below

- Normative data for the CSI-35 (Children's Somatization Inventory) was obtained on a whole UK school population.

- The CSI-35 showed good psychometric properties in this British community sample.

- Multi-symptomatic complaints can be an expression of somatisation and the CSI-35, in combination with measures of impairment and stress sensitivity, can be a good measure to use when studying somatisation in young people in the UK.

- Abdominal pain is a common complaint in British school students and is associated with considerable impairment for a subgroup of children leading to medical consultations.

- Impairment could be an important trigger for further exploration of associated psychosocial problems in young people with abdominal pain.

- A considerable proportion of British adolescents (30%), contrary to general perception, are frequent attenders at primary care services (four or more times in the previous year).

- Over and above physical health problems, psychosocial factors including somatisation are relevant to the frequency of primary care consultations in British young people.

- This study highlights adolescent frequent attenders as a target group for further exploration of emotional problems in primary care; the provision of effective psychological interventions will also be essential for this group.

Chapter 8. *Summary of results and comparisons with the existing literature*

In **paper number one** normative data for the CSI-35 (Children's Somatization Inventory) among British adolescents in the general population was gathered, and the psychometric properties of this instrument were also studied.

The distribution of the *CSI total scores* showed a large positive skew; the median *CSI total score* for the 35-items was 12 (5, 23), while the median *CSI somatization score* was 0 (0, 1). Overall, the most frequently endorsed symptoms were headaches (66%), low in energy (49%), sore muscles (49%), faintness (45%), nausea (44%) and stomach pain (43%). Girls scored significantly higher than boys on the CSI total score, and respondents aged 13-14 years had significantly lower scores than 11-12 year olds. The CSI-35 total and somatization scores obtained in the current study were generally comparable to those described in American and Ukrainian populations [36, 39]. However, the total number of symptoms endorsed was higher than in a Dutch population sample, suggesting better physical well-being or less somatisation in the Netherlands [53]. The most common CSI symptoms were also similar to those reported in studies from other countries, as were the gender effects with higher scores in girls [36, 39, 47, 53]. Findings related to age have been less clear-cut across community studies [26, 27, 35, 39]; and the results in our sample could be explained by higher stress levels in the younger children who needed to adapt to a new school.

The psychometric properties of the CSI 35-item in this community sample were good. The internal consistency revealed an alpha coefficient of .93, and exploratory factor analysis produced a three-factor solution (pain/weakness, gastrointestinal and pseudo-neurological) comprising 17-items and accounting for 41% of the variance. The results indicated good construct and discriminant validity through good significant positive correlations with self-reported depressive symptoms (MFQ) ($r=.67$), moderately significant positive correlations with the emotional sub-scale of the SDQ ($r=.50$), and weak correlations with the conduct ($r=.25$) and hyperactivity ($r=.26$) sub-scales of the SDQ. The overall good validity and high internal consistency of the CSI-35 was consistent with previous studies [36, 39, 53], and the results of the exploratory factor analysis revealed a three-factor model similar to the structure reported within a comparable Dutch sample [53].

In addition, a quarter of respondents recognised a link between somatic symptoms and stress, whilst a further third were uncertain. These two groups combined had higher CSI, MFQ and SDQ total and emotional scores than young people denying psychosomatic links of this kind, which is in line with the notion of increased stress reactivity and emotional symptoms in children with functional somatic symptoms [56].

Finally, subjective impairment on domains such as enjoyment and concentration was reported by one in ten respondents, while one in twenty reported impairment in domains such as seeing friends and going to school. This order of impairing effects of somatic symptoms is also consistent with a previous study [133]. Impairment levels correlated significantly with the number of physical and emotional symptoms, and with perceptions that symptoms got worse with stress. This indicates that for a substantial minority of young people somatic symptoms are impairing and, therefore, clinically relevant.

In **paper number two** we studied the prevalence of abdominal pain in the same sample of British secondary school children, and its associations with impairment and health service use. Fifty three per cent of the students reported abdominal pain in the previous 3 months (15.5% > once a week). Abdominal pain was significantly linked to having past medical illness, to high levels of physical symptoms on the CSI and with students reporting these symptoms to be stress/mood sensitive. They were also linked to depressive and other emotional and behavioral problems, and with medical help seeking. The prevalence of abdominal pain in the current study, as well as associated physical symptoms and psychological problems, were comparable to previous studies [30, 47, 118, 123, 140, 199].

Most students in our sample reported some degree of impairment as a result of the abdominal pain. However, impairment was rated as "severe" by between 6-15% with regards to their ability to enjoy themselves, experience interference with other activities, see friends and go to school. This rate is in between those found in community samples in Germany and the USA and confirms that for a substantial minority symptoms are not trivial and are indeed troublesome [123, 140].

Impairment was found to be significantly correlated with pain frequency, number of physical symptoms endorsed on the CSI, symptom stress/mood sensitivity, and depressive and emotional symptoms. Previous studies have similarly found impairment related to paediatric pain generally (not just that due to abdominal pain) to be linked not only to pain

frequency and intensity, but also to the concurrent presence of psychological and other physical symptoms [27, 124, 126]. Considerable impairment related to pain was independently predicted by abdominal pain frequency, higher CSI total score and increased symptom stress/mood sensitivity, accounting for 17% of the variance. Depressive and emotional symptoms did not emerge as independent predictors of impairment which could indicate that the contribution of emotional symptoms to impairment may be mediated by somatic stress/mood sensitivity, possibly indicating enhanced perceptions or amplification of the physical symptom experience.

Eighteen per cent of the students had seen a doctor because of the pain, confirming abdominal pain to be a consistent reason to consult the doctor [27, 143]. Consultation rates were intermediary between those reported in other countries (8% to 51%) with variations likely to be related to differences in participants and methodologies [123, 140]. In line with previous studies, abdominal related impairment was an independent predictor of medical consultations, however accounting for only 16% of the variance [65, 140, 142].

In **paper number three** 30% of young people reported above average levels of primary health care attendance (≥4 appointments to GP in the previous year), and 55% reported 1-3 visits in the previous year. Moreover, almost a quarter of the sample had seen a hospital doctor in the past year and 12% reported having ever seen a mental health professional. The frequency of health service use in our sample was comparable to national statistics and in line with previous epidemiological reports [35, 185, 200, 201].

Frequent attenders in our study were significantly younger and had more days missed of school. They were also significantly more likely to report past and current physical problems, to have higher levels of conduct difficulties and contact with medical and mental health professionals. As with other age groups and compared to previous studies [133, 134, 179, 187, 202-206], the frequently attending group had lower socio-economic status and an excess of depressive and emotional symptoms, as well as more physical symptoms that were impairing and made worse by stress, which suggests an increased tendency to somatise distress as a potentially mediator of the effects of emotional symptoms on the frequency of attendance. The predictors of frequent attendance (i.e., seeing a hospital doctor, reporting a current illness, number of days off school, a history of mental health consultations and younger age) accounted for only 18% of the variance, suggesting that

other factors, such as parental attitudes towards symptoms and help seeking, must play an important part.

Chapter 9. *Methodological limitations*

A number of methodological limitations must be taken into consideration when interpreting the findings presented in these papers.

This is a cross sectional study; therefore, no causal inferences can be drawn from the reported associations.

An intrinsic limitation of the CSI is that it does not provide information on possible medical explanations for symptoms, and in this study we did not establish whether the symptoms reported were an expression of organic problems. However, data from other studies indicates that in only a small percentage of children would there have been a medical explanation for the pain [27, 41].

The study relied on self-report data and although young people are regarded as better informants than parents when reporting internalising experiences [172, 207], including somatic symptoms and functional disability, it is acknowledged that relying on younger children to provide data about the job of the main breadwinner, number of days missed of school or health service use might be problematic. Corroborative evidence from parents, teachers and medical records would have strengthened all these results.

In this survey the mean MFQ depressive symptom scores were higher than expected compared to other community samples [134, 191, 208], which might have led to an over-estimation of somatic symptoms.

The study was carried out in a single school with predominantly White British students from professional families; thus, our results may not be generalisable to more culturally and socio-economically diverse populations.

Finally, although this work identifies a number of independent predictors of impairment and health care consultation among young people with abdominal pain, as well as frequency of GP attendance, these only explained a small proportion of the variance indicating that other factors must also play a part.

Chapter 10. *Conclusions*

In summary, the CSI-35 in a sample of British secondary school young people, the largest non-clinical sample used so far, identified rates of somatic symptoms generally comparable to those in other countries and confirmed adequate psychometric properties for this instrument in such a population. When complemented by measures of impairment and perceived association with stress, the CSI is a good instrument to use in studies of somatisation in non-clinical samples of young people in the UK.

Additionally, the work in this thesis also fills a gap in the literature with regards to the knowledge about the frequency of and associations with abdominal pain in a British non-clinical population. The detailed analysis of impairment and medical help seeking is novel and highly relevant for understanding the clinical significance and implications of these symptoms. This study highlights that frequent abdominal pains are common in British secondary school children; that about one in ten experience frequent abdominal pains and that, in addition to the links with emotional symptoms, a considerable proportion experience substantial impairment leading to medical consultation. Impairment could be an important trigger for further exploration of associated psychosocial problems in young people with abdominal pain.

Finally, this study provides details of young people who frequently attend primary care, which is a research area that has so far been neglected in this population. Our results indicate that a considerable proportion of British adolescents visit the general practitioner four or more times a year, and that in addition to physical health problems and specialist contacts, psychosocial factors, including mood changes and somatisation, are relevant to understanding their frequency of attendance.

Chapter 11. *Clinical implications*

From a clinical perspective the results of this study suggest that the **CSI-35 (Children's Somatization Inventory)**, in combination with other instruments to evaluate stress sensitivity and impairment, could be a good screening tool to assess somatisation in both clinical and non-clinical samples of British young people. Furthermore, used in combination with instruments that assess emotional symptoms, the CSI could be used to identify those young people presenting with physical symptoms but suffering from psychiatric problems. The CSI could be easily used in schools with children who frequently visit school nurses or who are absent from school on a regular basis because of physical complaints. It could also be used in GP practices with children who often visit the doctor with unexplained physical symptoms. Appropriate medical evaluation would then be necessary to rule out an organic cause. School nurses are in a key position to screen for somatic and mental health symptoms in children, as well as to identify stressors and refer children to appropriate services. Primary care doctors and nurses also have a crucial role in this regards.

Moreover, when applied in clinical settings the CSI can be used to track symptoms over time and to monitor treatment response. As more studies are needed in the paediatric population to evaluate treatment effectiveness for somatoform syndromes/disorders, the CSI could be a useful tool to record changes in frequency and intensity of symptoms during the intervention. Additionally, and due to the high associations between FSS and emotional symptoms, the CSI can be used in mental health clinics to determine which patients are prone to somatisation. Although up until recently the CSI has mainly been used in the research field, the fact that it is a self-administered questionnaire and very simple to complete makes it the perfect instrument to use in clinical practice.

Furthermore, the CSI can be a useful measure to compare somatisation rates between paediatric populations in different countries, as different methodologies, including the use of different and/or inappropriate measures, have hampered such comparisons so far. If this questionnaire became the most widely used tool to study somatisation in youth in various populations (in combination with instruments to evaluate stress sensitivity and impairment), it would allow researchers and clinicians to have a much better and clearer

understanding of the phenomenon of paediatric somatisation worldwide. Moreover, it would subsequently assist with the understanding of the differences in prevalence rates between different countries, cultures and ethnic groups.

Findings from our second paper emphasise the importance of identifying those children with functional abdominal pain that are in need of therapeutic intervention. Assessing both impairment and help-seeking behaviour related to the pain are very good indicators to identify the group of young people that require such input. GPs, school nurses, paediatricians and mental health workers have an important role in recognising such individuals. Moreover, the exploration of other psychosocial factors, such as emotional difficulties and pain stress sensitivity, is also very important and needs to be incorporated into clinical assessments and subsequent treatment packages, because if not identified properly they can interfere with the success of the intervention.

Finally the results from our third paper highlight the contribution of psychosocial factors to young people's primary care frequent attendance. Although this is an area that has been widely investigated in the adult population, it has been relatively neglected in this group of patients. From a clinical perspective our results stress the importance of general practitioners identifying emotional difficulties and somatisation in young people, and acknowledging its contribution to frequent attendance, which will then need to be taken into consideration in the treatment recommendations. As it is known from previous studies that GPs recognise young people with severe psychiatric disorders but tend to fail at identifying less severely affected individuals, there are also implications for providing further training for GPs in recognising these conditions in this population.

Chapter 12. *Future research*

Further research using the CSI-35 in more heterogeneous and diverse samples, to explore the determinants of impairment and health consultations among young people with abdominal pain, as well as the contribution of somatisation and other psychosocial factors to the frequency of young people primary care attendance, are all needed to corroborate the findings of our study.

Diagnostic criteria and use of standardised measures

The classification of somatoform disorders according to DSM-IV-TR and ICD-10 diagnostic criteria has been found to be insufficiently useful for therapeutic and scientific purposes [10-13]. Hence, the classification and definition of these disorders have recently been revised for the DSM-V diagnostic criteria, and are currently being revised for the ICD-11 manual in order to improve its validity [9]. Several authors have claimed that it is important to reconsider the entire functional somatic symptoms spectrum in the paediatric population in future ICD and DSM manuals and include impairment criteria and a developmental perspective when describing the disorders, as they are key factors to identifying children in need of clinical intervention [19, 20, 56]. More epidemiological studies in community and clinical settings conducted with more socioeconomically and ethnically diverse groups are needed to provide the empirical base for paediatric somatisation and modified diagnostic criteria. In such research the consistent use of standardised assessment instruments is essential if the results are to be meaningful across studies [9, 32]. The Children's Somatization Inventory, in combination with measures to assess impairment and stress sensitivity, could be such an instrument.

The CSI-35 has been shown to be a reliable and psychometrically sound instrument in the UK [133, 209]. Because the current study obtained normative data from a predominantly White sample of British school children with parents from professional occupations, our results may not be generalisable and therefore it will be necessary to validate the findings in more representative populations. Moreover, as recent studies have used the CSI-24, which has proven to be a refinement of the original CSI-35, further work with both British clinical and non-clinical samples are needed with this new and preferable

CSI version. The creators of the CSI-24 have found that somatisation in children has a strong general factor representing a continuum of symptom reporting, which is consistent with the view of somatisation as a single dimension of somatic concern [155]. However, other studies have not confirmed these findings [157]. Further work is required to clarify the importance of focusing on a strong general CSI factor representing a continuum of symptom reporting rather than separate symptom clusters, and the use of a shortened CSI in both general and clinical populations.

Cross cultural differences

More epidemiological studies are needed comparing frequency rates and severity of somatic symptoms across populations, and examining the possible explanations for differences in prevalence rates across countries. For example, school stressors are often connected to the somatisation of distress in children and young people which could reflect differences in academic demand and pressure across different national curricula and educational systems, as well as differences in school based interventions to recognise and minimise such stress [210, 211]. Moreover, differences in cultural styles of expressing distress, which are influenced by cultural beliefs and practices, pathways to care and differences in healthcare systems, may explain differences in somatisation frequency in different societies. Furthermore, stigma associated with the expression of psychological problems may also increase the tendency towards somatisation in certain countries [212-214]. Most recent research has studied the potential role of the immune activation system and its positive correlations with adverse socio-environmental factors in the explanation of somatisation in children, which could explain why there are suggestions of higher prevalence rates in low and middle income countries [215-217].

Early identification and prevention

Early identification of children either with, or at risk of suffering from functional somatic symptoms is important. Early predictors of impairing FSS in childhood highlight infancy regulatory problems as an early marker of disturbed sensory reactivity, which, together with maternal emotional difficulties, point to possible early risk mechanisms that could be associated with FSS later in life [56, 71, 85]. This has implications for both prevention and treatment in early childhood. Parents of young children with regulatory

problems could learn how to help them regulate their behavioural and physiological state, which could potentially reduce the risk of developing impairing FSS [85]. Therefore, it would also be important to incorporate observational measures of parenting styles and measures of parental psychopathology in future research [56].

Because of the familial aggregation of somatic symptoms and the links between childhood somatisation and school non-attendance, efforts at prevention might also be relevant for children of parents with somatoform disorders, as well as those with a history of school refusal. This could be done via primary care practitioners identifying parents who regularly attend with somatic complaints and providing guidance regarding strategies for coping with their own and their children's FSS, or through teachers and school-based medical professionals identifying children who miss a lot of school because of FSS and supporting them in developing good coping strategies [8, 106]. It is also important to do more research on FSS in younger children and to do early screening and interventions in pre-school children as somatic symptoms have already been documented in this population [32].

Moreover, there is also the need for preventative interventions to tackle personality vulnerabilities that are likely to make children more prone to stress reactions and somatisation, and to address excessive academic and behavioural expectations throughout the school years which might trigger FSS in at-risk children [8, 95, 106]. More longitudinal research is needed to determine whether early intervention can serve as a protective factor [31, 218].

Future research on recurrent pain prevention should also target adolescent anxiety, depression and self-esteem as these are high risk factors for recurrent pain presentations [52]. Moreover, further research on the effects of puberty on somatisation, especially in females, is needed. As research has consistently shown an increase of FSS in females, they constitute a vulnerable subgroup to study in future prevention and treatment research [19, 52, 56].

Outcomes

In order to fully understand the aetiology, course and outcome of FSS, longitudinal study designs must replace cross-sectional designs that use large samples but with varied age ranges [9].

Epidemiological and longitudinal studies investigating continuities between paediatric and adult somatisation should be prioritised, with efforts directed towards identifying potential risk factors and predictors for the development of disabling somatisation and psychopathology over time [32]. Currently it remains unclear which symptoms or clusters of symptoms identify 'at risk young' patients, or whether other factors might have predictive value. The study of the determinants of impairment and health care consultations is also important. Research suggests that personality difficulties, an insidious onset of symptoms, poly-symptomatic presentations, symptom chronicity, comorbid psychiatric or medical disorders, and poor capacity to gain insight tend to predict poorer outcomes. More research on family variables that predict long-term outcomes, such as parental failure to acknowledge the possibility that psychological factors could be contributing to the maintenance of symptoms, severe internal conflict and serious family dysfunction, is also needed [31, 52, 84, 107, 152, 153, 219, 220]. It is equally important to further understand positive factors for recovery, such as good engagement with psychiatric services, clear physical precipitants of the illness and better maternal health and socio-economic status [152] .

Treatment

More epidemiological studies are needed to understand the extent to which FSS are normative at certain developmental periods as this would help identify when FSS are 'clinically significant' and therefore warrant clinical treatment [56].

Empirical data on treatment efficacy are scant for somatising children and adolescents, and in particular for symptoms other than headaches and stomach-aches [57, 89, 95, 106, 221-223]. More randomised controlled trials are needed for the treatment of somatoform disorders in this population [224]. Data on various dimensions of symptoms, particularly their frequency, duration and intensity, should be measured and reported, as treatments may affect them differently [57]. Moreover, it would also be important to investigate the predictors of response to treatment as little is known at present [28]. The effectiveness of treatments designed for either self-administration or administration by non-professionals has important cost implications for service delivery and needs further evaluation. The age at which to involve parents in treatment is also an important issue that needs further evaluation [57].

Moreover, as there is a link between parental anxiety and the continuity of somatic symptoms in children, addressing parental psychopathology might also be important when treating this group of patients, which is also an area of research that needs developing [64, 84, 143, 145].
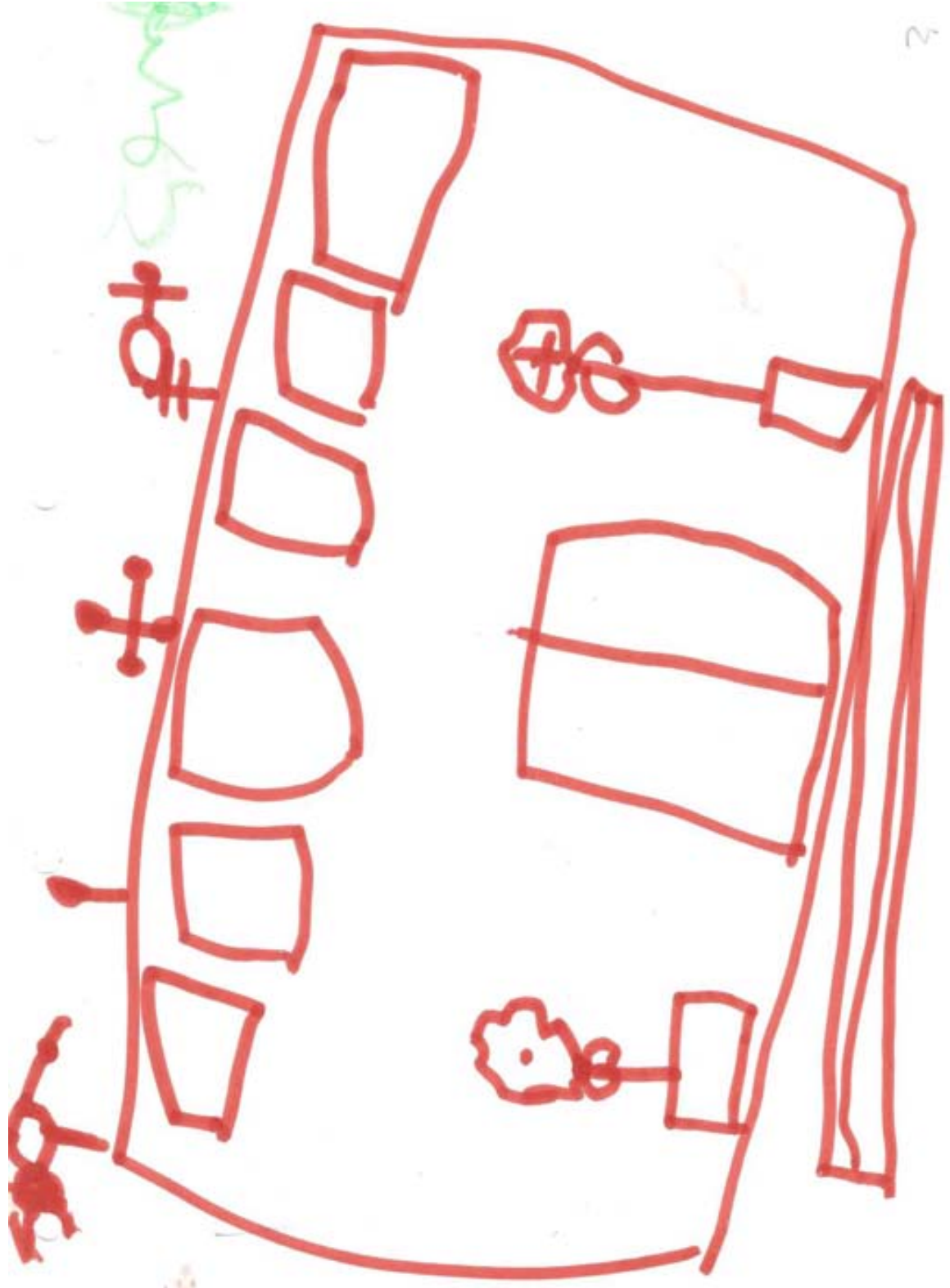
RESUM EN CATALÀ

Aquesta tesi està basada en tres articles que he publicat amb dades recollides l'any 2004 d'una mostra d'estudiants de Secundària i Batxillerat al Regne Unit (11-17 anys). La informació que es va obtenir amb els qüestionaris que aquest grup de joves estudiants van emplenar, ha permès ampliar el coneixement del **fenomen de somatització** en aquesta població.

Les **somatitzacions** són dolors i altres malestars físics que tenen un origen psicològic i no orgànic. Els símptomes psicosomàtics són comuns en la població pediàtrica. Trobem mals de panxa, vòmits, mals de cap, punxades al pit o dolors musculars entre d'altres. Poden ser lleus i transitoris o bé configurar trastorns psicosomàtics quan suggereixen malalties mèdiques, limiten funcionalment el pacient i comporten visites mèdiques. Aquests trastorns estan fonamentats en condicions psiquiàtriques que s'anomenen **Trastorns Somatomorfs**. Els nens poden tenir somatitzacions puntuals benignes, perquè les seves vies d'expressió emocional estan encara en desenvolupament i somatitzen les emocions. Si les somatitzacions són recurrents i els afecten en el seu funcionament global, poden tenir un valor clínic significatiu. Descartada la causa mèdica, i atenent a una freqüència o intensitat elevades, o a la possible correlació amb circumstàncies ambientals estressants, problemes emocionals o estils d'afrontament negatius i ansiosos, caldrà fer-ne un diagnòstic i tractament especialitzats. Si no és així, aquests símptomes poden persistir fins a l'adolescència i l'edat adulta i comportar conseqüències importants tant a nivell personal i laboral com de salut pública. Les somatitzacions són més freqüents en noies que en nois, i acostumen a ser poli-simptomàtiques a mesura que el nen es fa gran. A més, tendeixen a aparèixer en nens ansiosos, insegurs, sensibles i amb temperaments difícils i sovint s'associen amb símptomes ansiosos i depressius. És també freqüent el trobar familiars amb queixes somàtiques, malalties físiques o problemes de salut mental, en concret depressió i ansietat.

La motivació per escriure aquesta tesi va sorgir de l'oportunitat de poder estudiar els símptomes psicosomàtics i les seves associacions en una mostra d'estudiants Britànics, així

com els seu efectes en el funcionament global d'aquests joves i en la decisió de consultar el metge. L'objectiu del primer article era avaluar els símptomes somàtics utilitzant el **CSI-35 (Children's Somatization Inventory)** i analitzar les propietats psicomètriques d'aquest qüestionari. En el segon article volíem examinar la prevalença dels mals de panxa en aquesta població i estudiar les associacions amb altres variables, a més dels factors predictius d'impacte dels mals de panxa en el funcionament global d'aquests joves i en les consultes mèdiques. Finalment, l'objectiu del tercer article el d'analitzar la contribució de factors psicosocials, incloent somatització i problemes emocionals, en la freqüència de les visites a Assistència Primària en aquesta mostra.

Els nens i adolescents que presenten símptomes psicosomàtics sovint es queixen de patir-ne més d'un tipus alhora, per exemple mals de panxa i mals de cap. Fins ara, en els estudis que han avaluat el fenomen de somatització en la població infanto-juvenil, no s'han utilitzat instruments que avaluïn presentacions poli-simptomàtiques d'una forma sistemàtica i consistent, de manera que és difícil tenir una idea clara de com els símptomes s'agrupen i comparar els resultats entre els diferents estudis. El **CSI-35 (Children's Somatization Inventory)** és un qüestionari que engloba preguntes sobre 35 queixes físiques que el nen ha presentat en les dues setmanes prèvies i avalua tant la freqüència com la intensitat de les mateixes. Aquest instrument permet estudiar presentacions poli-simptomàtiques en nens a partir dels 7 anys i ha demostrat tenir bones propietats psicomètriques en estudis amb mostres clíniques i comunitàries de joves de diferents països. És per això, i pel fet que és un instrument fàcil d'entendre i ràpid d'administrar, que el vam escollir per el nostre estudi. Fins ara en el Regne Unit el CSI-35 sols s'ha utilitzat en mostres clíniques i ha identificat alts nivells de símptomes en joves que consulten al metge de primària. En un estudi fet per *Kramer I Garralda* (1998) els símptomes avaluats amb el CSI-35 en una mostra de joves que visitaven el metge de primària, eren inferiors en nombre als identificats en una mostra comunitària d'estudiants Americans (*Garber et at*., 1991). Aquests resultats van motivar la necessitat d'obtenir dades normatives del CSI-35 en una mostra no clínica de joves Britànics i d'estudiar les propietats psicomètriques d'aquest qüestionari en aquest group. El CSI-35 no avalua l'impacte dels símptomes en el funcionament global del nen o adolescent, o les associacions amb l'estrès o amb les consultes mèdiques, aspectes que són crucials en l'estudi del fenomen de somatització. És

per això que en aquest projecte vam afegir preguntes per avaluar totes aquestes facetes, i vam utilitzar una escala d'impacte en el funcionament global adaptada d'un estudi previ de *Kramer I Garralda* (1998) que pregunta sobre l'afectació dels símptomes somàtics en 4 àrees: concentració, estar amb els amics, anar a l'escola i disfrutar d'activitiats en general. Aquesta és la primera vegada que s'han estudiat tots aquests aspectes en una població comunitària d'estudiants Britànics en el context de símptomes somàtics identificats amb el CSI.

A més a més d'avaluar els símptomes psicosomàtics utilitzant el CSI-35, i ja que els mals de panxa són les queixes més freqüents en la població infanto-juvenil, vam decidir estudiar aquests símptomes amb més profunditat. Fins ara hi ha hagut pocs estudis al Regne Unit que hagin estudiat prevalences de mals de panxa en mostres comunitàries d'adolescents anglesos, i les seves associacions amb l'estrès, problemes psicològics, l'impacte en el funcionament global i en les consultes mèdiques.

D'altra banda, estudis en la població adulta indiquen que els pacients que consulten el metge de capçalera amb alta freqüència constitueixen la majoria de les visites a Assistència Primària. Resultats en aquesta àrea d'investigació han demostrat que aquests pacients tenen més desavantatges socials, més problemes mèdics i de salut mental, consulten freqüentment altres metges i pateixen alts nivells de queixes psicosomàtiques. De totes maneres, l'estudi d'aquesta àrea en la població adolescent és escàs i no es coneixen els factors que estan associats amb l'alta freqüència de consultes mèdiques en els joves. És per això que en aquest projecte també ens vam concentrar en investigar la contribució d'una sèrie de variables, incloent factors psicosocials, a la freqüència de visites mèdiques en la nostra mostra, posant especial èmfasi en el fenomen de somatització.

Aquesta tesi està basada en un estudi transversal d'una mostra de 1251 joves d'estudiants de Secundària d'una escola del sud-est de Londres. 1173 (94%) adolescents van emplenar els qüestionaris on se'ls hi preguntaven dades demogràfiques, a més de dades sobre la presència i freqüència de mals de panxa, problemes mèdics i contactes amb el metge de capçalera i de salut mental. A més, els estudiants van omplir el **CSI-35**, el **MFQ (Moods and Feelings Questionnaire)** i el **SDQ (Strengths and Difficulties Questionnaire)**. El MFQ és un qüestionari de 34 preguntes per nens i joves en edats compreses entre els 8 i els 18 anys, que avalua la presència de símptomes depressius en les dues setmanes anteriors ,

i el SDQ és un instrument de cribatge de problemes emocionals i de conducta presents en els darrers 6 mesos per a joves d'edats entre els 11 i els 17 anys. Ambdos qüestionaris han estat validats en mostres clíniques i no clíniques en varis països, i han demostrat tenir bones propietats psicomètriques.

El permís per fer l'estudi es va aconseguir de l'escola i del consell d'ètica del servei de salut local, i als pares se'ls va informar de l'estudi per carta. Els joves van emplenar els qüestionaris a l'escola durant hores de classe; els estudiants d'edats d'entre 11-13 anys van necessitar 1 hora per emplenar els qüestionaris, i els estudiants més grans sols van necessitar 35 minuts en total. La majoria dels joves tenien entre 11 i 16 anys i la mitja d'edat era de 13 anys (IQ 12-15). El 51% eren noies, la majoria d'ells provenien de famílies professionals (54%) i el 91% eren de raça blanca i Britànics.

Els resultats del nostre estudi demostren que el **CSI-35 (Children's Somatization Inventory)**, juntament amb instruments que avaluen l'impacte dels símptomes somàtics en el funcionament global del nen o l'adolescent i la relació dels mateixos amb l'estrès, és un bon instrument per estudiar el fenomen de somatització en la nostra població d'estudiants Britànics. A més, hem identificant prevalences de símptomes somàtics comparables a mostres de joves d'altres països i hem confirmat les bones propietats psicomètriques d'aquest instrument en la nostra població. D'altra banda, en el nostre estudi els mals de panxa són molt comuns en la població estudiantil Britànica (el 53% es va queixar d'haver patit mal de panxa d'almenys una hora de duració en els últims 3 mesos) i aproximadament el 15% dels joves els experimenta amb una alta freqüència (almenys setmanalment). A més el 36% es queixa de que els mals de panxa els limita bastant en el seu funcionament global i en el 18% els va portar a consultar el metge. Els mals de panxa estaven positivament correlacionats amb problemes emocionals i de conducta en l'escala SDQ i amb símptomes depressius en el MFQ. En el nostre estudi l'impacte dels mals de panxa en el funcionament global de l'estudiant va destacar com la única variable predictiva de les visites mèdiques, explicant sols el 16% de la variància. I ja per finalitzar, els resultats d'aquest estudi també ens indiquen que una considerable proporció de joves Britànics (30%) visita el metge de capçalera 4 ó mes vegades a l'any, i que a més dels problemes mèdics i l'associació amb visites a altres metge, els problemes emocionals i les queixes psicosomàtiques són rellevants alhora d'entendre l'alta freqüència de les consultes.

Des d'un punt de vista clínic, els resultats d'aquesta tesi indiquen que el **CSI-35** és un bon instrument per l'estudi del fenomen de somatització en la població general de joves Britànics, i que podria ser un bon instrument de cribatge per utilitzar a les escoles, a les consultes del metge de capçalera o del pediatra, amb nens que sovint es queixen de 'mals', o que visiten freqüentment el metge o que no van a l'escola per queixes de dolor somàtic. En mostres clíniques, el CSI es podria utilitzar per avaluar l'eficàcia dels tractaments dels transtorns psicosomàtics ja que permetria comparar la freqüència i la intensitat dels símptomes al llarg de la intervenció terapèutica. El fet de ser un instrument ràpid d'administrar i fàcil d'entendre permet el seu bon ús en la pràctica clínica. A més, si el CSI s'utilitzés d'una forma sistemàtica en mostres infanto-juvenils de diferents països, ens permetria estudiar les diferències en les prevalences de símptomes somàtics entre països i en diferents cultures i els factors que expliquen aquestes discrepàncies.

Les troballes del segon article emfatitzen la importància d'identificar aquell subgrup de nens i adolescents amb mals de panxa que es beneficiaran d'una intervenció clínica i terapèutica. L'avaluació de l'impacte dels mals de panxa en el funcionament global del jove i en les consultes mèdiques, a més dels problemes psicològics associats, és crucial alhora d'identificar aquests pacients.

I ja per últim, els resultats del tercer article ens indiquen que en el Regne Unit és important que els metges de capçalera identifiquin els joves que els visiten freqüentment i que avaluïn la contribució de les queixes psicosomàtiques i dels problemes emocionals en les mateixes, ja que tots aquests factors s'hauran de tenir en compte alhora de fer les recomanacions terapèutiques pertinents.

En el futur i per confirmar les nostres troballes, serà necessari ampliar l'estudi del fenomen de somatització en poblacions més variades i heterogènies utilitzant el **CSI-35**, o la nova versió més refinada, el **CSI-24** (que consta de 24 queixes físiques en comptes de 35), i estudiar les diferències en les prevalences de símptomes somàtics entre diverses cultures i països i les possibles explicacions de les mateixes. A més, serà important continuar amb l'avaluació dels factors predictius d'impacte funcional i de consultes mèdiques en els joves amb dolor psicosomàtic, ampliant les variables d'estudi. També serà crucial el poder identificar aquells nens amb risc de desenvolupar símptomes somàtics i la conseqüent

implementació de mesures de prevenció, l'estudi del curs i pronòstic d'aquests símptomes amb estudis longitudinals, i ja per últim el disseny d'estudis aleatoris i controlats per estudiar l'eficàcia de diferents teràpies, tant psicològiques com farmacològiques, per tractar els trastorns psicosomàtics. Totes aquestes línies d'investigació són importants per ampliar el coneixement del fenomen de somatització en la població infanto-juvenil.

REFERENCES

1. Lipowski, Z., *Review of consultation psychiatry and psychosomatic medicine, III: theoretical issues* Psychosomatic Medicine, 1968, 30: p. 395-422.
2. Murphy, M., *Somatisation: embodying the problem.* British Medical Journal, 1989. 298: p. 1331-1332.
3. Kellner, R., *Psychosomatic syndromes and somatic symptoms*. 1991, Washington DC: American Psychiatric Press, Inc.
4. Lloyd, G., *Psychiatric syndromes with a somatic presentation.* Journal of Psychosomatic Research, 1986. 30(2): p. 113-120.
5. Garralda, M., *Somatisation in children.* Journal of Child Psychology and Psychiatry, 1996. 37(1): p. 13-33.
6. American Association of Psychiatry., *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed, text revision ed. 2000, Washington, DC APA.
7. *ICD-10: International statistical classification of diseases and related health problems* 10th ed, revised ed. 1992, Geneva: World Health OrganisatioN.
8. Garralda, M., *Functional somatic symptoms and somatoform disorders in children*, in *A clinician's handbook of child and adolescent psychiatry*, Christopher Gillberg, Editor. 2005, Cambridge University Press: Cambridge.
9. Fritz, G., S. Fritsch, and O. Hagino, *Somatoform disorders in children and adolescents: a review of the past 10 years.* Journal of the American Academy of Child and Adolescent Psychiatry, 1997. 36(10): p. 1329-1338.
10. Creed, F., *Can DSM-V facilitate productive research into the somatoform disorders?* Journal of Psychosomatic Research, 2006. 60: p. 331-334.
11. Janca, A., *Rethinking somatoform disorders.* Common Opinion in Psychiatry, 2005. 18: p. 65-71.
12. Kroenke, K., M. Sharpe, and R. Sykes, *Revising the classification of somatoform disorders: key questions and preliminary recommendations.* Psychosomatics, 2007. 48: p. 277-285.
13. Lowe, B., et al., *Validity of current somatoform disorder diagnoses: perspectives for classification in DSM-V and ICD-11.* Psychopathology, 2008. 41(1): p. 4-9.
14. *Diagnostic and Statistical Manual of Mental Disorders* 5th edition ed. 2013, Arlington, VA: American Psychiatric Publishing.
15. Fink, A., *One single diagnosis, bodily distress syndrome, succeeded to capture 10 diagnostic categories of functional somatic syndromes and somatoform disorders.* Journal of Psychosomatic Research, 2010. 68: p. 415-426.
16. Mayou, R., et al., *Somatoform disorders: time for a new approach in DSM-V.* American Journal of Psychiatry, 2005. 162(5): p. 847-855.
17. Voigt, K., et al., *Towards positive diagnostic criteria: a systematic review of somatoform disorder diagnoses and suggestions for future classification.* Journal of Psychosomatic Research, 2010. 68: p. 403-414.
18. Erkolahti, R., S. Sandberg, and H. Ebeling, *Somatization and somatoform disorders in children and adolescents.* Duodecim, 2011. 127(18): p. 1904-1910.
19. Eminson, M., *Somatising in children and adolescents. 1.Clinical presentations and aetiological factors.* Advances in Psychiatry Treatment, 2001. 7: p. 266-274.
20. Garber, J., *Classification of childhood psychopathology: a developmental perspective.* Child Development, 1984. 55(1): p. 30-48.
21. Angold, A., et al., *The development of a short questionnaire for use in epidemiological studies of depression in children and adolescents.* International Journal of Methods in Psychiatric Research, 1995. 5(4): p. 237-249.

22.   Costello, E., A. Angold, and G. Keeler, *Adolescent outcomes of childhood disorders: the consequences of severity and impairment.* Journal of the American Academy of Child and Adolescent Psychiatry, 1999. 38(2): p. 121-128.

23.   Fukuda, K., et al., *The Chronic Fatigue Syndrome: A comprehensive approach to its definition and study.* Annals of Internal Medicine, 1994. 121(12): p. 953-959.

24.   Sharpe, M., et al., *A report-chronic fatigue syndrome: guidelines for research.* Journal of the Royal Society of Medicine, 1991. 84(2): p. 118-121.

25.   *Chronic Fatigue Syndrome.* 1996, London: Royal College of Physicians, Psychiatrists and General Practitioners.

26.   Perquin, C., et al., *Pain in children and adolescents: a common experience.* Pain, 2000. 87: p. 51-58.

27.   Campo, J., et al., *Somatization in pediatric primary care: association with psychopathology, functional impairment, and use of services.* Journal of the American Academy of Child and Adolescent Psychiatry, 1999. 38(9): p. 1093-1101.

28.   Garralda, M., *Practitioner review: assessment and management of somatisation in childhood and adolescence: a practical perspective.* Journal of Child Psychology and Psychiatry, 1999. 40(8): p. 1159-1167.

29.   Garralda, M., *Psychiatric management of severe somatoform disorders in childhood and adolescence.* Acta Neuropsychiatrica, 2002. 14: p. 85-89.

30.   Eminson, M., *Medically unexplained symptoms in children and adolescents.* Clinical Psychology Review, 2007. 27: p. 855-871.

31.   Campo, J. and S. Fritsch, *Somatization in children and adolescents.* Journal of the American Academy of Child and Adolescent Psychiatry, 1994. 33(9): p. 1223-1235.

32.   King, S., et al., *The epidemiology of chronic pain in children and adolescents revisited: a systematic review.* Pain, 2011. 152: p. 2729-2738.

33.   Apley, J., *The child with abdominal pains.* 2nd edition ed. 1975, Oxford: Blackwell Science.

34.   Goodman, J. and P. McGrath, *The epidemiology of pain in children and adolescents: A review.* Pain, 1991. 46: p. 247-264.

35.   Offord, D., et al., *Ontario child health study. II. Six-month prevalence of disorder and rates of service utilization.* Archives of General Psychiatry, 1987. 44: p. 832-836.

36.   Litcher, L., et al., *Ukrainian application of the Children's Somatization Inventory: Psychometric properties and associations with internalizing symptoms.* Journal of Abnormal Child Psychology, 2001. 29(2): p. 165-175.

37.   Rask, C., *Functional somatic symptoms in 5-7 year old children: assessment, prevalence and co-occurrence.* Danish Medical Journal, 2012. 59(11).

38.   Aro, H., *Life stress and psychosomatic symptoms among 14–16 year old Finnish adolescents.* Psychological Medicine, 1987. 17: p. 191-201.

39.   Garber, J., L. Walker, and J. Zeman, *Somatization symptoms in a community sample of children and adolescents: Further validation of the Children's Somatization Inventory.* Psychological Assessment: A Journal of Consulting and Clinical Psychology, 1991. 3(4): p. 588-595.

40.   Larsson, B. and J. Carlsson, *A school-based, nurse-administered relaxation training for children with chronic tension-type headache.* Journal of Pediatric Psychology, 1996. 21: p. 603-614.

41.   Apley, J. and N. Naish, *Recurrent abdominal pains: a field survey of 1000 school children.* Archives of Disease in Childhood, 1958. 33(168): p. 165-170.

42.   Campo, J., et al., *Recurrent abdominal pain, anxiety, and depression in primary care.* Pediatrics, 2004. 113(4): p. 817-824.

43.   Faull, C. and A. Nicol, *Abdominal pain in six-year-olds: an epidemiological study in a new town.* Journal of Child Psychology and Psychiatry, 1986. 27: p. 251-260.

44.   Larsson, B., *Somatic complaints and their relationship to depressive symptoms in Swedish adolescents.* Journal of child psychology and psychiatry, 1991. 32(5): p. 821-832.

45.   Costello, E., et al., *The Great Smoky Mountains Study of youth. Functional impairment and serious emotional disturbance.* Archives of General Psychiatry, 1996. 53(12).

46.   Costello, E., et al., *The Great Smoky Mountains Study of Youth. Goals, design, mehods, and the prevalence of DSM-III-R disorders.* Archives of General Psychiatry, 1996. 53(12): p. 1129-1136.

47.   Eminson, M., et al., *Physical symptoms and illness attitudes in adolescents: an epidemiological study.* Journal of Child Psychology and Psychiatry, 1996. 37(5): p. 519-528.

48.   Zuckerman, B., J. Stevenson, and V. Bailey, *Stomachaches and headaches in a community sample of preschool children.* Pediatrics, 1987. 79: p. 677-682.

49.   Domenech-Llaberia, E., et al., *Parental reports of somatic symptoms in preschool children: prevalence and associations in a Spanish sample.* Journal of the American Academy of Child and Adolescent Psychiatry, 2004. 43: p. 598-604.

50.   Berntsson, L., L. Kohler, and J. Gustafsson, *Psychosomatic complaints in school children: a Nordic comparison.* Scandinavian Journal of Public Health, 2001. 29: p. 44-54.

51.   Petersen, S., C. Brulin, and E. Bergstrom, *Recurrent pain symptoms in young schoolchildren are often multiple.* Pain, 2006. 121(1-2): p. 145-150.

52.   Stanford, E., et al., *The frequency, trajectories and predictors of adolescent recurrent pain: a population-based approach.* Pain, 2008. 138: p. 11-21.

53.   Meesters, C., et al., *The Children's Somatization Inventory: further evidence for its reliability and validity in a pediatric and a community sample of Dutch children and adolescents.* Journal of Pediatric Psychology, 2003. 28(6): p. 413-422.

54.   Lieb, R., et al., *Somatoform syndromes and disorders in a representative population sample of adolescents and young adults: prevalence, comorbidity and impairments.* Acta Psychiatrica Scandinavica, 2000. 101: p. 194-208.

55.   Lieb, R., et al., *The natural course fo DSM-IV somatoform disorders and syndromes among adolescents and young adults: a prospective-longitudinal community study.* European Psychiatry, 2002. 17: p. 321-331.

56.   Beck, J., *A developmental perspective on functional somatic symptoms.* Journal of Pediatric Psychology, 2008. 33(5): p. 547-562.

57.   Husain.K., T. Browne, and T. Chalder, *A review of psychological models and interventions for medically unexplained somatic symptoms in children.* Child and Adolescent Mental Health, 2007. 12(1): p. 2-7.

58.   Minuchin, S., et al., *A conceptual model of psychosomatic illness in children. Family organization and family therapy.* Archives of General Psychiatry, 1975. 32(8): p. 1031-1038.

59.   Wallander, J. and J. Varni, *Adjustment in children with chronic physical disorders: Programmatic research on a disability-stress-coping model*, in *Stress and coping in child health*, L.S. In A. M. LaGreca, J. L. Wallander, & C. E. Walker, Editor. 1992, Guilford Press: New York. p. 279-298.

60.   Achenbach, T., et al., *Replication of empirically derived syndromes as a basis for taxonomy of child/adolescent psychopathology.* Journal of Abnormal Child Psychology 1989. 17(3): p. 299-323.

61.   Egger, H., et al., *Somatic complaints and psychopathology in children and adolescents: stomach aches, musculoskeletal pains, and headaches.* Journal of the American Academy of Child and Adolescent Psychiatry, 1999. 38(7): p. 852-860.

62.   Kristjánsdóttir, G., *Sociodemographic differences in the prevalence of self-reported stomach pain in school children.* European Journal of Paediatrics, 1996. 155(11): p. 981-983.

63.   Petersen, S., E. Bergstrom, and C. Brulin, *High prevalence of tiredness and pain in young school children.* Scandinavian Journal of Public Health, 2003. 31(5): p. 367-374.

64. Ramchandani, P., et al., *The epidemiology of recurrent abdominal pain from 2 to 6 years of age: results of a large, population-based study.* Pediatrics, 2005. 116: p. 46-50.

65. Boey, C. and K. Goh, *Recurrent abdominal pain and consulting behaviour among children in a rural community in Malaysia.* Digestive and Liver Disease, 2001. 33(2): p. 140-144.

66. Oh, M., et al., *Epidemiology of recurrent abdominal pain among Singaporean adolescents.* Annals of the Academy of Medicine, Singapore, 2004. 33: p. 10-11.

67. Bugdayci, R., et al., *Prevalence and factors affecting headache in Turkish schoolchildren.* Pediatrics International: official Journal of the Japan Pediatric Society, 2005. 47(3): p. 316-322.

68. Carlsson, J., *Prevalence of headache in schoolchildren: relation to family and school factors.* Acta Paediatrica, 1996. 85(6): p. 692-696.

69. Fendrich, K., et al., *Headache prevalence among adolescents-the German DMKG headache study.* Cephalalgia, 2007. 27(4): p. 347-354.

70. Oster, J., *Recurrent abdominal pain, headache, and limb pains in children and adolescents.* Pediatrics, 1972. 50: p. 429-436.

71. Rask, C., et al., *Functional somatic symptoms and associated impairment in 5-7-year-old children: the Copenhagen Child Cohort 2000.* European Journal of Epidemiology, 2009. 24(10).

72. Walker, L. and J. Greene, *The functional disability inventory: measuring a neglected dimension of child health status.* Journal of Pediatric Psychology, 1991. 16(1): p. 39-58.

73. Goodyer, I. and C. Mitchel, *Somatic and emotional disorders in childhood and adolescence.* Journal of Psychosomatic Research, 1989. 33: p. 681–688.

74. Rhee, H., *Physical symptoms in U.S. adolescents: Prevalence and patterns.* Dissertation Abstracts International, 2002. 63(3): p. 1274B.

75. Rhee, H., *Relationships between physical symptoms and pubertal development.* Journal of Pediatric Health Care, 2005. 19: p. 95-103.

76. LeResche, L., et al., *Relationship of pain and symptoms to pubertal development in adolescents.* Pain, 2005. 118(1-2): p. 201-209.

77. Buchanan, C., J. Eccles, and J. Becker, *Are adolescents the victims of raging hormones? Evidence for activational effects of hormones on moods and behavior at adolescence.* Psychological Bulletin, 1992. 111(1): p. 62-107.

78. Angold, A., E. Costello, and C. Worthman, *Puberty and depression: the roles of age, pubertal status and pubertal timing.* Psychological Medicine, 1998. 28: p. 51-61.

79. Ge, X., R. Conger, and G. Elder, *Coming of age too early: pubertal influences on girls' vulnerability to psychological distress.* Child Development 1996. 67(6): p. 3386-3400.

80. Graber, J., et al., *Is psychopathology associated with the timing of pubertal development?* Journal of the American Academy of Child and Adolescent Psychiatry, 1997. 36(12): p. 1768-1776.

81. Davison, I., C. Faull, and A. Nicol, *Research note: Temperament and behaviour in six year olds with recurrent abdominal pain: a follow-up.* Journal of Child Psychology and Psychiatry, 1986. 27: p. 539-544.

82. Stone, R. and G. Barbero, *Recurrent abdominal pain in childhood.* Pediatrics, 1970. 45(5): p. 732-738.

83. Gilleland, J., et al., *Understanding the medically unexplained: emotional and familial influences on children's somatic functioning.* Child: Care, Health and Development, 2009. 35(3): p. 383-390.

84. Ramchandani, P., et al., *Early parental and child predictors of recurrent abdominal pain at school age: results of a large population-based study.* Journal of the American Academy of Child and Adolescent Psychiatry, 2006. 45(6): p. 729-736.

85.   Rask, C., et al., *Infant behaviours are predictive of functional somatic symptoms at ages 5-7 years: results from the Copenhagen Child Cohort CCC2000.* The Journal of Pediatrics, 2013. 162(2): p. 335-342.

86.   Walker, L., R. Claar, and J. Garber, *Social consequences of children's pain: When do they encourage symptom maintenance?* Journal of Pediatric Psychology, 2002. 27(8): p. 689-698.

87.   Walker, L., J. Garber, and J. Greene, *Somatic complaints in pediatric patients: a prospective study of the role of negative life events, child social and academic competence, and parental somatic symptoms.* Journal of Consulting and Clinical Psychology, 1994. 62(6): p. 1213-1221.

88.   Walker, L., et al., *Parent attention versus distraction: impact on symptom complaints by children with and without chronic functional abdominal pain.* Pain, 2006. 122: p. 43-52.

89.   Whiting, P., et al., *Interventions for the treatment and management of chronic fatigue syndrome: a systematic review.* Journal of the American Medical Association, 2001. 286(11): p. 1360-1368.

90.   Walker, L., et al., *A typology of pain coping strategies in pediatric patients with chronic abdominal pain.* Pain, 2008. 137: p. 266-275.

91.   Fowler, T., et al., *Relationship between disabling fatigue and depression in children.* British Journal of Psychiatry, 2006. 189: p. 247-253.

92.   Steinhausen, H., et al., *Comparative studies of conversion disorders in childhood and adolescence.* Journal of Child Psychology and Psychiatry, 1989. 30: p. 615-621.

93.   Walker, L., J. McLaughlin, and J. Greene, *Functional illness and family functioning: A comparison of healthy and somatizing adolescents.* Family Process, 1988. 27(3): p. 317-325.

94.   Garralda, E., *Somatization and somatoform disorders.* Psychiatry, 2005. 4(8): p. 97-100.

95.   Fiertag, O., et al., *Somatoform Disorders*, in *IACAPAP e-Textbook of Child and Adolescent Mental Health*, I.R. JM, Editor. 2012, International Association for Child and Adolescent Psychiatry and Allied Professions: Geneva.

96.   Garralda, M., *A selective review of child psychiatry syndromes with a somatic presentation.* British Journal of Psychiatry, 1992. 161: p. 759-773.

97.   Walker, L. and J. Greene, *Children with recurrent abdominal pain and their parents: more somatic complaints, anxiety, and depression than other patient families.* Journal of Pediatric Psychology, 1989. 14(2): p. 231-243.

98.   Hotopf, M., *Childhood experience of illness as a risk factor for medically unexplained symptoms.* Scandinavian Journal of Psychology, 2002. 43(2): p. 139-146.

99.   Hotopf, M., et al., *Why do children have chronic abdominal pain, and what happens to them when they grow up? Population based cohort study.* British Medical Journal, 1998. 316: p. 1196-1200.

100. Garber, J., J. Zeman, and L. Walker, *Recurrent abdominal pain in children: Psychiatric diagnoses and parental psychopathology.* Journal of the American Academy of Child and Adolescent Psychiatry, 1990. 29(4): p. 648-656.

101. Hotopf, M., et al., *Temporal relationships between physical symptoms and psychiatric disorder. Results from a national birth cohort.* British Journal of Psychiatry, 1998. 173: p. 255-261.

102. Robinson, J., J. Alverez, and J. Dodge, *Life events and family history in children with recurrent abdominal pain* Journal of Psychosomatic Research 1990. 34: p. 171-181.

103. Spierings, C., et al., *Conversion disorders in childhood: A retrospective follow-up study of 84 inpatients.* Developmental Medicine and Child Neurology, 1990. 32(10): p. 865-871.

104. Garber, J., D. Van Slyke, and L. Walker, *Concordance between mothers' and children's reports of somatic and emotional symptoms in patients with recurrent abdominal pain or emotional disorders.* Journal of Abnormal Child Psychology, 1998. 26(5): p. 381-391.

105. Campo, J., et al., *Physical and emotional health of mothers of youth with functional abdominal pain.* Archives of Paediatrics and Adolescent Medicine, 2007. 161: p. 131-137.

106. Garralda, E., *Somatization and somatoform disorders.* Psychiatry, 2008. 7(8): p. 353-356.

107.   Rangel, L., et al., *Family health and characteristics in chronic fatigue syndrome, juvenile rheumatoid arthritis and emotional disorders of childhood.* Journal of the American Academy of Child and Adolescent Psychiatry, 2005. 44: p. 150-158.

108.   Walker, L., et al., *Recurrent abdominal pain: a potential precursor of irritable bowel syndrome in adolescents and young adults.* The Journal of Pediatrics, 1998. 132(6): p. 1010-1015.

109.   Bird, H., *Epidemiology of childhood disorders in a cross-cultural context.* Journal of Child Psychology and Psychiatry, 1996. 37: p. 35-49.

110.   Farooq, S., et al., *Somatization: a transcultural study.* Journal of Psychosomatic Research, 1995. 39(7): p. 883-888.

111.   Bal, S., *Psychological symptomatology and health beliefs of Asian patients*, in *Clinical Psychology: Research and Developments*, D. H, Editor. 1987, Croom Helm: London. p. 101-110.

112.   Mumford, D., *Somatization: a transcultural perspective.* International Review of Psychiatry 1993. 5: p. 231-242.

113.   Bridges, K. and D. Goldberg, *Somatic presentation of DSM III psychiatric disorders in primary care.* Journal of Psychosomatic Research, 1985. 29(6): p. 563–569.

114.   Lipowski, Z., *Somatization: the concept and its clinical application.* The American Journal of Psychiatry, 1988. 145(11): p. 1358-1368.

115.   Lesser, I., *Current concepts in psychiatry: Alexithymia.* The New England Journal of Medicine, 1985. 312(11): p. 690-692.

116.   Gureje, O., et al., *Somatization in cross-cultural perspective: a World Health Organization study in primary care.* The American Journal of Psychiatry, 1997. 154(7): p. 989-995.

117.   Dufton, L., *Anxiety and somatic complaints in children with recurrent abdominal pain and anxiety disorders.* Journal of Pediatric Psychology, 2009. 34: p. 176-186.

118.   Garralda, M., *Unexplained physical complaints.* Pediatric Clinics of North America, 2011. 58(4): p. 803-813.

119.   Hunfeld, J., et al., *Chronic pain and its impact on quality of life in adolescents and their families.* Journal of Pediatric Psychology, 2001. 26(3): p. 145-153.

120.   Kashikar-Zuck, S., et al., *Depression and functional disability in chronic pediatric pain.* The Clinical Journal of Pain, 2001. 17(4): p. 341-349.

121.   Konijnenberg, A., et al., *Children with unexplained chronic pain: substantial impairment in everyday life.* Archives of Disease in Childhood, 2005. 90: p. 680-686.

122.   Mulvaney, S., et al., *Trajectories of symptoms and impairment for pediatric patients with functional abdominal pain: a 5-year longitudinal study.* Journal of the American Academy of Child and Adolescent Psychiatry, 2006. 45(6): p. 737-744.

123.   Roth-Isigkeit, A., et al., *Pain among children and adolescents: restrictions in daily living and triggering factors.* Pediatrics, 2005. 115(2): p. e152-e162.

124.   Gauntlett-Gilbert, J. and C. Eccleston, *Disability in adolescents with chronic pain: patterns and predictors across different domains of functioning.* Pain, 2007. 131(1-2): p. 132-141.

125.   Ando, S., et al., *A greater number of somatic pain sites is associated with poor mental health in adolescents: a cross sectional study.* BioMedCentral Psychiatry, 2013. 13(30): p. 1-8.

126.   Claar, R. and L. Walker, *Functional assessment of pediatric pain patients: psychometric properties of the functional disability inventory.* Pain, 2006. 121(1-2): p. 77-84.

127.   Claar, R., L. Simons, and D. Logan, *Parental response to children's pain: the moderating impact of children's emotional distress on symptoms and disability.* Pain, 2008. 138: p. 172-179.

128.   Aromaa, M., et al., *Pain experience of children with headache and their families. A controlled study.* Pediatrics, 2000. 106(2): p. 270-275.

129.   Bandell-Hoekstra, I., et al., *Coping and quality of life in relation to headache in Dutch schoolchildren.* European Journal of Pain, 2002. 6(4): p. 315-321.

130.   Bernstein, G., et al., *Somatic symptoms in anxious-depressed school refusers.* Journal of the American Academy of Child and Adolescent Psychiatry, 1997. 36(5): p. 661-668.

131.   Walker, L., et al., *Long-term health outcomes in patients with recurrent abdominal pain.* Journal of Pediatric Psychology, 1995. 20(2): p. 233-245.

132.   Hirsch, C., et al., *Pain-related impairment and health care utilization in children and adolescents: a comparison of orofacial pain with abdominal pain, back pain, and headache.* Quintessence International, 2006. 37(5): p. 381-390.

133.   Kramer, T. and M. Garralda, *Psychiatric disorders in adolescents in primary care.* British Journal of Psychiatry, 1998. 173: p. 508-513.

134.   Yates, P., T. Kramer, and E. Garralda, *Depressive symptoms amongst adolescent primary care attenders. Levels and associations* Social Psychiatry and Psychiatric Epidemiology, 2004. 39: p. 588-594.

135.   Campo, J. and M. Reich, *Somatoform disorders*, in *Child and Adolescent Psychological disorders: A comprehensive textbook*, S. Netherton and D. Holmes, Editors. 1999, Oxford University Press: New York. p. 320-343.

136.   Starfield, B., et al., *Psychosocial and psychosomatic diagnoses in primary care of children.* Pediatrics, 1980. 66(2): p. 159-167.

137.   McGrath, P., *Pain in children: nature, assessment and treatment.* 1990, New York: Guildford Press.

138.   Spee, L., et al., *Childhood abdominal pain in primary care: design and patient selection of the HONEUR abdominal pain cohort.* BMC Family Practice, 2010. 11(27): p. 1-6.

139.   Starfield, B., et al., *Morbidity in children: a longitudinal view.* The New England Journal of Medicine, 1984. 310(13): p. 824-829.

140.   Hyams, J., et al., *Abdominal pain and irritable bowel syndrome in adolescents: a community-based study.* The Journal of Pediatrics, 1996. 129(2): p. 220-226.

141.   Meldrum, M., J. Tsao, and L. Zeltzer, *"Just be in pain and just move on": Functioning limitations and strategies in the lives of children with chronic pain.* Journal of Pain Management, 2008. 1(2): p. 131-141.

142.   Boey, C. and K. Goh, *Predictors of health-care consultation for recurrent abdominal pain among urban schoolchildren in Malaysia.* Journal of Gastroenterology and Hepatology, 2001. 16(2): p. 154-159.

143.   Rask, C., et al., *Functional somatic symptoms and consultation patterns in 5- to 7-year-olds.* Pediatrics, 2013. 132(2): p. 459-467.

144.   Essau, C., *Course and outcome of somatoform disorders in non-referred adolescents.* Psychosomatics, 2007. 48(6): p. 502-509.

145.   Hotopf, M., et al., *Childhood risk factors for adults with medically unexplained symptoms: results from a national birth cohort study.* American Journal of Psychiatry, 1999. 156(11): p. 1796-1800.

146.   Steinhausen, H. and C. Winkler Metzke, *Continuity of functional-somatic symptoms from late childhood to young adulthood in a community sample.* Journal of Child Psychology and Psychiatry, 2007. 48(5): p. 508-513.

147.   Dunn, K., et al., *Trajectories of pain in adolescents: a prospective cohort study.* Pain, 2011. 152: p. 66-73.

148.   Dhossche, D., et al., *Outcome of self-reported functional-somatic symptoms in a community sample of adolescents.* Annals of Clinical Psychiatry, 2001. 13: p. 191-199.

149.   Campo, J., et al., *Adult outcomes of pediatric recurrent abdominal pain: do they just grow out of it?* Pediatrics, 2001. 108(1): p. 1-7.

150.   Zwaigenbaum, L., et al., *Highly somatizing young adolescents and the risk of depression.* Pediatrics, 1999. 103: p. 1203-1209.

151.   Ramchandani, P., et al., *The impact of recurrent abdominal pain: predictors of outcome in a large population cohort.* Acta Paediatrica, 2007. 96: p. 697-701.

152. Rangel, L., et al., *The course of severe chronic fatigue syndrome in childhood.* Journal of the Royal Psychiatry of Medicine, 2000. 93(3): p. 129-134.

153. Pehlivanturk, B. and F. Unal, *Conversion disorder in children and adolescents: a four-years follow-up study* Journal of Psychosomatic Research, 2002. 52(4): p. 187-191.

154. Eccleston, C., et al., *The Bath Adolescent Pain Questionnaire (BAPQ): Development and preliminary psychometric evaluation of an instrument to assess the impact of chronic pain on adolescents.* Pain, 2005. 118: p. 263-270.

155. Walker, L., et al., *Children's somatization inventory: psychometric properties of the revised form (CSI-24).* Journal of Pediatric Psychology, 2009. 34(4): p. 430-440.

156. American Association of Psychiatry., *Diagnostic and Statistical Manual of Mental Disorders* 3rd ed., revised ed. 1987, Washington, DC: American Psychiatric Association.

157. Essau, C., et al., *Somatic symptoms among children and adolescents in Poland: a confirmatory factor analytic study of the Children Somatization Inventory.* Front Public Health, 2013. 1(72): p. 1-9.

158. Hasibe, K., R. Fatma Nevin Sisman, and R. Ayse Ergun, *Reliability and Validity of the Turkish version of Children's Somatization Inventory.* Asian Nursing Research, 2012. 6: p. 9-12.

159. Imran, N., et al., *Anxiety and depression predicted by medically unexplained symptoms in Pakistani children: a case-control study.* Journal of Psychosomatic Research, 2014. 76(2): p. 105-112.

160. Lavigne, J., M. Saps, and F. Bryant, *Reexamining the Factor structure of somatization using the Children's Somatization Inventory (CSI-24) in a community sample.* Journal of Pediatric Psychology, 2012. 37(8): p. 914-924.

161. Orgiles, M. and J. Espada, *Spanish version of the Children's Somatization Inventory: factorial structure and psychometric properties in a community sample.* International Journal of Behavioural Medicine, 2013.

162. Derogatis, L., *BSI Brief Symptom Inventory: Administration, Scoring, and Procedure Manual*. 4th edition ed. 1993, Minneapolis, MN: National Computer Systems.

163. Derogatis, L. and N. Melisaratos, *The Brief Symptom Inventory: An introductory report.* Psychological Medicine 1983. 13: p. 595-605.

164. Cochran, C. and D. Hale, *College student norms on the Brief Symptom Inventory.* Journal of Clinical Psychology, 1985. 41(6): p. 777-779.

165. Handal, P., et al., *Preliminary validity for the Langner Symptom Survey and the Brief Symptom Inventory as mass-screening instruments for adolescent adjustment.* Journal of Clinical Child Psychology, 1993. 22(3): p. 382-386.

166. Piersma, H., J. Boes, and W. Reaume, *Unidimensionality of the Brief Symptom Inventory (BSI) in adult and adolescent inpatients.* Journal of Personality Assessment, 1994. 63(2): p. 338-344.

167. Derogatis, L., *Brief Symptom Inventory (BSI)-18. Administration, scoring and procedures manual*. 2001, Minneapolis: NCS: Pearson, Inc.

168. Jellesma, F., C. Rieffe, and M. Terwogt, *The Somatic Complaint List: Validation of a self-report questionnaire assessing somatic complaints in children.* Journal of Psychosomatic Research, 2007. 63(4): p. 399-401.

169. Rieffe, C., et al., *Interaction between emotions and somatic complaints in children who did or did not seek medical care* Cognition and Emotion, 2007. 21(8): p. 1630-1646.

170. Wisniewski, J., J. Naglieri, and J. Mulick, *Psychometric Properties of a Children's Psychosomatic Symptom Checklist* Journal of Behavioral Medicine, 1988. 11(5): p. 497-507.

171. Rask, C., et al., *The Soma Assessment Interview: new parent interview on functional somatic symptoms in children.* Journal of Psychosomatic Research, 2009. 66(5): p. 455-464.

172. Achenbach, T., S. McConaughy, and C. Howell, *Child/adolescent behavioural and emotional problems: implications of cross-informant correlations for situational specificity.* Psychological Bulletin, 1987. 101: p. 213-232.

173. Escobar, J., et al., *Somatization in the community.* Archives of General Psychiatry, 1987. 44: p. 713-718.
174. Garralda, E., et al., *Psychiatric adjustment in adolescents with a history of chronic fatigue syndrome.* Journal of the American Academy of Child and Adolescent Psychiatry, 1999. 38: p. 1515-1521.
175. Practitioners, R.C.o.G., *Curriculum Statement 8*, in *Care of Children and Young People*, M. Deighan and S. Field, Editors. 2007: London.
176. Vedsted, P. and M. Christensen, *Frequent attenders in general practice care: a literature review with special reference to methodological considerations.* Public Health, 2005. 119(12): p. 118-137.
177. Browne, G., et al., *Prevalence and characteristics of frequent attenders in a prepaid Canadian family practice.* Journal of Family Practice, 1982. 14: p. 63-71.
178. Clarke, D., et al., *Somatic symptoms, hypochondriasis and psychological distress: a study of somatisation in Australian general practice.* The Medical Journal of Australia, 2008. 189: p. 560-564.
179. Gill, D. and M. Sharpe, *Frequent consulters in general practice: a systematic review of studies of prevalence, associations and outcome.* Journal of Psychosomatic Research, 1999. 47: p. 115-130.
180. Grabe, H., et al., *Association of mental distress with health care utilization and costs: a 5-year observation in a general population.* Social Psychiatry and Psychiatric Epidemiology, 2009. 44(10): p. 835-844.
181. Schilte, A., et al., *Somatisation in primary care: clinical judgement and standardised measurement compared.* Social Psychiatry and Psychiatric Epidemiology, 2000. 35: p. 276-282.
182. Schrire, S., *Frequent attenders: a review.* Family Practice, 1986. 3(4): p. 272-275.
183. Vedsted, P., et al., *Physical, mental and social factors associated with frequent attendance in Danish general practice. A population-based cross-sectional study.* Social Science and Medicine, 2004. 59(4): p. 813-823.
184. McCormick, A., D. Fleming, and J. Charlton, *Morbidity statistics from general practice: Fourth National Study 1991-1992*, 1995, HMSO: London.
185. Health, D.o., *General Household Survey*, 1992, HMSO: London.
186. Ferrin, M., et al., *Factors influencing primary care attendance in depressed adolescents.* Social Psychiatry and Psychiatric Epidemiology, 2009. 44: p. 825-833.
187. Gledhill, J. and M. Garralda, *The short-term outcome of depressive disorder in adolescents attending primary care: a cohort study.* Social Psychiatry and Psychiatric Epidemiology, 2011. 46(10): p. 993-1002.
188. Haller, D., et al., *The identification of young people's emotional distress: a study in primary care.* British Journal of General Practice, 2009. 59: p. 61-70.
189. Iliffe, S., et al., *Treading a fine line: is diagnosing depression in young people just medicalising moodiness?* British Journal of General Practice, 2009. 56: p. 156-157.
190. Kent, L., P. Vostanis, and C. Feehan, *Detection of major and minor depression in children and adolescents: evaluation of the Mood and Feelings Questionnaire.* Journal of Child Psychology and Psychiatry, 1997. 38: p. 565-573.
191. Sund, A., B. Larsson, and L. Wichstrom, *Depressive symptoms among young Norwegian adolescents as measured by the Mood and Feelings Questionnaire (MFQ).* European Child and Adolescent Psychiatry, 2001. 10: p. 222-229.
192. Wood, A., et al., *Properties of the Mood and Feelings Questionnaire in adolescent psychiatric outpatients: a research note.* The Journal of Child Psychology and Psychiatry, 1995. 36(2): p. 327-334.
193. Goodman, R., *The Strengths and Difficulties questionnaire: A research note.* Journal of Child Psychology and Psychiatry, 1997. 38: p. 581-586.

194. Goodman, R., H. Meltzer, and V. Bailey, *The Strengths and Difficulties Questionnaire: a pilot study on the validity of the self-report version.* European Child and Adolescent Psychiatry, 1998. 7: p. 125-130.
195. Du, Y., J. Kou, and D. Coghill, *The validity, reliability and normative scores of the parent, teacher and self report versions of the Strengths and Difficulties questionnaire in China.* Child and Adolescent Psychiatry and Mental Health, 2008. 2: p. 1-15.
196. Koskelainen, M., A. Sourander, and A. Kaljonen, *The Strenghts and Difficulties Questionnaire among Finnish school-aged children and adolescents.* European Child and Adolescent Psychiatry, 2000. 9: p. 277-284.
197. Muris, P., C. Meesters, and F. van den Berg, *The Strengths and Difficulties Questionnaire (SDQ): Further evidence for its reliability and validity in a community sample of Dutch children and adolescents.* European Child and Adolescent Psychiatry, 2003. 12: p. 1-8.
198. Van Widenfelt, B., et al., *Dutch version of the Strengths and Difficulties Questionnaire (SDQ).* European Child and Adolescent Psychiatry, 2003. 12: p. 281-289.
199. Chitkara, D., D. Rawat, and N. Talley, *The epidemiology of childhood recurrent abdominal pain in Western countries: a systematic review.* The American Journal of Gastroenterology, 2005. 100(8): p. 1868-1875.
200. Kataoka, S., L. Zhang, and K. Wells, *Unmet need for mental health care among U.S. children: variation by ethnicity and insurance status.* American Journal of Psychiatry, 2002. 159(9): p. 1548-1555.
201. Meltzer, H., et al., *Mental health of children and adolescents in Great Britain*, 2000: London.
202. Gill, D., et al., *GP frequent consulters: their prevalence, natural history, and contribution to rising workload.* British Journal of General Practice, 1998. 48(437): p. 1856-1857.
203. Kramer, T., et al., *Which adolescents attend the GP?* British Journal of General Practice, 1997. 47(418): p. 327.
204. Petersson, C. and A. Hakansson, *High-consulting children indicate illness-prone families. A study of 38 rural and 38 urban Swedish children's health and use of medical care.* Scandinavian Journal of Primary Health Care, 1996. 14: p. 71-78.
205. Saxena, S., A. Majeed, and M. Jones, *Socioeconomic differences in childhood consultation rates in general practice in England and Wales: prospective cohort study.* British Medical Journal, 1999. 318: p. 642-646.
206. Scaife, B., et al., *Socio-economic characteristics of adult frequent attenders in general practice: secondary analysis of data.* Family Practice, 2000. 17: p. 298-304.
207. Czyzewski, D., et al., *Recurrent abdominal pain in primary and tertiary care: differences and similarities.* Child Health Care, 2007. 36(2): p. 137-153.
208. Cooper, P. and I. Goodyer, *A community study of depression in adolescent girls. I: estimates of symptom and syndrome prevalence.* British Journal of Psychiatry, 1993. 163: p. 369-374.
209. Vila, M., et al., *Assessment of somatic symptoms in British secondary school children using the Children's Somatization Inventory (CSI).* Journal of Pediatric Psychology, 2009. 34(9): p. 989-998.
210. Shannon, R., M. Bergren, and A. Mathews, *Frequent visitors: somatization in school-age children and implications for school nurses.* The Journal of School Nursing, 2010. 26: p. 169-182.
211. Torsheim, T. and B. Wold, *School-related stress, school support, and somatic complaints: a general populationsStudy.* Journal of Adolescent Research, 2001. 16.
212. Katon, W., A. Kleinman, and G. Rosen, *Depression and somatization: a review.* The American Journal of Medicine, 1982. 72: p. 127-135.
213. Minhas, F. and A. Nizami, *Somatoform disorders: perspectives from Pakistan.* International Review of Psychiatry, 2006. 18: p. 55-60.
214. Mubbashar, M. and K. Saeed, *Development of mental health services in Pakistan.* Eastern Mediterranean Health Journal, 2001. 7: p. 392-396.

215. Lekandere, M., et al., *Self-rated health is related to levels of circulating cytokines.* Psychosomatic Medicine, 2004. 66: p. 559-563.

216. Rief, W. and A. Barsky, *Psychobiological perspectives on somatoform disorders.* Psychoneuroendocrinology, 2005. 30: p. 996-1002.

217. Sandberg, S. and J. Stevenson, *Psychiatric aspects of somatic disease*, in *Rutter Child and Adolescent Psychiatry*, Rutter M., et al., Editors. 2008, Whiley-Blackwell: Oxford. p. 930-944.

218. Walker, L., et al., *Appraisal and coping with daily stressors by pediatric patients with chronic abdominal pain.* Journal of Pediatric Psychology, 2007. 32(2): p. 206-216.

219. *SDQ: Normative SDQ Data from Britain*. http://www.sdqinfo.org/.

220. Rangel, L., et al., *Personality in adolescents with chronic fatigue syndrome.* European Child and Adolescent Psychiatry, 2000. 9(1): p. 39-45.

221. Robins, P., et al., *A randomized controlled trial of a cognitive-behavioural family intervention for pediatric recurrent abdominal pain.* Journal of Pediatric Psychology, 2005. 30(5): p. 397-408.

222. Sanders, M., et al., *Cognitive-behavioural treatment of recurrent nonspecific abdominal pain in children: An analysis of generalisation, maintenance, and side effects.* Journal of Consulting and Clinical Psychology, 1989. 57: p. 294-300.

223. Sanders, M., et al., *A treatment of recurrent abdominal pain in children: a controlled comparison of cognitive-behavioural family intervention and standard pediatric care.* Journal of Consulting and Clinical Psychology, 1994. 62: p. 306-314.

224. Eminson, M., *Somatising in children and adolescents. 2. Management and outcomes.* Advances in Psychiatry Treatment, 2001. 7: p. 388-398.
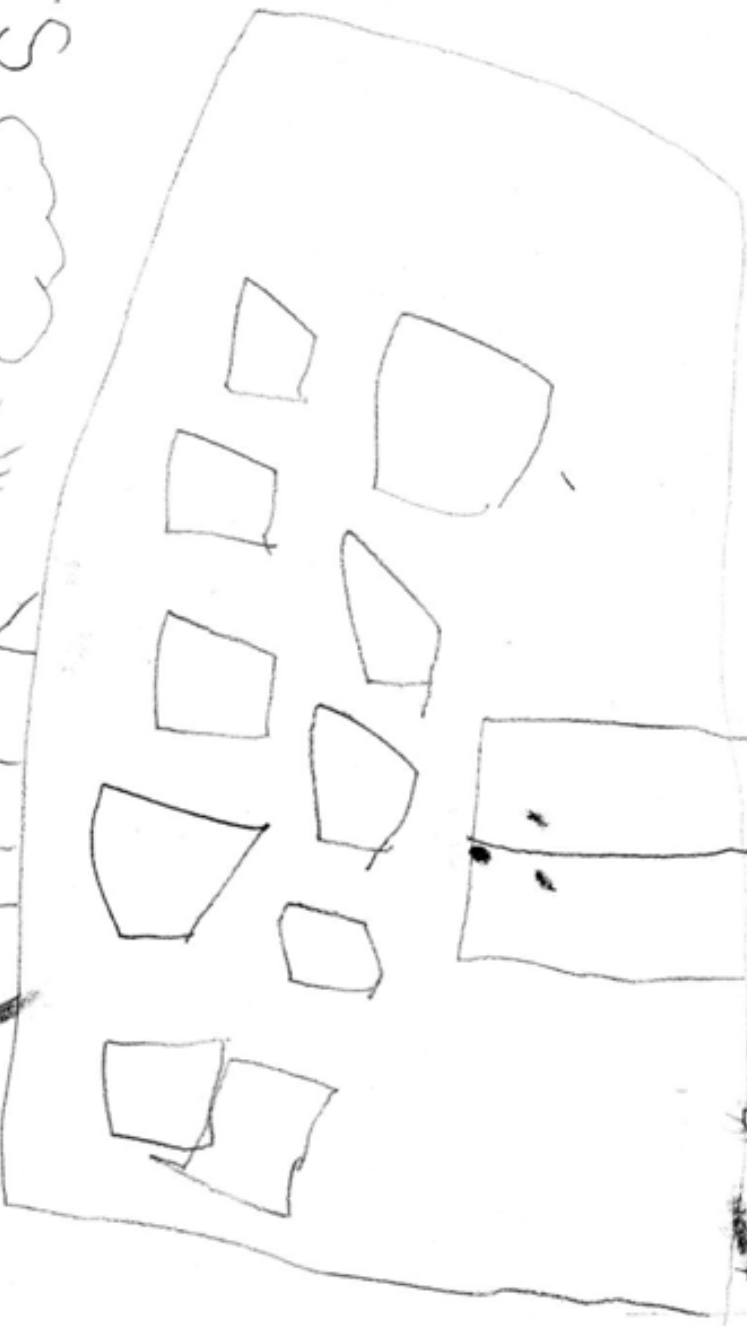
APPENDICES

Appendix I

The ICD-10 Classification of Mental and Behavioural Disorders. Clinical descriptions and diagnostic guidelines.

F44 Dissociative [conversion] disorders

The common theme shared by dissociative (or conversion) disorders is a partial or complete loss of the normal integration between memories of the past, awareness of identity, immediate sensations, and control of bodily movements. There is normally a considerable degree of conscious control over the memories and sensations that can be selected for immediate attention, and the movements that are to be carried out. In the dissociative disorders it is presumed that this ability to exercise a conscious and selective control is impaired, to a degree that can vary from day to day or even from hour to hour. It is usually very difficult to assess the extent to which some of the loss of functions might be under voluntary control.

Dissociative disorders as described here are presumed to be "psychogenic" in origin, being associated closely in time with traumatic events, insoluble and intolerable problems, or disturbed relationships. It is therefore often possible to make interpretations and presumptions about the individual's means of dealing within intolerable stress, but concepts derived from any one particular theory, such as "unconscious motivation" and "secondary gain", are not included among the guidelines or criteria for diagnosis.

The term "conversion" is widely applied to some of these disorders, and implies that the unpleasant affect, engendered by the problems and conflicts that the individual cannot solve, is somehow transformed into the symptoms.

Individuals with dissociative disorders often show a striking denial of problems or difficulties that may be obvious to others. Any problems that they themselves recognize may be attributed by patients to the dissociative symptoms.

Diagnostic guidelines
For a definite diagnosis the following should be present:
(a) the clinical features as specified for the individual disorders in F44
(b) no evidence of a physical disorder that might explain the symptoms
(c) evidence for psychological causation, in the form of clear association in time with stressful events and problems or disturbed relationships (even if denied by the individual)

Convincing evidence of psychological causation may be difficult to find, even though strongly suspected. In the presence of known disorders of the central or peripheral nervous system, the diagnosis of dissociative disorder should be made with great caution. In the absence of evidence for psychological causation, the diagnosis should remain provisional, and enquiry into both physical and psychological aspects should continue.

Includes:
conversion hysteria
conversion reaction
hysteria
hysterical psychosis

Excludes: malingering [conscious simulation] (Z76.5)

F44.0 Dissociative amnesia

Diagnostic guidelines
A definite diagnosis requires:
(a) amnesia, either partial or complete, for recent events that are of a traumatic or stressful nature (these aspects may emerge only when other informants are available)
(b) absence of organic brain disorders, intoxication, or excessive fatigue

F44.1 Dissociative fugue

Diagnostic guidelines
For a definite diagnosis there should be:
(a) the features of dissociative amnesia (F44.0)
(b) purposeful travel beyond the usual everyday range (the differentiation between travel and wandering must be made by those with local knowledge)
(c) maintenance of basic self-care (eating, washing, etc.) and simple social interaction with strangers (such as buying tickets or petrol, asking directions, ordering meals)

F44.2 Dissociative stupor

Diagnostic guidelines
For a definite diagnosis there should be:
(a) stupor, as described above
(b) absence of a physical or other psychiatric disorder that might explain the stupor; and
(c) evidence of recent stressful events or current problems

F44.3 Trance and possession disorders
Disorders in which there is a temporary loss of both the sense of personal identity and full awareness of the surroundings; in some instances the individual acts as if taken over by another personality, spirit, deity, or "force". Attention and awareness may be limited to or concentrated upon only one or two aspects of the immediate environment, and there is often a limited but repeated set of movements, postures, and utterances. Only trance disorders that are involuntary or unwanted, and that intrude into ordinary activities by occurring outside (or being a prolongation of) religious or other culturally accepted situations should be included here.

F44.4-F44.7 Dissociative disorders of movement and sensation

Diagnostic guidelines
The diagnosis should be made with great caution in the presence of physical disorders of the nervous system, or in a previously well-adjusted individual with normal family and social relationships.

For a definite diagnosis:
(a) there should be no evidence of physical disorder; and
(b) sufficient must be known about the psychological and social setting and personal relationships of the patient to allow a convincing formulation to be made of the reasons for the appearance of the disorder

The diagnosis should remain probable or provisional if there is any doubt about the contribution of actual or possible physical disorders, or if it is impossible to achieve an understanding of why the disorder has developed. In cases that are puzzling or not clear-cut, the possibility of the later appearance of serious physical or psychiatric disorders should always be kept in mind.

F44.4 Dissociative motor disorders
The commonest varieties of dissociative motor disorder are loss of ability to move the whole or a part of a limb or limbs. Paralysis may be partial, with movements being weak or slow, or complete. Various forms and variable degrees of incoordination (ataxia) may be evident, particularly in the legs, resulting in bizarre gait or inability to stand unaided (astasia-abasia). There may also be exaggerated trembling or shaking of one or more extremities or the whole body. There may be close resemblance to almost any variety of ataxia, apraxia, akinesia, aphonia, dysarthria, dyskinesia, or paralysis.

Includes: psychogenic aphonia, psychogenic dysphonia

F44.5 Dissociative convulsions
Dissociative convulsions (pseudoseizures) may mimic epileptic seizures very closely in terms of movements, but tongue-biting, serious bruising due to falling, and incontinence of urine are rare in dissociative convulsion, and loss of consciousness is absent or replaced by a state of stupor or trance.

F44.6 Dissociative anaesthesia and sensory loss
Anaesthetic areas of skin often have boundaries which make it clear that they are associated more with the patient's ideas about bodily functions than with medical knowledge. There may also be differential loss between the sensory modalities which cannot be due to a neurological lesion. Sensory loss may be accompanied by complaints of paraesthesia. Loss of vision is rarely total in dissociative disorders, and visual disturbances are more often a loss of acuity, general blurring of vision, or "tunnel vision". In spite of complaints of visual loss, the patient's general mobility and motor performance are often surprisingly well preserved.

Dissociative deafness and anosmia are far less common than loss of sensation or vision.

Includes: psychogenic deafness

F44.7 Mixed dissociative [conversion] disorders
Mixtures of the disorders specified above (F44.0-F44.6) should be coded here.

F45 Somatoform disorders

The main feature of somatoform disorders is repeated presentation of physical symptoms, together with persistent requests for medical investigations, in spite of repeated negative findings and reassurances by doctors that the symptoms have no physical basis. If any physical disorders are present, they do not explain the nature and extent of the symptoms or the distress and preoccupation of the patient. Even when the onset and continuation of the symptoms bear a close relationship with unpleasant life events or with difficulties or conflicts, the patient usually resists attempts to discuss the possibility of psychological causation; this may even be the case in the presence of obvious depressive and anxiety symptoms. The degree of understanding, either physical or psychological, that can be achieved about the cause of the symptoms is often disappointing and frustrating for both patient and doctor.

In these disorders there is often a degree of attention-seeking (histrionic) behaviour, particularly in patients who are resentful of their failure to persuade doctors of the essentially physical nature of their illness and of the need for further investigations or examinations.

F45.0 Somatization disorder

Diagnostic guidelines
A definite diagnosis requires the presence of all of the following:
(a) at least 2 years of multiple and variable physical symptoms for which no adequate physical explanation has been found
(b) persistent refusal to accept the advice or reassurance of several doctors that there is no physical explanation for the symptoms
(c) some degree of impairment of social and family functioning attributable to the nature of the symptoms and resulting behaviour

Includes:
multiple complaint syndrome
multiple psychosomatic disorder

F45.1 Undifferentiated somatoform disorder
When physical complaints are multiple, varying and persistent, but the complete and typical clinical picture of somatization disorder is not fulfilled, this category should be considered. For instance, the forceful and dramatic manner of complaint may be lacking, the complaints may be comparatively few in number or the associated impairment of social and family functioning may be totally absent. There may or may not be grounds for presuming a psychological causation, but there must be no physical basis for the symptoms upon which the psychiatric diagnosis is based.

If a distinct possibility of underlying physical disorder still exists, or if the psychiatric assessment is not completed at the time of diagnostic coding, other categories from the relevant chapters of ICD-10 should be used.

Includes: undifferentiated psychosomatic disorder

F45.2 Hypochondriacal disorder

Diagnostic guidelines
For a definite diagnosis, both of the following should be present:
(a) persistent belief in the presence of at least one serious physical illness underlying the presenting symptom or symptoms, even though repeated investigations and examinations have identified no adequate physical explanation, or a persistent preoccupation with a presumed deformity or disfigurement
(b) persistent refusal to accept the advice and reassurance of several different doctors that there is no physical illness or abnormality underlying the symptoms

Includes:
body dysmorphic disorder
dysmorphophobia (nondelusional)
hypochondriacal neurosis
hypochondriasis
nosophobia

F45.3 Somatoform autonomic dysfunction

Diagnostic guidelines
Definite diagnosis requires all of the following:
(a) symptoms of autonomic arousal, such as palpitations, sweating, tremor, flushing, which are persistent and troublesome
(b) additional subjective symptoms referred to a specific organ or system
(c) preoccupation with and distress about the possibility of a serious (but often unspecified) disorder of the stated organ or system, which does not respond to repeated explanation and reassurance by doctors
(d) no evidence of a significant disturbance of structure or function of the stated system or organ

F45.4 Persistent somatoform pain disorder
The predominant complaint is of persistent, severe, and distressing pain, which cannot be explained fully by a physiological process or a physical disorder. Pain occurs in association with emotional conflict or psychosocial problems that are sufficient to allow the conclusion that they are the main causative influences. The result is usually a marked increase in support and attention, either personal or medical.

Pain presumed to be of psychogenic origin occurring during the course of depressive disorder or schizophrenia should not be included here. Pain due to known or inferred psychophysiological mechanisms such as muscle tension pain or migraine, but still believed

to have a psychogenic cause, should be coded by the use of F54 (psychological or behavioural factors associated with disorders or diseases classified elsewhere) plus an additional code from elsewhere in ICD-10 (e.g. migraine, G43.-).

Includes:
psychalgia
psychogenic backache or headache
somatoform pain disorder

F45.8 Other somatoform disorders
In these disorders the presenting complaints are not mediated through the autonomic nervous system, and are limited to specific systems or parts of the body. This is in contrast to the multiple and often changing complaints of the origin of symptoms and distress found in somatization disorder (F45.0) and undifferentiated somatoform disorder (F45.1). Tissue damage is not involved.

Any other disorders of sensation not due to physical disorders, which are closely associated in time with stressful events or problems, or which result in significantly increased attention for the patient, either personal or medical, should also be classified here. Sensations of swelling, movements on the skin, and paraesthesias (tingling and/or numbness) are common examples.

Disorders such as the following should also be included here:
(a)"globus hystericus" (a feeling of a lump in the throat causing dysphagia) and other forms of dysphagia
(b) psychogenic torticollis, and other disorders of spasmodic movements (but excluding Tourette's syndrome)
(c) psychogenic pruritus (but excluding specific skin lesions such as alopecia, dermatitis, eczema, or urticaria of psychogenic origin (F54))
(d) psychogenic dysmenorrhoea (but excluding dyspareunia (F52.6) and frigidity (F52.0))
(e) teeth-grinding

F45.9 Somatoform disorder, unspecified
Includes: unspecified psychophysiological or psychosomatic disorder

F48 Other neurotic disorders

F48.0 Neurasthenia

Diagnostic guidelines
Definite diagnosis requires the following:
(a) either persistent and distressing complaints of increased fatigue after mental effort, or persistent and distressing complaints of bodily weakness and exhaustion after minimal effort
(b) at least two of the following: feelings of muscular aches and pains, dizziness, tension, headaches, sleep disturbance, inability to relax, irritability, dyspepsia

(c) any autonomic or depressive symptoms present are not sufficiently persistent and severe to fulfil the criteria for any of the more specific disorders in this classification

Includes: fatigue syndrome

The DSM-IV-TR. Diagnostic and Statistical Manual of Mental Disorders. Fourth Edition Revised.

Somatisation disorder (300.81)

A. A history of many physical complaints beginning before age 30 years that occur over a period of several years and result in treatment being sought or significant impairment in social, occupational, or other important areas of functioning

B. Each of the following criteria must have been met, with individual symptoms occurring at any time during the course of the disturbance:

(1) four pain symptoms: a history of pain related to at least four different sites or functions (e.g., head, abdomen, back, joints, extremities, chest, rectum, during menstruation, during sexual intercourse, or during urination)

(2) two gastrointestinal symptoms: a history of at least two gastrointestinal symptoms other than pain (e.g., nausea, bloating, vomiting other than during pregnancy, diarrhea, or intolerance of several different foods)

(3) one sexual symptom: a history of at least one sexual or reproductive symptom other than pain (e.g., sexual indifference, erectile or ejaculatory dysfunction, irregular menses, excessive menstrual bleeding, vomiting throughout pregnancy)

(4) one pseudoneurological symptom: a history of at least one symptom or deficit suggesting a neurological condition not limited to pain (conversion symptoms such as impaired coordination or balance, paralysis or localized weakness, difficulty swallowing or lump in throat, aphonia, urinary retention, hallucinations, loss of touch or pain sensation, double vision, blindness, deafness, seizures; dissociative symptoms such as amnesia; or loss of consciousness other than fainting)

C. Either (1) or (2):

(1) after appropriate investigation, each of the symptoms in Criterion B cannot be fully explained by a known general medical condition or the direct effects of a substance (e.g., a drug of abuse, a medication)

(2) when there is a related general medical condition, the physical complaints or resulting social or occupational impairment are in excess of what would be expected from the history, physical examination, or laboratory findings

D. The symptoms are not intentionally feigned or produced (as in Factitious Disorder or Malingering)

Persistent somatoform pain disorder

A. Pain in one or more anatomical sites is the predominant focus of the clinical presentation and is of sufficient severity to warrant clinical attention

B. The pain causes clinically significant distress or impairment in social, occupational, or other important areas of functioning

C. Psychological factors are judged to have an important role in the onset, severity, exacerbation, or maintenance of the pain.

D. The symptom or deficit is not intentionally produced or feigned (as in Factitious Disorder or Malingering)

E. The pain is not better accounted for by a Mood, Anxiety, or Psychotic Disorder and does not meet criteria for Dyspareunia

Code as follows:

307.80 Pain Disorder Associated With Psychological Factors: psychological factors are judged to have the major role in the onset, severity, exacerbation, or maintenance of the pain. (If a general medical condition is present, it does not have a major role in the onset, severity, exacerbation, or maintenance of the pain.) This type of Pain Disorder is not diagnosed if criteria are also met for Somatization Disorder.

Specify if:
Acute: duration of less than 6 months
Chronic: duration of 6 months or longer

307.89 Pain Disorder Associated With Both Psychological Factors and a General Medical Condition: both psychological factors and a general medical condition are judged to have important roles in the onset, severity, exacerbation, or maintenance of the pain.

Specify if:
Acute: duration of less than 6 months
Chronic: duration of 6 months or longer

Pain Disorder Associated with a General Medical Condition: a general medical condition has a major role in the onset, severity, exacerbation, or maintenance of the pain. (If psychological factors are present, they are not judged to have a major role in the onset, severity, exacerbation, or maintenance of the pain.) The diagnostic code for the pain is selected based on the associated general medical condition if one has been established or on the anatomical location of the pain if the underlying general medical condition is not yet clearly established--for example, low back (724.2), sciatic (724.3), pelvic (625.9), headache (784.0), facial (784.0), chest (786.50), joint (719.4), bone (733.90), abdominal (789.0), breast (611.71), renal (788.0), ear (388.70), eye (379.91), throat (784.1), tooth (525.9), and urinary (788.0).

Hypochondriasis (300.7)
A. The preoccupation with fears of having, or the idea that one has, a serious disease based on the person's misinterpretation of bodily symptoms
B. The preoccupation persists despite appropriate medical evaluation B. and reassurance
C. The belief in Criterion A is not of delusional intensity (as in Delusional Disorder, Somatic Type) and is not restricted to a circumscribed concern about appearance (as in Body Dysmorphic Disorder)
D. The preoccupation causes clinically significant distress or impairment in social, occupational, or other important areas of functioning
E. The duration of the disturbance is at least 6 months
F. The preoccupation is not better accounted for by Generalized Anxiety Disorder, Obsessive-Compulsive Disorder, Panic Disorder, a Major Depressive Episode, Separation Anxiety, or another Somatoform Disorder

Specify if:

With Poor Insight: if, for most of the time during the current episode, the person does not recognize that the concern about having a serious illness is excessive or unreasonable.

Body dysmorphic disorder (300.7)
A. Preoccupation with an imagined defect in appearance. If a slight physical anomaly is present, the person's concern is markedly excessive
B. The preoccupation causes clinically significant distress or impairment in social, occupational, or other important areas of functioning
C. The preoccupation is not better accounted for by another mental disorder (e.g., dissatisfaction with body shape and size in Anorexia Nervosa)

Undifferentiated somatoform disorder (300.81)
A. One or more physical complaints (e.g., fatigue, loss of appetite, gastrointestinal or urinary complaints)
B. Either (1) or (2):
(1) after appropriate investigation, the symptoms cannot be fully explained by a known general medical condition or the direct effects of a substance (e.g., a drug of abuse, a medication)
(2) when there is a related general medical condition, the physical complaints or resulting social or occupational impairment is in excess of what would be expected from the history, physical examination, or laboratory findings
C. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning
D. The duration of the disturbance is at least 6 months
E. The disturbance is not better accounted for by another mental disorder (e.g., another Somatoform Disorder, Sexual Dysfunction, Mood Disorder, Anxiety Disorder, Sleep Disorder, or Psychotic Disorder)
F. The symptom is not intentionally produced or feigned (as in Factitious Disorder or Malingering)

Conversion disorder (300.11)
A. One or more symptoms or deficits affecting voluntary motor or sensory function that suggest a neurological or other general medical condition
B. Psychological factors are judged to be associated with the symptom or deficit because the initiation or exacerbation of the symptom or deficit is preceded by conflicts or other stressors
C. The symptom or deficit is not intentionally produced or feigned (as in Factitious Disorder or Malingering)
D. The symptom or deficit cannot, after appropriate investigation, be fully explained by a general medical condition, or by the direct effects of a substance, or as a culturally sanctioned behavior or experience
E. The symptom or deficit causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or warrants medical evaluation
F. The symptom or deficit is not limited to pain or sexual dysfunction, does not occur exclusively during the course of Somatization Disorder, and is not better accounted for by another mental disorder
Specify type of symptom or deficit:

With Motor Symptom or Deficit
With Sensory Symptom or Deficit
With Seizures or Convulsions
With Mixed Presentation

Somatoform disorder not otherwise specified (300.81)
This category includes disorders with somatoform symptoms that do not meet the criteria for any specific somatoform disorder. Examples include:
1. Pseudocyesis: a false belief of being pregnant that is associated with objective signs of pregnancy, which may include abdominal enlargement, amenorrhea etc.
2. A disorder involving non psychotic hypochondriacal symptoms of less than 6 months duration
3. A disorder involving unexplained physical complaints (e.g., fatigue or body weakness0 of less than 6 months duration that are not due to another mental disorder

Appendix II

Highlights of Changes from DSM-IV-TR to DSM-5

Somatic Symptom and Related Disorders

In DSM-5, somatoform disorders are now referred to as somatic symptom and related disorders. In DSM-IV, there was significant overlap across the somatoform disorders and a lack of clarity about their boundaries. These disorders are primarily seen in medical settings, and non-psychiatric physicians found the DSM-IV somatoform diagnoses problematic to use.

The DSM-5 classification reduces the number of these disorders and subcategories to avoid problematic overlap. Diagnoses of somatization disorder, hypochondriasis, pain disorder, and undifferentiated somatoform disorder have been removed.

Somatic Symptom Disorder
DSM-5 better recognizes the complexity of the interface between psychiatry and medicine. Individuals with somatic symptoms plus abnormal thoughts, feelings, and behaviors *may or may not* have a diagnosed medical condition. The relationship between somatic symptoms and psychopathology exists along a spectrum, and the arbitrarily high symptom count required for DSM-IV somatization disorder did not accommodate this spectrum. The diagnosis of somatization disorder was essentially based on a long and complex symptom count of medically unexplained symptoms. Individuals previously diagnosed with somatization disorder will usually meet DSM-5 criteria for somatic symptom disorder, but only if they have the maladaptive thoughts, feelings, and behaviors that define the disorder, in addition to their somatic symptoms.

In DSM-IV, the diagnosis undifferentiated somatoform disorder had been created in recognition that somatization disorder would only describe a small minority of "somatizing" individuals, but this disorder did not prove to be a useful clinical diagnosis. Because the distinction between somatization disorder and undifferentiated somatoform disorder was arbitrary, they are merged in DSM-5 under somatic symptom disorder, and no specific number of somatic symptoms is required.

Medically Unexplained Symptoms
DSM-IV criteria overemphasized the importance of an absence of a medical explanation for the somatic symptoms. Unexplained symptoms are present to various degrees, particularly in conversion disorder, but somatic symptom disorders can also accompany diagnosed medical disorders. The reliability of medically unexplained symptoms is limited, and grounding a diagnosis on the absence of an explanation is problematic and reinforces mind - body dualism. The DSM-5 classification defines disorders on the basis of positive symptoms (i.e., distressing somatic symptoms plus abnormal thoughts, feelings, and behaviors in response to these symptoms). Medically unexplained symptoms do remain a key feature in conversion disorder and pseudocyesis because it is possible to demonstrate definitively in such disorders that the symptoms are not consistent with medical pathophysiology.

Hypochondriasis and Illness Anxiety Disorder
Hypochondriasis has been eliminated as a disorder, in part because the name was perceived as pejorative and not conducive to an effective therapeutic relationship. Most individuals who would previously have been diagnosed with hypochondriasis have significant somatic symptoms in addition to their high health anxiety, and would now receive a DSM-5 diagnosis of somatic symptom disorder. In DSM-5, individuals with high health anxiety without somatic symptoms would receive a diagnosis of illness anxiety disorder (unless their health anxiety was better explained by a primary anxiety disorder, such as generalized anxiety disorder).

Pain Disorder
DSM-5 takes a different approach to the important clinical realm of individuals with pain. In DSM-IV, the pain disorder diagnoses assume that some pains are associated solely with psychological factors, some with medical diseases or injuries, and some with both. There is a lack of evidence that such distinctions can be made with reliability and validity, and a large body of research has demonstrated that psychological factors influence all forms of pain. Most individuals with chronic pain attribute their pain to a combination of factors, including somatic, psychological, and environmental influences. In DSM-5, some individuals with chronic pain would be appropriately diagnosed as having somatic symptom disorder, with predominant pain. For others, psychological factors affecting other medical conditions or an adjustment disorder would be more appropriate.

Psychological Factors Affecting Other Medical Conditions and Factitious Disorder
Psychological factors affecting other medical conditions is a new mental disorder in DSM-5, having formerly been included in the DSM-IV chapter "Other Conditions That May Be a Focus of Clinical Attention." This disorder and factitious disorder are placed among the somatic symptom and related disorders because somatic symptoms are predominant in both disorders and both are most often encountered in medical settings. The variants of psychological factors affecting other medical conditions are removed in favour of the stem diagnosis.

Conversion Disorder (Functional Neurological Symptom Disorder)
Criteria for conversion disorder (functional neurological symptom disorder) are modified to emphasize the essential importance of the neurological examination, and in recognition that relevant psychological factors may not be demonstrable at the time of diagnosis.

Appendix III

Somatising in children and adolescents. 1. Clinical presentations and aetiological factors

D. Mary Eminson, *Advances in Psychiatric Treatment* (2001), vol. 7, pp. 266–274

Somatising disorders	
Predisposing factors	**Family:** Many somatic symptoms experienced (genetic component?) Limited in verbal communication about emotional issues, including conflict 'Conditional caretaking' Suspicious attitude to medical expertise Parental history of somatoform illness, anxiety or depression Problems with boundary setting for children **Child:** Temperamental factors, including conscientiousness, perfectionism, emotional liability, vulnerability and worthlessness Earlier emotional abuse Low IQ (intelligence quotient) Social-relating difficulties
Precipitating factors	**Child:** Anxiety, depression Life stresses of all types-overt and covert Physical illness Peer group problems Academic problems and cognitive limitations Low self-esteem **Parent:** Life events/crises
Maintaining factors	**Child, parental and professional:** Current family relationship difficulties Predicament is resolved by symptoms Family model of serious illness Current parental mental ill health, particularly anxiety and somatisation School problems Models of sickness and conflict avoidance Benefits of sick role Professional behaviour that reinforces anxieties and sick role

APPENDIX IV

Measures

1. Year Group: 7 8 9 10 11 (please circle)

2. Age: 10 11 12 13 14 15 16 17 (please circle)

3. Sex: Male/Female   (please circle)

4. Which of these exams are you studying for? (please tick correct box)

SATS	
GCSE's	
End of Year exams	
None	

5. How many days of school have you missed over the last 12 months?..........days

Main reason school was missed (please tick)

Own illness	
Family holiday	
Family situation/events	
Other	

6. Who do you live with? (please tick)

Both natural parents
Natural mother only
Natural father only
Natural mother and step father
Natural father and step mother
Adopted parents
Other: please state

7. Who is the main 'breadwinner' (meaning, who earns the most of the money in your house)? (please tick)

Mother
Father
Other (say who)

8. What is the job of the 'breadwinner'?

9. What is your ethnic group? (please tick)

White English/Scottish/Welsh   Pakistani
White Irish   Indian
White other (describe)   Bangladeshi
Black English   Chinese
Black African   Other (describe)
Black Caribbean
Black other (describe)

10. Approximately how many times have you seen your family doctor in the last year?

0   1-3   4-6   7-9   more than 10   (please circle)

11. Have you seen anybody else about physical health problems in the last year?   Yes / No

If 'Yes', who? (please tick)

Hospital doctor
Other (please state who)

12. Have you seen a counsellor/psychologist/psychiatrics?   Yes, No   (please circle)

If 'Yes' what was it for?

13. List any serious illnesses or health problems you have had in the past:

14. List any serious illnesses or health problems you have at the moment:

15. Since November 2003, have you had STOMACH ACHE that has lasted at last 1 hour?

Yes / No (please circle)

If 'Yes':

a/ Since November 2003, how often has this occurred? (please circle)

Less than once a week   Once a week   More than once a week

b/ Have your stomach aches interfered with any of the following?

	Not at all	Yes, a little	Yes, a lot
Going to school			
Enjoying yourself			
Seeing friends			
Other activities			

c/ Have you seen a doctor or another health professional about this stomach ache? Yes / No

STRENGTHS AND DIFFICULTIES QUESTIONNAIRE

For each statement below, please tick the box for **NOT TRUE, SOMEWHAT TRUE or CERTAINLY TRUE**. It would help us if you answer all statements as best you can even if you are not absolutely certain or the statements seem daft

Please give your answers on the basis of how things have been for you over the **last 6 MONTHS**

	Not true	Somewhat true	Certainly true
I am considerate of other people's feelings			
I am restless, I cannot stay still for long			
I get a lot of headaches, stomach aches or sickness			
I usually share with others (food, games, pens, etc)			
I get very angry and often lose my temper			
I am usually on my own. I usually play alone or keep to myself			
I usually do as I am told			
I worry a lot			
I am helpful if someone is hurt, upset or feeling ill			
I am constantly fidgeting or squirming			
I have at least one good friend			
I fight a lot. I can make other people do what I want			
I am often unhappy, downhearted or tearful			
Other people my own age generally like me			
I am easily distracted, I find it difficult to concentrate			
I am nervous in new situations. I easily lose confidence			
I am kind to younger children			
I am often accused of lying or cheating			
Other children or young people pick on me or bully me			
I often volunteer to help others (parents, teachers, other children)			
I think before I do things			
I take things that are not mine from home, school or elsewhere			
I get on better with adults than with people my own age			
I have many fears, I am easily scared			
I see tasks through to the end, my attention is good			

Do these difficulties interfere with your everyday life e.g. home, friendships, classroom learning or leisure?

Not at all	Quite a little	Quite a lot	A great deal

MOOD AND FEELINGS QUESTIONNAIRE
This form is about how you have been feeling or acting within the past TWO WEEKS

If a sentence was true about you <u>most</u> of the time, tick 'TRUE'
If it was only <u>sometimes true</u>, tick 'SOMETIMES'
If a sentence was <u>not true</u> about you, tick 'NOT TRUE'

	TRUE	SOMETIMES TRUE	NOT TRUE
1. I felt miserable or unhappy			
2. I did not enjoy anything at all			
3. I was less hungry than usual			
4. I ate more than usual			
5. I felt so tired I just sat around and did nothing			
6. I was moving and walking more slowly than usual			
7. I was very restless			
8. I felt I was not good anymore			
9. I sometimes blamed myself when not at fault			
10. It was hard for me to make up my mind			
11. I felt grumpy and cranky with my parents			
12. I felt like talking less than usual			
13. I was talking more slowly than usual			
14. I cried a lot			
15. I thought there was nothing good for me in the future			
16. I thought that life wasn't worth living			
17. I thought about death or dying			
18. I thought my family would be better off without me			
19. I thought about killing myself			
20. I did not want to see my friends			
21. I found it hard to think properly or concentrate			
22. I thought that bad things would happen to me			
23. I hated myself			
24. I was a bad person			
25. I thought I looked ugly			
26. I worried about aches and pains			
27. I felt lonely			
28. I thought nobody really loved me			
29. I did not have any fun at school			
30. I thought I could never be as good as other kids			
31. I did everything wrong			
32. I didn't sleep as well as I usually sleep			
33. I slept a lot more than usual			
34. I was not as happy as usual even when praised/rewarded			

CHILDREN'S SOMATIZATION INVENTORY
Your symptoms

Below is a list of symptoms that children and teenagers sometimes have. Please tick the box to tell us <u>how much you were bothered by each symptom over the last 2 weeks.</u>

	Not at all	A little	Some	A lot	A whole lot
1. Headaches					
2. Faintness or dizziness (feeling faint or dizzy)					
3. Pain in your heart or chest					
4. Feeling low in energy or slowed down					
5. Pains in your lower back					
6. Sore muscles					
7. Trouble getting your breath (when you are not exercising)					
8. Hot or cold spells (suddenly feeling hot or cold for no reason)					
9. Numbness or tingling in parts of your body					
10. A lump in your throat					
11. Weakness (feeling weak) in parts of your body					
12. Heavy feelings in your arms or legs (when they feel too heavy to move)					
13. Nausea or upset stomach (feeling like you might throw up, or having an upset stomach)					
14. Constipation					
15. Diarrhoea					
16. Pain in your stomach or abdomen (stomach aches)					
17. Your heart beating too fast at rest					
18. Difficulty swallowing					
19. Losing your voice					
20. Deafness (when you can't hear)					
21. Double vision (when you see two of everything even with glasses on)					
22. Blurred vision (when things look blurred, even with glasses on)					
23. Blindness (when you can't see at all)					
24. Fainting or passing out					
25. Memory loss (or not being able to remember anything)					
26. Seizures or convulsions (your body moving and shaking and you can't control it)					
27. Trouble walking					

28. Paralysis or muscle weakness (your muscles are too weak to move, as if you can't move your arms or legs at all)					
29. Difficulty urinating (difficulties passing water)					
30. Vomiting (throwing up)					
31. Feeling bloated or gassy					
32. Food making you feel sick					
33. Pain in your knees, elbows or other joints					
34. Pain in your arms or legs					
35. Pain when you urinate (pass water)					

If you have suffered from any of the above complaints, **did they stop you from? (please tick)**

	No	Yes, a bit	Yes, a lot
Going to school?			
Concentrating on what you are doing?			
Enjoying yourself?			
Seeing friends?			

If you have suffered from any of the above complaints, **do they get worse if you have any stress, worry or anxiety? (please tick)**

No	Don't know	Yes

Many thanks for your help