



## Studying Chronic Pain in Children and Adolescents: Why is it Important?

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### **Author's contribution**

*The sole author designed, analyzed and interpreted and prepared the manuscript.*

### **Article Information**

DOI: 10.9734/BJMMR/2016/28333

#### Editor(s):

(1) Rakesh Garg, Department of Anaesthesiology, Intensive Care, Pain and Palliative Care, Dr. BRAIRCH, All India Institute of Medical Sciences, New Delhi, India.

#### Reviewers:

(1) Hassan Ali Abdelwahid, Suez Canal University, Egypt.  
(2) Joe Liu, Wayne State University, USA.

Complete Peer review History: <http://www.sciencedomain.org/review-history/16056>

**Mini-review Article**

**Received 14<sup>th</sup> July 2016**  
**Accepted 23<sup>rd</sup> August 2016**  
**Published 5<sup>th</sup> September 2016**

### **ABSTRACT**

**Background:** Chronic pain not associated with a disease is very common in childhood and adolescence, with prevalence rates between 5-27%, and is considered to constitute a considerable health problem.

**Aim:** The current update of literature aims at showing why studying chronic pain and related issues in children, adolescents and their families is important.

**Methods:** Mostly recent (2010-2015) studies of youth chronic pain were included in this update.

**Results:** This update gives the main findings of mostly recent studies which contribute to our knowledge on chronic pain and its impact on child quality of life, association with child mental health, persistence and consequences in adulthood, family/parental influences and attitudes, and association with parental somatic symptoms.

**Conclusion:** In studying chronic pain, a holistic approach in the assessment and management, based on the biopsychosocial model, should be considered. More studies in the field are needed, especially in preschoolers from the community, with large numbers of children and adolescents, and a follow-up design.

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**Keywords:** Chronic pain; children; adolescents.

## 1. INTRODUCTION

Chronic pain is considered to be any pain persistent or recurrent for a period of three months. Chronic pain not associated with a disease is very common in childhood and adolescence, with prevalence rates ranging substantially, between 5-27%, and as such constitutes a considerable health problem [1,2]. A typical example of chronic pain i.e. headache is the most prevalent pain in children and adolescents, experienced weekly by more than 10% while the number of headache-affected youths with high disability is about 4% [3].

Chronic pain has been studied in psychiatric clinical settings, pediatric outpatients [4], primary care [5] and the community [6]. Most of the studies have been conducted in clinical samples and are cross-sectionally designed; Therefore, the answer to the questions which children develop chronic pain, its association with mental health problems and which comes first are still

unclear [6]. There are many studies in school aged children and adolescents but few in preschool ages and epidemiological studies are usually hampered by lack of good standardized measures [6,7]. The current update of literature aims at showing why studying chronic pain and related issues in children and adolescents is important also considering new important contributions in this field.

## 2. METHODS

Mostly recent (2010-2015) studies of youth chronic pain were included in this update. The Medline was searched, during the period October 2015-June 2016 for studies on chronic pain and its impact on child quality of life, association with child mental health, persistence and consequences in adulthood, family/parental influences and attitudes, and association with parental somatic symptoms. The results of the update are summarized in the Table 1.

**Table 1. Studies of youth chronic pain included in the update**

Study	Topic	Type of study	Main findings
Gold et al. (2009) [14]	Chronic pain and HRQL	Patients recruited from an outpatient clinic	Chronic pain affects children's health related quality of life compared to population-based normative data and data of children with other chronic illnesses
Hirschfeld et al. (2015) [15]	Chronic pain and HRQL	Nation-wide data	Pain-related disability and frequency are also important in assessing the severity of recurrent pain while generic predictors and demographic variables are of lesser relevance to children with recurrent pain
Rask et al. (2012) [7]	Chronic pain and HRQL	The Copenhagen Child Cohort 2000	Close link between health anxiety symptoms, functional somatic symptoms and emotional symptoms
Egger et al. (1998) [16]	Chronic pain and child mental health	Population-based sample of children and adolescents	Girls with depression and anxiety disorders had a significantly greater prevalence of headaches than girls without an internalizing disorder while conduct disorder was significantly associated with headaches in boys
Crawley et al. (2014) [17]	Chronic pain and child mental health	Randomized controlled trial that compared the efficacy of CBT, SRT, their combination, and pill placebo	The total number and severity of physical symptoms was associated with age, principal diagnosis, anxiety severity, impairment, and comorbid internalizing disorders
van Geelen et al. (2015) [18]	Chronic pain and child mental health	General adolescent population study	The proportion of medical and psychiatric conditions was highest in the group with 3 or more persistent distressing somatic symptoms combined with serious psychological concern; belonging to this group most significantly increased odds ratios for functional impairment
Knook et al. (2012) [19]	Persistence of chronic pain	Follow-up study of referred youth	After 6 years, 75% of the participants still experienced chronic pain and 15% were in complete

<b>Study</b>	<b>Topic</b>	<b>Type of study</b>	<b>Main findings</b>
		aged 8-17 with chronic pain	remission of both chronic pain and psychiatric disorder; comorbid psychiatric disorder at study entry was a predictor of psychiatric disorder, but not of persistent chronic pain, in adolescence and young adulthood
Perquin et al. (2003) [20]	Persistence of chronic pain	Follow-up study	Chronic benign pain in childhood seemed to persist in a considerable proportion (30-45%); children with persistent pain (9.4%) differed from those with non-persistent pain in frequency, history and location of the pain, emotional problems and their mother's health
Shanahan et al. (2015) [21]	Persistence of chronic pain	Prospective-longitudinal community sample	Frequent and recurrent somatic complaints in childhood predict adulthood emotional disorders and specific to later depression and generalized anxiety disorder
Hotopf et al. (1998) [22]	Persistence of chronic pain	Population based cohort study	Children with persistent abdominal pain did not necessarily continue to experience physical symptoms into adulthood but were at increased risk of adult psychiatric disorders
Spee et al. (2015) [5]	Persistence of chronic pain	Prospective cohort study in primary care	The risk of having chronic abdominal pain at 1 year of follow-up was 37.1% overall; the risk of this outcome increased with number of predictors (e.g. increasing age, waking up at night with pain, high levels of other somatic complaints, and chronic abdominal pain at baseline)
Wilson et al. (2015) [24]	Chronic pain and family influences	Study of parents with and without chronic pain	Parents with chronic pain endorsed more pain in their adolescents, were more likely to catastrophize about their offspring's pain and respond with protective behaviors
Helgeland et al. (2011) [4]	Chronic pain and family influences	Follow-up study of referred patients	Patient's older age and peer problems at baseline were significantly associated with more abdominal pain at follow-up whereas patient's emotional symptoms, prosocial behaviour and maternal somatic symptoms with disability
Coenders et al. (2014) [26]	Chronic pain and family influences	Case control study	Children with chronic pain are more likely to have a parent with chronic pain like migraine, recurrent abdominal pain, restless leg syndrome and various somatic symptoms
Evans et al. (2007) [27]	Chronic pain and parental somatic symptoms	Pilot study	Children of mothers with chronic pain reported the most physical and psychological problems, followed by children of fathers with chronic pain and children from the control group
Graungaard et al. (2015) [28]	Chronic pain and parental somatic symptoms	Cross-sectional questionnaire based survey	Mothers who had chronic pain were five times more likely to report frequent pain in their children than mothers without pain
Kaasbøll et al. (2015) [29]	Chronic pain and parental somatic symptoms	Large population-based health survey	Concurrent maternal and paternal chronic pain was associated with reduced self-esteem, social competence, and family cohesion in girls; maternal chronic pain was associated with higher social competence in boys and reduced self-esteem in girls
Lier et al. (2014) [30]	Chronic pain and parental somatic symptoms	Large population-based health survey	Maternal and paternal musculoskeletal pain (CMP) was associated with 20-40% increased odds of CMP in sons and daughters; both sons and daughters had an OR of 1.6 (95% CI 1.4 to 1.9) when both parents reported CMP, compared to when none of the parents had CMP
Darlington et al. (2012) [31]	Chronic pain and parental somatic	General population sample of adolescents	Chronic pain in adolescents was associated with mothers' mainly somatic pain and/or psychopathology; maternal anxiety, maternal stress

Study	Topic	Type of study	Main findings
	symptoms	from a cohort study	and higher levels of parenting stress were related to chronic pain at a later age
Ramchandani et al. (2006) [32]	Chronic pain and parental somatic symptoms	Population based study	Maternal -but not paternal- anxiety, depression and somatic symptoms at the age of 21 months were associated with recurrent abdominal pain at age 2.5 years; however, at follow-up (6.75 years), both maternal and paternal anxiety in the first year were related to children's recurrent abdominal pain
Walker et al. (1994) [34]	Chronic pain and parental mental health	Pediatric patient sample aged 8-17	Mothers, but not fathers, of children with recurrent abdominal pain had more anxiety, depression and somatic symptoms
Wolff et al. (2010) [6]	Chronic pain and parental mental health	Epidemiological study	Prenatal and early postnatal maternal anxiety and somatic symptoms (including pain symptoms) predicted children's somatic symptoms at the age of 1.5 years

### 3. RESULTS

#### 3.1 Chronic Pain and the Biopsychosocial Model

It is generally agreed that in order to study chronic pain, all three aspects of the bio-psycho-social model should be considered i.e. biological, psychological and social. A lot of risk factors and stressors have been associated with chronic pain and somatic complaints in children and young people e.g. past and current emotions, personality types and coping styles, poor environment including trauma and stress, parental influences, anxious attachment, family conflict, school and peer stress, community violence exposure [8-11]. In Generation R Study, a large epidemiological study, Wolff and colleagues found that fearful temperament, temperamental falling reactivity, maternal somatic symptoms, anxiety symptoms, and parenting stress each independently and prospectively increased the likelihood of children's somatic complaints at 18 months of age [6]. Most somatic complaints are caused by a combination of these and other risk factors, demonstrating the complexity of this diagnosis [8] and the clustering of illness within families is best understood using a model that incorporates all these factors [11].

One of the most important issues in chronic pain is to identify children at risk of a prolonged course of pain and its correlated functional disability. The evaluation of family for coping strategies, psychosocial factors and appropriate follow-up can prevent ineffective use of healthcare resources [12]. The role and effects of parents in their child's pain is becoming clearer, and effective interventions for parents are being

developed [1]. By involving parents more effectively, care providers may address unmet treatment needs in a more effective way and improve treatment programs with the aim of increasing function, reducing pain-related disability and improving quality of life of children with chronic pain [13].

#### 3.2 Chronic Pain and Its Impact on Child Quality of Life

Chronic pain can affect children's wellbeing, quality of life, and every day functioning; more specifically, chronic abdominal pain sufficient to affect well-being is common among children initially seen for abdominal pain by family physicians [5]. In addition, chronic pain affects children's health related quality of life compared to population-based normative data and data of children with other chronic illnesses [14]. Pain-related disability and frequency are also important in assessing the severity of recurrent pain while generic predictors and demographic variables are of lesser relevance to children with recurrent pain [15].

#### 3.3 Chronic Pain and Child Mental Health

Many studies have documented a strong association between chronic pain and psychopathology. Thus, chronic pain can be a symptom of an underlying psychiatric disorder such as anxiety and/or depression. Different theoretical models have been suggested to explain the causal relationship between chronic pain and psychopathology, with the diathesis-stress model possibly being one of the most dominant ones. In one of the earlier studies [16], girls, but not boys, with depression and anxiety disorders had a significantly greater prevalence of headaches than girls without an internalizing

disorder while conduct disorder was significantly associated with headaches in boys [16]. The findings of another study similarly suggest a close link between health anxiety symptoms, functional somatic symptoms and emotional symptoms [7]. In a study of youth with anxiety [17], the total number and severity of physical symptoms was associated with age, principal diagnosis, anxiety severity, impairment, and the presence of comorbid internalizing disorders. In another study, the proportion of medical and psychiatric conditions was highest in the group reporting 3 or more persistent distressing somatic symptoms combined with serious psychological concern; belonging to this group most significantly increased odds ratios for functional impairment [18].

### **3.4 Chronic Pain, and Its Persistence and Consequences in Adulthood**

Chronic pain frequently persists into adolescence and adulthood and also can lead to psychopathology. In a follow-up study of clinically referred youth aged 8 to 17 years with chronic pain, it was found that after 6 years, 75% of the participants still experienced chronic pain and 15% were in complete remission of both chronic pain and psychiatric disorder; comorbid psychiatric disorder at study entry was a predictor of psychiatric disorder, but not of persistent chronic pain, in adolescence and young adulthood [19]. In an earlier follow-up study [20], chronic benign pain in childhood seemed to persist in a considerable proportion (30-45%), although it didn't generally deteriorate over time. Children with persistent pain (9.4%) differed from those with non-persistent pain in frequency, history and location of the pain, emotional problems and their mother's health [20]. The follow-up of a clinical sample of children with abdominal pain revealed that patient's older age and peer problems at baseline were significantly associated with more abdominal pain at follow-up whereas patient's older age, emotional symptoms, prosocial behaviour and maternal somatic symptoms were associated with disability [4]. In a prospective cohort study in primary care, the risk of having chronic abdominal pain at 1 year of follow-up was 37.1% overall; although the risk of this outcome increased with number of predictors, these predictors (e.g. increasing age, waking up at night with pain, high levels of other somatic complaints, and chronic abdominal pain at baseline) were of limited value in identifying children in whom pain will become chronic,

suggesting that other, as yet unidentified factors play an important role [5].

Shanahan and colleagues reported that frequent and recurrent somatic complaints in childhood predict adulthood emotional disorders and specific to later depression and generalized anxiety disorder [21]. Similarly in another study, children with persistent abdominal pain did not necessarily continue to experience physical symptoms into adulthood but were at increased risk of adult psychiatric disorders [22].

### **3.5 Chronic Pain and Family/Parental Influences and Attitudes**

Parents and family can have an impact on children's chronic pain. In a review by Palermo and colleagues, a developmental perspective of this influence has been suggested; Parental behaviors, emotions, and attitudes can shape this influence. The reviewers also point out to several gaps in this research such as in understanding the processes, the lack of longitudinal data and also the need for adapting relevant intervention strategies [23].

On the other hand, child chronic pain can impact everyday parenting activities and emotions, and also pain-specific parent responses that are known to be related to increased pain and pain catastrophizing in children and adolescents. When compared with controls, parents with chronic pain endorsed more pain in their adolescents, were more likely to catastrophize about their offspring's pain and respond with protective behaviors. Parents' own pain interference and the perception of higher pain in their adolescent was associated with increased protective parenting in the chronic pain group [24].

Overall, families of children with chronic pain have poorer family functioning compared to families of healthy ones [23,25]. In addition, the pain-related disability is more consistently related to family functioning than pain intensity [25].

### **3.6 Chronic Pain and Parental Somatic Symptoms**

Several clinical studies have shown that children with chronic pain are more likely to have a parent with chronic pain like migraine, recurrent abdominal pain, restless leg syndrome and various somatic symptoms [4,26]. In a pilot study, pain reports between children with chronic pain

and their parents were significantly correlated, suggesting a familial pain model. Social learning theory may explain the concordance between parent and child health in families experiencing parental chronic pain. Nevertheless children are not equally affected by fathers as by mothers in pain: children of mothers with chronic pain reported the most physical and psychological problems, followed by children of fathers with chronic pain and children from the control group [27].

A cross-sectional questionnaire-based survey in Danish public schools of children aged 6-11 years and their mothers, showed that mothers who had chronic pain were five times more likely to report frequent pain in their children than mothers without pain [28]. Other cross-sectional studies in adolescent and adult offsprings i.e. the HUNT 3, YOUNG-HUNT 3 and a large family-linkage within the HUNT study, have also revealed that both maternal and paternal chronic pain is a high risk factor for internalizing symptoms in their offspring, suggesting also that chronic pain has a heritable component [29,30].

In the TRAILS study, chronic pain in adolescents was associated with mothers' mainly somatic pain and/or psychopathology; maternal anxiety, maternal stress and higher levels of parenting stress were related to chronic pain at a later age [31]. On the contrary, one population-based study found no association of parental pain complaints with children's recurrent abdominal pain at the age of 2.5 and 6.75 [32]. Evans and colleagues in reviewing the parent-child pain association, they present a conceptual model incorporating a number of parent and child specific characteristics and variables necessary to exploring the mechanisms of parent-child pain relationships and designing the appropriate interventions [33].

### **3.7 Chronic Pain and Parental Mental Health**

Parental mental health also seems to be related to children's chronic pain. The study of an earlier pediatric patient sample aged 8-17 years, revealed that mothers but not fathers, of children with recurrent abdominal pain had more anxiety, depression and somatic symptoms [34]. In a more recent study, it was also found that maternal -but not paternal- anxiety, depression and somatic symptoms at the age of 21 months were associated with recurrent abdominal pain at age 2.5 years. However, at follow-up, both

maternal and paternal anxiety in the first year were related to children's recurrent abdominal pain at 6.75 years [32]. In another study [20], persistent abdominal pain was associated with poor health and emotional disorder in the parents. Two large epidemiological studies have also confirmed the above association. In the Generation R Study, prenatal and early postnatal maternal anxiety and somatic symptoms (including pain symptoms) predicted children's somatic symptoms at the age of 1.5 years [6]. Similarly, in the TRAILS study, maternal anxiety, maternal stress and higher levels of parenting stress were related to chronic pain at a later age [31].

## **4. CONCLUSIONS**

In conclusion, research suggests that chronic pain of unknown etiology is common, can have an early onset and persistence in later life and points to the importance of focusing wider than just the patient's symptoms of pain in clinical practice and research as well as to the need for clinical and preventive interventions at least in vulnerable children. Identifying the associations between individual, social, family, and community based stress and somatic symptoms may improve the quality of life for children living in urban environments through early identification and treatment [9]. Parental somatic and mental health problems are among the commonest early risk factors associated with children's chronic pain. Lastly, Pain training in Child, as in Adult, Psychiatry will contribute to better understanding both pain syndromes and psychiatric morbidity [35].

## **CONSENT**

It is not applicable.

## **ETHICAL APPROVAL**

It is not applicable.

## **COMPETING INTERESTS**

Author has declared that no competing interests exist.

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