School Functioning and Chronic Pain: A Review of Methods and Measures

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Objective   School functioning is among the most important life domains impacted by chronic pain. This review provides a summary of the measures currently used by researchers to assess school functioning in children with chronic pain. Methods   We conducted a systematic review of the literature on school absenteeism and school functioning in children and adolescents with pain. Searches were restricted to a time frame including January 1985 to December 2010. Results   Fifty-three articles are reviewed: all include some form of assessment of school absenteeism or school functioning as part of the study outcome measures. Of the 53 articles, 26 assessed school absenteeism and 27 assessed an aspect of school functioning; 14 of these 27 articles assessed both. Conclusions   Understanding the comprehensive impact of pain on school functioning will require improvements in our current assessment methods.

Key words   academic functioning; chronic and recurrent pain; school functioning.

Introduction

All children and adolescents experience pain at some time (e.g., injury and medical procedures). While pain is a common experience, not all types of pain are associated with regular disruptions of daily activities. Chronic or recurrent pain is particularly concerning, in part, because of the influence on functioning. Children and adolescents who have chronic or recurrent pain often cannot participate in activities that are typical for their developmental level (Claar, Walker, & Smith, 1999; Hainsworth, Davies, Khan, & Weisman, 2007). The inability to engage in and navigate developmentally appropriate activities such as attending school and social situations may decrease a child’s feeling of competence in these areas (Walters & Williamson, 2000). In an effort to design comprehensive treatment strategies, it is important that we accurately assess the impact of pain on functioning in day-to-day activities.

Among the activities in which youth engage, school-related activities are among the most important, with myriad ways in which this area of life can be impacted by pain. For example, it has been found that children who have chronic pain conditions are absent from school more often than their healthy peers (e.g., Carlsson, Larsson, & Mark, 1996; Dunn-Geier, McGrath, Rourke, Latter, & D’Astous, 1986; Lovell et al., 1990). Chronic pain can also influence activities in the school setting through sleep deprivation, negative family interactions related to pain symptoms and treatment, pain-related inattention in the classroom (Chan, Piira, & Betts, 2005), increased susceptibility to the experience of depressive symptoms (Logan, Simons, & Kacynski, 2009), and difficulty in coping with the demands of the tasks in the classroom (Logan & Curran, 2005), to name just a few examples.

More often than any other variable, school absence has been used as an indication of the degree to which pain affects the ability to “function” in school (e.g., Gil et al., 2003; Hyman et al., 2002; Kashikar-Zuck et al., 2010). While absenteeism is an important outcome, the school functioning construct should encompass more than...
attendance alone (Chan et al., 2005). More broadly defined, it could also include a number of related aspects of functioning, including academic performance (e.g., grades within and across subjects, local and national standardized test scores, and classroom participation), self and teacher perceptions of academic competence (Logan, Simons, Stein, & Chastain, 2008), participation in school activities (e.g., athletic groups, academic clubs, academic, and social field trips), and social functioning in the school setting (e.g., social clubs, dances, school friendships) (Chan et al., 2005). In short, *school functioning* includes any social, cognitive, or emotional aspect of behaviour that occurs directly within the school setting or indirectly impacts behaviour and mental processing in the school setting. Without thoroughly understanding all of the ways in which pain impacts this critical domain of daily life, it is as though a large piece of the puzzle is missing, making it impossible to completely comprehend what it means for a child or teen to live with chronic pain.

**Current Review**

The overall goal of the current investigation was to review the construct of school functioning as used in studies of pediatric chronic and recurrent pain. Given that the overwhelming majority of studies have focused on school attendance as the sole index of school functioning, this review will necessarily emphasize this particular outcome. Further, we provide an overview of standardized measures (including psychometrics) that have been used to understand the impact of pain on school functioning, based on the broad definition described above. Finally, we provide recommendations to unify and strengthen future research. It is hoped that this review may serve as a tool and as a springboard to foster much needed development in this area of clinical research.

**Methods**

Included in this methodological review were empirical studies in which school absenteeism and/or school functioning was assessed in children and adolescents with chronic or recurrent pain; review articles and purely observational or descriptive studies were excluded. The definition of chronic and recurrent pain was not limited, except to exclude acute pain (i.e., pain <3 months' duration and not related to a chronic pain status or experience, and explicitly referred to as “acute” by the authors, such as related to procedural pain). Therefore, the articles included pain of more than 3 months’ duration, resulting from any etiology (e.g., juvenile rheumatoid arthritis, chronic fatigue syndrome, and pain due to chronic illness).

**Search Strategies**

A systematic search of the literature was conducted using electronic searches of CINAHL, Ovid MedLine, PubMed, ERIC, and PsychInfo. The objective of the search was to obtain all empirical, peer-reviewed articles in which school absenteeism and aspects of school functioning were used as variables (either independent or dependent) to assess the functioning of children with chronic pain. Searches were restricted to the period from January 1985 to December 2010, and articles were included only if published in English. An initial search was conducted using a combination of key words: child*, adolescent*, and pain were combined with key words and phrases related to school: “school absence,” “school avoidance,” “school performance,” and “school function*.” After an initial search yielded 85 relevant articles, a secondary search conducted by a research librarian yielded 610 articles. The secondary search included a combination of the following key words: school function*, “school achievement,” “school performance,” “academic achievement,” “academic performance,” “achievement tests,” “academic failure,” “classroom behavior,” “student engagement,” “student attitudes,” “school environment,” “elementary school students,” “junior high schools,” “high schools,” “middle schools,” “school,” “elementary schools,” “school absen*,” “truancy,” “school avoidance,” “school refusal,” “school attendance,” “educational status,” “school adjustment,” “educational measurement,” “pain,” “chronic pain,” and “chronic disease.” These results were compared against results from the initial search, with a total of 53 peer-reviewed, empirical studies meeting search criteria.

**Results**

Of the 53 articles included (summarized in Table 1 and Supplementary Data), 27 assessed school absenteeism alone. Fourteen assessed both school absenteeism and at least 1 aspect of school functioning, and 13 assessed at least 1 aspect of school functioning without including absenteeism. Information derived from each study included: descriptive data on the study sample, the operational definitions of school absenteeism or school functioning as used in the study, and related findings.
### Table I. A Description of Studies involving Assessments of School Functioning

<table>
<thead>
<tr>
<th>Authors</th>
<th>Population</th>
<th>Aspect of school functioning assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berrin et al. (2007)</td>
<td>Cerebral palsy</td>
<td>General school functioning</td>
</tr>
<tr>
<td>Boey and Goh (2001)</td>
<td>Recurrent abdominal pain</td>
<td>School absence</td>
</tr>
<tr>
<td>Brace et al. (2000)</td>
<td>Chronic fatigue syndrome, juvenile rheumatoid arthritis</td>
<td>School absence</td>
</tr>
<tr>
<td>Breuner et al. (2004)</td>
<td>Recurrent headaches</td>
<td>School absence, school performance, involvement in extracurricular activities</td>
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<tr>
<td>Campo et al. (2002)</td>
<td>Frequent pain complaints</td>
<td>School attendance</td>
</tr>
<tr>
<td>Carlsson et al. (1996)</td>
<td>Headache</td>
<td>School absence, school satisfaction</td>
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<tr>
<td>Claar et al. (1999)</td>
<td>Recurrent abdominal pain</td>
<td>School competence</td>
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<tr>
<td>Collin et al. (1985)</td>
<td>Headache</td>
<td>School absence and visits to sickbay</td>
</tr>
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<td>Eaton et al. (1995)</td>
<td>Sickle cell anaemia</td>
<td>School attendance, grades, achievement</td>
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<tr>
<td>Fichtel and Larsson (2002)</td>
<td>Headache pain</td>
<td>School absence</td>
</tr>
<tr>
<td>Gauntlett-Gilbert and Eccleston (2007)</td>
<td></td>
<td>School attendance, school performance</td>
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<tr>
<td>Gil et al. (2003)</td>
<td></td>
<td>School absence</td>
</tr>
<tr>
<td>Gold, Mahrer, Yee, &amp; Palermo (2009)</td>
<td></td>
<td>General school functioning</td>
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<tr>
<td>Gold, Yetwin, et al. (2009)</td>
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<td>School absence</td>
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<td>Greco et al. (2007)</td>
<td></td>
<td>School absence</td>
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<tr>
<td>Guite et al. (2007)</td>
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<td>Hechler et al. (2009)</td>
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<td>School absence, scholastic competence</td>
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<td>Hershey et al. (2000)</td>
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<td>School attendance</td>
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<td>Hunfeld et al. (2001)</td>
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<td>School absence</td>
</tr>
<tr>
<td>Ho et al. (2009)</td>
<td></td>
<td>Intelligence, achievement, oral reading ability, written language ability</td>
</tr>
<tr>
<td>Huguet and Miró (2008)</td>
<td>Community participants</td>
<td>School absence, general school functioning</td>
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<tr>
<td>Hunfeld et al. (2002)</td>
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<td>School absence</td>
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<tr>
<td>Hyman et al. (2002)</td>
<td>Pain associated-disability syndrome</td>
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<tr>
<td>Kashikar-Zuck et al. (2007)</td>
<td>Juvenile fibromyalgia syndrome</td>
<td>Peer relationships</td>
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<td>Kashikar-Zuck et al. (2010)</td>
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<td>Logan et al. (2009)</td>
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<td>School attendance, grades, self- and teacher-rated academic competence</td>
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<tr>
<td>Logan et al. (2008)</td>
<td></td>
<td>School attendance, grades, self- and teacher-rated academic competence, IEP or 504 plan</td>
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<td>Lovell et al. (1990)</td>
<td>Rheumatic disease</td>
<td>School absence</td>
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<tr>
<td>Nilsson, Drangsholt, M, &amp; List (2009)</td>
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<td>School absence, peer relationships</td>
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<tr>
<td>Noll et al. (2000)</td>
<td>Sickle cell disease</td>
<td>School absence, peer relationships</td>
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<tr>
<td>Noll et al. (1996)</td>
<td>Chronic benign pain</td>
<td>School absence, social impairment</td>
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<tr>
<td>Perquin et al. (2001)</td>
<td>Juvenile fibromyalgia, juvenile rheumatoid arthritis</td>
<td>General school functioning</td>
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<tr>
<td>Petersen et al. (2009)</td>
<td></td>
<td>School attendance</td>
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<tr>
<td>Reid et al. (2005)</td>
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<td>School absence</td>
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<tr>
<td>Roth-Isigkeit et al. (2003)</td>
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<td>School absence, peer relationships</td>
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<tr>
<td>Shapiro et al. (1993)</td>
<td></td>
<td>Intelligence, achievement</td>
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<td>Sherry et al. (1991)</td>
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<td>School absence, academic performance, scholastic competence</td>
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<td>Simons et al. (2010)</td>
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<td>School absence</td>
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<tr>
<td>Smith et al. (2003)</td>
<td>CFS and migraine</td>
<td>School absence</td>
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<td>Smith et al. (1999)</td>
<td>Headaches</td>
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<tr>
<td>Stordal, Nygaard, &amp; Bentsen (2003)</td>
<td></td>
<td>School absence, academic competence, peer relations, perceived academic and social competence</td>
</tr>
<tr>
<td>Sturge et al. (1997)</td>
<td>Recurrent abdominal pain</td>
<td>School absence</td>
</tr>
<tr>
<td>Tsao, Meldrum, Kim, &amp; Zeltzer (2007)</td>
<td></td>
<td>Social functioning</td>
</tr>
<tr>
<td>Varni et al. (2006)</td>
<td>Chronic pain</td>
<td>School absence, general school functioning</td>
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<tr>
<td>Walker et al. (1995)</td>
<td>Recurrent abdominal pain</td>
<td>School absence</td>
</tr>
<tr>
<td>Walker et al. (1998)</td>
<td>Recurrent abdominal pain</td>
<td>School absence, academic competence, peer relations, perceived academic and social competence</td>
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<tr>
<td>Walters and Williamson (2000)</td>
<td>Chronic pain</td>
<td>School attendance, activity restriction related to school</td>
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<tr>
<td>Youssef, Atienza, Langseder, &amp; Strauss (2008)</td>
<td>Community participants</td>
<td>School absence, participation in school activities</td>
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</tbody>
</table>

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**Approaches to Assessing School Absence/Attendance**

Twenty-six studies used school absence/attendance as the sole index of the impact of pain on school functioning (see Supplementary Table S1), and 14 of the studies used school attendance coupled with other measures of school functioning (see Supplementary Table S2). While full days absent was the most commonly used metric, details involved in the measurement of this seemingly simple outcome varied significantly across studies. For example, reasons for school absences were not always specified, which means that absences could have been related to a variety of reasons other than pain, such as religious obligations, family emergencies, or illness, yet this information cannot be parsed out from the study details. In other cases, a reason was specified but was not restricted to pain. For example, in a study by Roth-Isigkeit, Thyen, Stöven, Schwarzenberger, and Schmucker (2005) only the total number of school days absent was utilized; and therefore, the influence of pain on school attendance may be overestimated. Among articles in which absences were restricted to time missed due to pain or “illness,” other aspects of the assessment of absence varied. For example, a clean time frame over which the absences occurred was not provided in the articles by Boey and Goh (2001); Campo, Comer, Jansen-McWilliams, Gardner, and Kelleher (2002); Carlsson et al. (1996); Gil et al. (2003); and Wiendels, van der Geest, Neven, Ferrari, and Laan (2005), made it impossible to determine the cause of the absences.

Across studies in which the time frame of the absences was specified, the range varied from very short to much longer periods of time. For example, Hunfeld et al. (2001, 2002) and Kashikar-Zuck, Goldschneider, Powers, Vaught, and Hershey (2001) summer school days absent within the past 4 weeks of school, Dunn-Geier et al. (1986) and Lovell et al. (1990) included the past 2 months of school. Hershey, Powers, Beniti, and deGrauw (2000) examined absences within the past semester. Other studies specified longer periods, such as the past 6 months of the school year (Brace, Smith, McCauley, & Sherry, 2000; Breuner, Smith, & Womack, 2004; Smith, Martin-Herz, Womack, & Marsigan, 2003; Smith, Martin-Herz, Womack, & McMahon, 1999), the past three semesters of school (Sturge, Garralda, Boissin, Doré, & Woo, 1997), and the past school year (Fowler, Johnson, & Atkinson, 1985; Reid, McGrath, & Lang, 2005; Walker, Garber, Van Slyke, & Greene, 1995; Walker, Guite, Duke, Barnard, & Greene, 1998; Weitzman, Walker, & Gortmaker, 1986).

In addition to variation in reason and time frame, we found limited information within the methods sections regarding what constitutes an absence from school. While arriving late or leaving early from school may be common for children with chronic pain, we found limited data on such occurrences and no consensus between studies regarding how much time missed from school would be considered an absence. Most of the studies collected “days missed” (e.g., Brace et al., 2000; Breuner et al., 2004; Dunn-Geier et al., 1986; Fowler et al., 1985; Hershey et al., 2000; Smith et al., 1999; Sturge et al., 1997) that would imply full days missed; however, this may not be the case. Several studies obtained more detailed information, choosing to collect number of full and half-days (Kashikar-Zuck et al., 2010), number of half-days attended in an average week (Cohen, Vowles, & Eccleston, 2010), number of school hours absent (rated on a scale from 0 hrs to more than 10 hrs), number of times the student left school due to pain (“never” to “more than six times”) in the previous month (Fichtel & Larsson, 2002), as well as number of half-day sessions attended in 1 week coupled with a categorization of school attendance (graduated, full time, part time, home tutoring, none, completed school) (Eccleston, Malleson, Clinic, Connell, & Soubut, 2003).

Finally, the agent of report varied across studies. Most relied on self-report by children (Cohen et al., 2010; Eccleston et al., 2003; Smith et al., 1999), followed by those in which parents reported absences (Campo et al., 2002). A few studies involved the use of data from multiple reporters, including both self- and parent-report (e.g., Brace et al., 2000), averages of the two (Smith et al., 2003), reports by a healthcare professional, parents, and self-reports (Lovell et al., 1990), and attendance records obtained directly from the school (Reid et al., 2005), or school and parent report (Kashikar-Zuck et al., 2010). In part to address the question of report validity, one recent study has shown that the source of reports of school absences does not influence the quality of the report, with parent, adolescent, and school reports being fairly consistent (Logan et al., 2008).

**Approaches to Assessing School Functioning**

Of the 27 articles assessing at least 1 aspect of school functioning, 13 evaluated an aspect of school functioning with no mention of attendance, and 14 assessed school attendance and at least 1 aspect of school functioning (see Supplementary Table S2). Both standardized and unstandardized measures were used to address various ways in which pain may impact school functioning in a broader sense than afforded by assessing attendance alone.
Standardized Measures Used to Assess School Functioning

Of the studies that employed standardized measures to examine school functioning (see Supplementary Table S3), the most commonly used was the Pediatric Quality of Life Inventory (PedsQL, V 4.0, Varni, Burwinkle, & Seid, 2006). Although each of the five studies that used the PedsQL reported on all scores available (total, summary, and subscale scores), the school functioning subscale was used to address overall school functioning. Based on the use of this measure, investigators have linked specific disease states (Petersen, Hägglöf, & Bergström, 2009), recurrent pain (Petersen, Huguet & Miro, 2008) to poor school functioning, as compared with less severe disease states, normative healthy samples, or those without recurrent pain.

Several standardized measures have been used to explore domains of functioning not typically addressed in studies of pediatric chronic pain. As one example, the Harter Self-Perception Profile for Adolescents (SPPA) has the potential to assess multiple aspects of academic, social, and athletic domains. The Self-Perception Profile for Children (SPPC) contains six of the nine domains (Scholastic Competence, Social Acceptance, Athletic Competence, Physical Appearance, Behavioral Conduct, and Global Self-worth) in the SPPA. For example, Claar and colleagues (1999) examined the relationship between academic, social, and athletic domains and functional disability in adolescents with recurrent abdominal pain. Walker and colleagues (1998) used this measure to assess academic and social competence in adolescents with recurrent abdominal pain. Logan and colleagues (2008) used the scholastic subscale to address academic competence in adolescents with chronic pain. While the SPPA also exists as a child self-report form, no studies in pediatric pain have used it to examine school functioning. Assessment of social functioning can also be found using the Child and Adolescent Social and Adaptive Functioning Scale (CASAFS). This measure assesses not only social functioning, but also adaptive functioning, which can provide more information regarding how painful experiences influence children’s general school experience. Using this measure coupled with absenteeism, Gauntlett-Gilbert and Eccleston (2007) were able to show that while youth with chronic pain had poor attendance, they were similar to nonclinical controls in both social and adaptive functioning.

Teacher reports of school functioning can be beneficial because they provide information that is not readily available from medical appointments during which only the patients and family members are present. The Walker–McConnell Scale (WMS) provides a teacher report of academic competence and was used by Logan et al. (2008) to assess children with chronic pain, noting that these children displayed no difficulties in these areas as compared to peers. The Social Skills Rating Scale (SSRS) provides a teacher report of children’s social interactions, specifically victimization, which can be a concern for children with chronic pain who miss many days of school. Greco, Freeman, and Dufton (2007) were able to show that youth (particularly boys) with frequent abdominal pain were not only using school medical services more often than their peers without pain, but they also experienced higher levels of overt victimization. Levels of pain were also shown to be inversely related to social skills and academic competence. Other measures focus on social interactions and social competence, such as the Health Resources Inventory, as used by Walker et al. (1998) to examine children with recurrent abdominal pain. It was found that children who experienced increased functional disability also reported lower levels of social competence.

Measures assessing peer relationships and social functioning at school have been used to further understand how peers’ perceptions of one another influence peer relationships. The measures must be completed by the primary participant’s peers, and can also be completed by the participant. These measures include the Like Rating Scale, Revised Class Play, and Three Best Friends. The teacher can also complete the Revised Class Play. The Loneliness and Social Dissatisfaction Questionnaire is a self-report measure that also assesses peer relationships and social functioning. Using these measures, it has been noted that individuals with chronic pain conditions, such as juvenile primary fibromyalgia syndrome and sickle cell disease, are viewed by peers as less well liked and having fewer reciprocal relationships than peers (Kashikar-Zuck et al., 2007; Noll et al., 1996). Peers also viewed children with sickle cell disease as being sick often, missing school often and being tired at school more often than peers (Noll et al., 1996). However, no differences were found in a study of youth with juvenile rheumatoid arthritis when compared with peers (Noll et al., 2000). These differences in peers’ perceptions of children with chronic pain conditions require more investigation to assess whether the differences are a direct result of the chronic pain condition.
(i.e., reduced school attendance influences the ability to build peer relationships) or an indirect result of the condition (i.e., peers’ perceptions of the chronic pain condition influence peer relationships).

Finally, Ho, Bennett, Cox, and Poole (2009) and Sherry et al. (1991) examined cognitive achievements and intelligence using standardized measures, such as the Wechsler Intelligence Scale for Children and the Wide Range Achievement Test, to compare the abilities of children with chronic pain against population standards. It was found that children with chronic pain did not differ significantly from the general population on cognitive abilities and intelligence and their scores most often fell in the average range.

As can be seen above, there are multiple standardized measures used to assess various aspects of school functioning. The PedsQL (Varni et al., 2006) assesses the overall domain of school functioning, while the other measures used in the pediatric population assess specific aspects of school functioning. The WMS provides a teacher report of academic competence (Walker & McConnell, 1988), and the SSRS provides a teacher report of social functioning (Gresham & Elliott, 1990). Other measures that specifically address various factors of school functioning include the SPPA, which assesses academic, social, and athletic functioning (Harter, 1988); the CASAFS, which assesses social and adaptive functioning (Price, Spence, Sheffield, & Donovan, 2002); and the Health Resources Inventory (Gesten, 1976) and the CHQ (Landgraf & Abetz, 1997), which focus on social functioning. Cognitive abilities and intelligence in youth with chronic pain have been measured by intelligence and achievement tests (e.g., Weschler, 2003, 2008). Each of the above measures have high levels of reliability and/or validity (see Supplementary Data) and assess aspects of school functioning. However, there is currently no comprehensive measure available which assesses all facets of school functioning.

**Nonstandardized Measures of School Functioning**

In some studies, the authors chose a nonstandardized measure of functioning in the school setting (typically coupled with standardized measures) to tap into understudied areas of school functioning (see Supplementary Table S2). Both child-report of levels of satisfaction with school (Carlsson et al., 1996) and social interactions (Konijnenberg et al., 2005) have been found to be negatively related to school attendance in children who experience chronic pain. Indirect measures have also been used to assess the effects of pain on academic competence. For example, children who experienced chronic pain and who were not attending school regularly reported a significant increase in difficulty with school-related activities, such as completing homework and projects (Walters & Williamson, 2000). Many studies utilized parent or self-report of academic grades to assess how pain was influencing academic performance. These studies generally noted that pain was related to decreased academic performance (Breuner et al., 2004; Logan et al., 2008; Simons, Logan, Chastain, & Stein, 2010). Pain while at school (Heller, Alberto, & Meagher, 1996) and reduced hours of restful sleep due to pain (Bonner, Gustafson, Schumacher, & Thompson, 1999) have been found to be negatively correlated with students’ ability to concentrate, and maintain effort and motivation during classes. Other studies have used self-reports of social competence in the school setting. For example, Claar and colleagues (1999) found that children who rated themselves low in social competence experienced more abdominal pain symptoms than those who reported higher levels. In a separate study, a decrease in general school satisfaction was noted for children who experienced chronic headaches when compared to the satisfaction ratings of headache-free peers (Carlsson et al., 1996).

Several studies have involved five or more separate measures of various aspects of school functioning (Logan & Simons, 2010; Logan et al., 2008, 2009). In these studies, the investigators were not only able to report on baseline indices of pain and characteristics of school functioning such as number of days absent, they were also able to report on changes in these measures after an intervention, as well as relationships between indices of impaired school functioning. For example, Logan et al. (2009) found that level of depression was associated with self- and parent-report of pain’s interference on attendance and performance, as well as teacher reports of school adjustment. Among all of the studies reviewed, only one assessed whether an individualized education plan (IEP) or 504 plan was in place along with the accommodations available for students with chronic pain (Logan et al., 2008). Using these measures, the investigators found a relationship between the number of accommodations and school impairment, such that a greater number of accommodations was inversely related to attendance and directly related to subjective ratings of interference of pain with school attendance and performance.

**Limitations**

While a comprehensive search of the literature was accomplished, it is possible that this review has not captured all empirical studies on all direct or indirect aspects of school functioning for youth with chronic and recurrent pain. The literature in chronic pain and recurrent pain populations is often merged with literature on pain in general due to...
comorbid medical conditions, making it possible that the exclusion criteria limiting the search to chronic and recurrent pain reduced the number of studies reviewed. It is possible that factors related to other chronic medical conditions, such as diabetes and asthma, would influence children’s school functioning in the same manner as chronic pain but were deemed outside of the scope of this article.

Recommendations

Children and adolescents with chronic pain experience regular disruptions to their daily activities, with school functioning among the most important. This review provides a thorough overview of the methods used to assess school functioning in youth with chronic pain, with specific attention given to the use of school absenteeism, as this is what was found to be the most often used proxy in the literature. Two main conclusions can be drawn from this review: First, there are great disparities in assessment methods, particularly with respect to school absence. Standardizing assessment methods would foster both research and clinical endeavors. Second, the focus of research has primarily been on school absence, and it is clear that school functioning must include more than a child merely being physically present at school. It must also include assessment of academic performance, which is not limited to grades, and the ability to participate in and attend to academic activities regardless of graded outcome (Logan et al., 2008; Palermo, 2000). Levels of perceived competence (both self- and proxy reports by teacher or parent) in school and in social and athletic spheres are also part of what it means to function in the school setting (Chan et al., 2005; Logan et al., 2008; Palermo, 2000).

Based on this Review, We Offer Several Recommendations to Foster Both Research and Clinical Endeavors

1. Assessments of absenteeism should be as accurate and uniform as possible. The operational definition should take into consideration the amount of each school day missed, at least as detailed as half-day attendance. Perhaps the most accurate and informative assessment would be to report time missed as a function of potential time in school. It is also of importance when assessing the influence of pain on school functioning to clarify if the absence is due to pain or some other reason, such as a family emergency or illness unrelated to pain symptoms. Further, while parent- and self-reports have been shown to correlate with school records over relatively short periods of time, further evaluation of the accuracy of these subjective reports is needed, particularly if absenteeism is to be reported over longer time frames.

2. Given that physical presence at school does not necessarily equate with full cognitive or social presence, examination of the effect of pain on time present in either classroom, athletic, or social activities is warranted. For example, research in the education literature has examined “seat time,” calculated as time in class from which time spent in the nurses’ office was subtracted (Van Cura, 2010). It is also common for a child’s pain to interfere with participation in a physical education class, in which case time spent sitting out or not attending rather than participating could also be assessed.

3. Examinations of individual patterns and seasonal trends in both attendance and academic performance are needed. While reporting absenteeism as a severity index necessitates reporting over longer (e.g., an entire school year) rather than shorter (e.g., 2 weeks) periods of time, more focused attention on absences and academic functioning across time may allow for identification of triggers for pain as well as specific targets for intervention. It is much easier to catch up if one misses 5 individual days over a period of 2 months, as opposed to five consecutive days (Logan & Curran, 2005). The difficulty of the latter is best captured by Thies (1999, p. 395): “Falling behind academically leads to catching up, and catching up takes time away from keeping up. Self-confidence and achievement motivation are undermined.” Such occurrences may play a role in perpetuating pain and would go unnoticed without examining patterns over time.

4. More comprehensive measures and the consistent use of more standardized measures are needed to begin to understand the broad construct of school functioning. Included in such use should be standardized measures of academic achievement and measures of intelligence, as were utilized by Ho et al. (2009) and Sherry et al. (1991).

5. Recommendation 4 notwithstanding, a large gap exists in pediatric chronic pain research. Very few studies have examined cognitive functioning or academic performance. A recent review by Dick and Riddell (2010) includes nine studies (six of which did not meet our search criteria) that involve one or more aspects of cognitive functioning in youth.
with chronic pain. Aspects of cognitive processing addressed in these studies include memory, selective attention, intelligence, sequential and simultaneous information processing, memory loss and/or difficulty concentrating, academic competence, and academic performance. While a few of these studies suggest that cognitive functioning is disrupted by chronic pain, the findings are mixed. The authors make several very important points: (a) pain may disrupt cognitive processing through multiple pathways; (b) we know little about pre-pain levels of functioning, making it difficult to draw any conclusions regarding cause–effect relationships; (c) intellectual testing is often done under optimal conditions which may be very unlike typical learning environments, such as busy classrooms; and (d) little to nothing is known about the mechanisms which may underlie changes or disruptions in cognitive processing. Regarding this final point, two studies in the review suggest that youth with chronic pain may develop pain-related attentional biases. Along these lines, several other recent studies (e.g., Van Ryckeghem et al., 2011) have employed experimental tasks to examine attentional control. Such studies may further expand our understanding of the potential relationships between chronic pain and cognitive processing and academic functioning. It is critical that future endeavors be directed toward understanding the effects of chronic pain on all aspects of cognitive functioning. We should also determine functioning throughout the pain experience, including prepain, current, and postintervention levels of functioning.

6. It is important that we begin to focus attention on treatment effectiveness aimed at improving functioning in the school setting, particularly from the perspective of the patient and the family. For example, determining whether IEPs and 504 plans are in place (as in Logan et al., 2008) and identifying ways in which such plans may or may not be helpful to the patient.

7. Research aimed at identifying developmental differences is needed to understand the complex interplay between pain and school functioning for youth of different ages and levels of development. As children get older, motivators for school engagement change, with characteristics of academic and social factors taking on different meaning and levels of importance. To understand the impact of pain on school functioning, we need to be able to parse out normal developmental forces that impact school functioning as well as identifying potential interactions between developmental levels and pain experiences.

8. It would be helpful to look to other areas of research to identify standardized measures that would allow for an examination of domains of school functioning that may otherwise remain unstudied. For example, Kashikar-Zuck et al. (2007) and others have used the Revised Class Play, often used in studies in developmental psychology, to examine peer reputation and social competence. We could also look to other fields to refine our current approaches. While our work involves many patient and proxy-reports of functioning, we know very little about the degree of change necessary for the child and important others (e.g., parents and/or teachers) to notice that functioning has either improved or declined. A primary focus of the field of patient-reported outcomes and health related quality of life has been to demonstrate that measures accurately reflect change that is important to patients/families, and are responsive to changes in health status. An additional focus has been on quantifying minimally important differences (Revicki et al., 2006). It is important that we continue efforts to understand outcomes as defined by the patients/families themselves and, importantly, to place those outcomes within an interpretable clinical framework.

9. Finally, research and clinical practice would benefit from the development of a comprehensive, standardized measure of the impact of pain on school functioning.

Conclusion

It is hoped that this review may serve as a tool and as a springboard to foster much needed development in this area of research. Operating from a significantly broader definition of “school functioning,” future research should work toward improving upon our current assessment methods. Aspects, as described above, could be included, as well as other important factors that may influence overall functioning such as levels of depression (Logan et al., 2008) and anxiety. Further, while standardized measures are available, currently there is no single measure that provides a comprehensive assessment of school functioning, including academic, extracurricular, social, and athletic functioning. In an effort to design
comprehensive treatment strategies for youth with chronic pain, it is important that we accurately assess the impact of pain on school functioning. Without thoroughly understanding all of the ways pain impacts this critical domain of daily life, it will not be possible to fully comprehend what it means for a child or teen to live with chronic pain.

Supplementary Data

Supplementary Data can be found at: http://www.jpepsy.oxfordjournals.org/

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References


