Children's Health Care

ISSN: 0273-9615 (Print) 1532-6888 (Online) Journal homepage: https://www.tandfonline.com/loi/hchc20

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To cite this article: Lloyd A. Taylor, Emma A. Climie & Melissa Wing-Yin Yue (2018): The role of parental stress and knowledge of condition on incidences of bullying and ostracism among children with ADHD, Children's Health Care, DOI: 10.1080/02739615.2018.1545580

To link to this article: https://doi.org/10.1080/02739615.2018.1545580

Published online: 28 Nov 2018.

CHILDREN'S HEALTH CARE
https://doi.org/10.1080/02739615.2018.1545580

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The role of parental stress and knowledge of condition on incidences of bullying and ostracism among children with ADHD

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ABSTRACT

This investigation explored the relation between parental stress and knowledge of Attention-Deficit/Hyperactivity Disorder (ADHD) on bullying and ostracism in children. Children diagnosed with ADHD have been shown to be more likely to be bullied than peers as well as being ostracized (Bastien, 2013; Fogleman et al., 2016; Taylor et al., 2010). Decreased parental stress and greater knowledge of ADHD are hypothesized to be associated with reduced reports of bullying and ostracism. Participants (n = 29) completed measures assessing parental stress, knowledge of condition, and measures of victimization. Significant relationships were found among markers of parental stress and child's severity of inattention and hyperactivity. Parents of children who reported increased victimization were more likely to report increased parental stress. Finally, knowledge of ADHD was associated with reductions in incidences of being bullied and ostracized. Implications for practice and practitioners are discussed.

Attention-Deficit/Hyperactivity Disorder (ADHD) is the among the most common neurodevelopmental disorders in children, affecting approximately 9.5% of kids aged 4–17 years (Pastor, Reuben, Duran, & Hawkins, 2015). Prevalence of diagnosis is variable across the lifespan with younger children being diagnosed less frequently than older children and boys being diagnosed more than girls (Pastor et al., 2015). Children diagnosed with ADHD often experience difficulties in a number of domains, including academic, social, emotional, and adaptive challenges. These children are at greater risk for academic underachievement (Biederman et al., 2004) and increased rates of depression or anxiety (Humphreys et al., 2013). The disorder is characterized by increased impulsivity, shortened attention spans, and verbal outbursts leading to social difficulties (such as being the victim of bullying and/or ostracism), and increased parental demands and parental stress (Barkley, 2014; Theule, Wiener, Tannock, & Jenkins, 2013). The role of parental stress and parental demands on the psychological and academic outcomes of

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children diagnosed with ADHD has been well established in the literature (Theule et al., 2013); however, exploration of the impact of parental stress on significant outcomes of bullying and ostracism have not been established.

The importance of understanding and addressing the factors that influence outcomes among children with ADHD cannot be overstated. Patients diagnosed with ADHD are at greater risk for social difficulties including being bullied and/or ostracized (Taylor, Saylor, Twyman, & Macias, 2010). For the purposes of this investigation, being bullied or ostracized will be operationally defined as being victimized by their peers. Specific definitions of bullying and ostracism may be found in the following. The impact of being bullied and/or ostracized on the short term and long term well-being of children is significant, including school attendance concerns, academic difficulties, heightened physical complaints, and increased internalizing and externalizing problems (Mason, 2008; Beran, 2009). This investigation sought to understand factors that might ameilorate social obstacles faced by these children with a particular focus on the role of parental stress and parental knowledge about ADHD.

While the impact of ADHD on functioning is multifaceted, one of the most difficult tasks and important challenges faced by children diagnosed with ADHD is their negotiation of their social domain. Children with ADHD often struggle in everyday social interactions and can have difficulties making and keeping friends (Barkley, 2014). As such, they may experience two significant outcomes that have deleterious consequences: they may be involved in bully/victim situations or they may be the victim of stigmatizing experiences, including ostracism.

Bullying is defined as behavior characterized by repetitive peer aggression with a power asymmetry where a perpetrator engages in harassing or picking on a victim (Monks & Smith, 2006), whereas ostracism involves exclusion or generally being ignored (Williams & Nida, 2009). Bullying has been linked concurrently and/or longitudinally to school attendance issues (Mason, 2008), academic achievement problems (Beran, 2009), heightened general health problems (Rigby, 1998), distraction that can threaten academics (Kowalski, Limber, & Agatson, 2008), externalizing and internalizing behaviors including violent and antisocial behavior, anxiety, depression, low self-esteem (Arseneault et al., 2006; Nansel, Haynie, & Simons-Morton, 2003), suicides (e.g., recent news stories), and homicides (Leary, Kowalski, Smith, & Phillips, 2003). Ostracism has been shown to routinely produce negative feelings, sadness, and anger (Williams & Nida, 2009). Ostracism may be even more painful than bullying as it can make the target feel invisible, non-existent, and completely discounted (Williams & Nida, 2009). Bullying, however aversive, affirms that children are noticed and in some way engaged with peers (Williams & Nida, 2009). Additionally, ostracism stimulates the same regions of brain that are activated during physical pain in preliminary studies of adults using fMRI (Eisenberger, Lieberman, & Williams, 2003). While

these results are in adult populations, the physiological ramifications of ostracism is noteworthy.

Studies have demonstrated that children and adolescents diagnosed with ADHD are at increased risk for both being bullied and becoming a bully (e.g., Holmberg & Hjern, 2008; Taylor et al., 2010; Twyman et al., 2010; Unnever & Cornell, 2003) and being ostracized by their peers (Hoza, 2007; Williams, 2001). Those children with externalizing behaviors have also been shown to be at greater risk for being bullied or becoming a bully (Twyman et al., 2010). In one of the first investigations demonstrating the relation between diagnosis of ADHD and incidences of bullying, Taylor et al. (2010) called for a systematic understanding of factors influencing bullying and ostracism among children with ADHD to develop targeted and empirically supported interventions; however, to date, limited work has been done in this regard.

Two factors that may influence bullying and ostracism among pediatric patients diagnosed with ADHD are parental stress and parental knowledge of ADHD, as these factors have been shown to impact morbidity in other pediatric populations, such as autism (Rao & Beidel, 2009), pediatric cancers (Rabineau, Mabe, & Vega, 2008), and type I diabetes (Streisand, Swift, Wickmark, Chen, & Holmes, 2005). The relationship between parental stress and parental knowledge of their child's medical condition and instances of bullying has also been established in other pediatric populations, thus setting the stage to explore these constructs and the impact they have on bullying and ostracism among children with ADHD (Alizadeh, Mirnaasb, & Hashemi, 2016; Garaigordobul & Machimbarrena, 2017). Parenting stress is defined as a mismatch between parenting demands and resources available to address those demands (Abidin, 1992; Theule et al., 2013). Parental knowledge of disease, or parental health literacy, is the awareness and accurate knowledge that parents have regarding a disorder that may be impacting their child.

Reductions in parental stress have been shown to lead to enhanced health outcomes and compliance to treatment, and improved social and academic functioning across diverse pediatric populations. Parental stress predicts functional impairment among pediatric cancer survivors regardless of neurocognitive deficits (Hile, Erickson, Agee, & Annett, 2014), greater morbidity among pediatric patients diagnosed with inflammatory bowel disease and asthma (Wolf, Miller, & Chen, 2008), and impacts overall school readiness and competence in the classroom (Soltis, Davidson, Moreland, Felton, & Dumas, 2015). Children of parents with less parental stress typically have better health outcomes, improved morbidity, and improved academic and social functioning regardless of diagnosis and/or condition (Farrell, Simpson, Carlson, Englund, & Sung, 2017; Lohaus et al., 2017). Maternal stress, which often manifests as maternal depression, has consistently been found to impact socio-emotional functioning, growth, and development among children and young adults with or without chronic illnesses (Ferro, Boyle, & Avison, 2015; Wajnsztejn et al., 2016).

The impact of parental knowledge of disease on pediatric outcomes has also been shown across diverse populations, including pediatric asthma patients (Janevic et al., 2017), children with chronic kidney disease, (Harrington, 2015), and school-aged children facing obesity (Chari, Warsh, Ketterer, Hossain, & Sharif, 2014). Increased parental knowledge and health literacy has been associated with improved preschool oral health (Mahat, 2017), greater adherence to provider recommendations among pediatric patients with epilepsy (Paschal, Mitchell, Wilroy, Hawley, & Mitchell, 2016), and improved mental health outcomes among pediatric patients (Dey, Wang, Jorm, & Mohler-Kuo, 2015).

Families of children with ADHD have been shown to demonstrate greater parental stress, while the impact of knowledge of ADHD on outcomes among these children is less understood. Regarding parental stress, recent work by Theule et al. (2013) demonstrated that parents of children diagnosed with ADHD have greater stress than their non-ADHD peers. Other investigations have shown that the parents of children with externalizing behaviors, such as emotional dysregulation and hyperactivity commonly found among children diagnosed with ADHD, have increased parental stress compared to parents of same aged healthy peers (Anastopoulos, Guevremont, & Shelton, 1992; Breen & Barkley, 1988; Johnson & Reader, 2002; Mash & Johnston, 1983; Theule et al., 2013). The increased parental stress is likely attributable to the aforementioned academic, social, emotional, and adaptive challenges children with ADHD face each day. Russell Barkley, arguably among the leading experts in the field, has noted that parents of children with ADHD face increased demands for advocating for their children at school and with other children and families (Barkley, 2006). Parents of children with ADHD struggle to meet the demands of parenting, and this increased parental stress negatively impacts the family (Deault, 2010; Johnston, Mash, Johnston, & Mash, 2001).

The impact of parental knowledge of ADHD on outcomes among these children remains elusive. While ADHD has been researched and studied for over a century (Barkley, 2014; Stubbe, 2000), the public's general knowledge of the disorder is often limited to media sensationalism and a focus on stories that are strongly emotional, controversial, or one-sided. In addition, even most evidence-based studies on ADHD are deficit-focused, highlighting areas in which individuals with ADHD perform worse or are less capable than those without ADHD (Climie & Mastoras, 2015; Climie, Mastoras, McCrimmon, & Schwean, 2013). Furnham and Sarwar (2011) noted that despite an increase in diagnoses of ADHD in both children and adults, as well as increased attention in popular media, parental knowledge regarding the causes, etiology, and treatment of ADHD remains at an unsettlingly low level. Kos, Richdale, and Jackson (2004, 2006) noted that particular areas of knowledge deficit included (a) family circumstances surrounding ADHD, (b) co-morbidities associated

with the disorder, and (c) poor knowledge regarding the social difficulties of these children including challenges related to being bullied or ostracized.

It is likely that both parental stress and parental knowledge of condition impact outcomes such as bullying and ostracism among pediatric patients diagnosed with ADHD. However, to date, these relationships have not been investigated. In response to the aforementioned call to action by Taylor et al. (2010), to better understand factors that influence outcomes of bullying and ostracism among children with ADHD, this investigation explored the relationship between parental stress and parental knowledge of condition on self-reported incidences of bullying and ostracism among children diagnosed with ADHD. One goal of the present investigation was to replicate others' findings regarding parental stress among children with ADHD in a Canadian sample and to assess the relationships between parental stress and disease severity. Consistent with the literature, we hypothesized that parental stress would increase as symptoms of ADHD increase. In addition, we sought to understand the relationship between parental stress and self-reported victimization (e.g., self-report of ostracism and self-report of being a victim of a bully) among patients diagnosed with ADHD. To date, no studies have explored the link between children's self-reported levels of victimization and markers of parental stress. We hypothesized that as children reported greater levels of victimization, indices of parental stress would correspondingly increase. A final goal of this investigation was to explore the relationship between parental knowledge of ADHD and self-reported victimization. It was hypothesized that greater parental knowledge of ADHD would be associated with lower self-reports of victimization. In other words, it was predicted that children whose parents had less overall knowledge of condition would be at greater risk for being bullied.

Method

Participants

To participate in the study, children were between the ages of 8 and 12 years, resided with their parents/guardians, and understood the English language. Those in the ADHD group were required to have a previous diagnosis of ADHD by a medical professional (e.g., physician, psychologist). Participants were excluded if they indicated any other neurological condition (e.g., Autism Spectrum Disorder [ASD], Tourette's syndrome) to ensure that the sample was comprised of those with ADHD as a primary concern. Thirty-five participants indicated interest in the current study (17 with ADHD, 18 controls); however, 5 of these participants were excluded due to failure to complete one or more of the tasks in this study and 1 participant was excluded due to the presence of ASD.

Final participants in the current study included 29 children (15 with ADHD, 14 controls) between the ages of 8 and 12 years of age, recruited from a large western Canadian city. Within the ADHD group, children had a mean age of 9.94 years (*SD* = 1.37) and included slightly more male participants (60%). Within the control group, children had a mean age of 10.39 years (*SD* = 1.56) and included more female participants (85%). No significant difference in age between groups was found although there were differences in the proportion of male to females in each group. Eighty percent of the parents of those in the ADHD group were married (1 family did not report); 73% identified themselves and their children as Caucasian, while 2 additional families identified as Chinese and Indian, respectively (2 families did not report ethnicity). In the control group, 64% of the parents were married (3 families did not report) and 64% identified themselves and their children as Caucasian (5 families did not report). Three parent reports were completed by fathers of the participating children (10%), while the rest were completed by mothers (90%). Four children in the ADHD group were identified as having a co-morbid learning disability, while 1 child in the control group had a learning disability and 1 child had anxiety concerns.

It is important to note that, for all analyses, children were combined into one group and differences between the control and ADHD children were not explored. This strategy was intentional. The authors were interested in understanding how a range of symptom severity may impact parent stress. As such, inclusion of those without ADHD meant that there were children with lower symptom presentations in addition to those with higher presentations (as part of the ADHD group). As well, use of symptom severity as a continuous variable allows for a greater understanding of those children who are slightly above or below an arbitrary symptom cut-off score (often a t-score of 65 or 70).

Measures

A number of research measures were completed by the parent and child participants independently. These measures provided insight into the parents' understanding and knowledge of ADHD and parent-reported stress levels, as well as the child's functioning regarding ADHD symptoms and bullying experience.

Parent measures

Parents completed a number of measures related to their child's functioning, as well as providing some demographic information. This demographic information included child age and gender, as well as ethnicity.

Conners rating scale, 3rd edition (conners-3). Parents completed the Conners-3 (Conners, 2008), a standardized measure that uses observer ratings to help

assess a child's behavior related to inattention, hyperactivity/impulsivity, learning problems, executive functioning, aggression, and peer relations. In addition, the scale provides a total score indicative of an attention or behavioral disorder. This form was used to determine the severity of a child's ADHD symptoms. The participating parent reported on their child's behaviors over the past month using a 3-point Likert scale, which ranged from "Never/Seldom" to "Very Often/Very Frequently." The Conners-3 has been normed on a large, American (United States and Canada) sample and covers the age range from 6 to 18 years old for the parent form (Conners, 2008). It has demonstrated internal consistencies values from 0.77 to 0.97 (Conners, 2016). Inter-rater reliably coefficients ranged from 0.52 to 0.94, which is indicative of weak to strong ranges in reliability (Conners, 2016). In regards to test-retest reliability, these coefficients ranged from 0.71 to 0.98, which is indicative of fair to strong levels of reliability (Conners, 2016).

Parenting stress index—4th edition (PSI-4). The PSI-4 (Abidin, 2012) is a standardized 120 item self-report measure that assesses parenting stress within the parent–child relationship. The PSI-4 evaluates stress associated with factors due to the characteristics of the parent, the child, and life circumstances. Within the PSI, there are two domains: Parent, examining characteristics of the parent that contribute to overall parenting stress, including factors such as sense of Competence (i.e., the extent to which the parent feels competent and capable in a parenting role), Isolation (i.e., degree of social support), Attachment (i.e., parent's sense of closeness with the child), Health (i.e., the extent to which parent health contributes to parenting stress), Role Restriction (i.e., parent's sense of limited freedom and constrained personal identity), Depression (i.e., assesses the parent's affective state), and Spouse/Parenting Partner Relationship (i.e., parent's perception of emotional and physical support from partner); and Child, including child characteristics such as Adaptability (i.e., the child's ability to adjust to changes in the social or physical environment), Demandingness (i.e., the parent's experience of the child placing demands on him or her), Mood (i.e., the child's affective state), Distractibility/Hyperactivity (i.e., the behavioural characteristics of the child often associated with ADHD), Acceptability (i.e., the extent to which the child's characteristics meet the parent's expectations), and Child's Reinforcement of Parent (i.e., parent's experience of interactions with the child as being positive or reinforcing; Abidin, 2012). Coefficient alpha reliability coefficients range from 0.78 to 0.88 for the Child Domain subscales and from 0.75 to 0.87 for the Parent Domain subscales with reliability across all domains greater than 0.96.

ADHD knowledge and opinion scale (AKOS). The AKOS (Bennett, Power, Rostain, & Carr, 1996) is a 43-item scale that measures parents' knowledge and attitudes towards ADHD. The scale is divided into two sections. The first section

consists of 17 true and false questions measuring parent knowledge of ADHD. The second section consists of 26 items answered on a 6-point Likert scale format (e.g., 1 = Strongly Disagree to 6 = Strongly Agree) assessing parents' willingness to use, and perceptions of, various treatment methods. The AKOS has four subscales designed to measure Knowledge, Counseling Acceptance, Medication Acceptance, and Counseling Feasibility. Psychometrically, the AKOS demonstrates adequate reliability and validity. Internal consistencies were 0.85 for Counselling Acceptability, 0.89 for Medication Acceptability, and 0.76 for Counseling Feasibility (Bennett et al., 1996). Item-total correlations for the Knowledge scale items were found to be significantly correlated with the total score (r = 0.15 to 0.62; $p < 0.05$; Bennett et al., 1996). Validity of this measure is not reported; however it has been utilized in research since 1996 with publications occurring in numerous peer reviewed journals of high standing including the Journal of Pediatric Psychology (Bennett et al., 1996).

Child measures

Children completed a number of measures related to intelligence, social-emotional well-being, and ADHD experiences. Of particular relevance to this study, the children completed an intelligence measure as part of the inclusionary criteria and two measures related to bullying.

Wechsler abbreviated intelligence scale, 2nd edition (WASI-II). The WASI-II (Wechsler, 2011) is an abbreviated version of the standardized Wechsler intelligence scales, appropriate for individuals aged 5 to 90 years. The WASI-II collects information regarding an individual's verbal and visual processing and reasoning abilities through the use of four subtests; together, these subtests generate a Full Scale Intelligence Quotient (FSIQ). For the purpose of the current study, children were required to demonstrate performance in the Average range (FSIQ ≥ 85) to ensure that lower cognitive abilities were not impacting their ability to understand and answer questions.

The WASI-II was normed on 2,300 individuals within the United States according to the U.S. Census 2008. Both strong reliability and validity have been demonstrated in the WASI-II (McCrimmon & Smith, 2013). The scores obtained using the WASI-II are highly correlated (r = 0.71 to 0.92) with the Wechsler Intelligence Scale for Children, 4th edition (WISC-IV; Wechsler, 2003) and the Wechsler Adult Intelligence Scale, 4th edition (WAIS-IV; Wechsler, 2008). Test-retest reliability measured twice within 12 to 88 days ranged from 0.87–0.95 within the child sample and thus demonstrates strong stability. Furthermore, internal test validity for the FSIQ-4 ranged from 0.94–0.97 (Wechsler, 2011). Across each subtest, strong interrater reliability is also demonstrated (0.94–0.95; Wechsler, 2011).

Bullying and ostracism screening scale (BOSS). The BOSS (Saylor et al., 2012) is a self-report measure used to examine the presence of bullying and ostracism in a pediatric population. It incorporates 16 core items that define and ask children about the perceived frequency of four types of bullying: physical, verbal/social, cyberbullying, and ostracism. Victimization scores are calculated based on the results of self-reported experiences of being a victim of a bully or being ostracized. Children indicate the extent to which others experience these types of bullying as well as whether they themselves experience these situations. The psychometric properties of the BOSS have been reported by Saylor et al. (2012). Test-retest correlations on the BOSS range from 0.38 to 0.64 and summary scores range from 0.55 to 0.64. Cronbach's alpha for each of the factors were at or above 0.70.

Procedure

Recruitment of participants occurred through a variety of methods, including poster advertisements in various clinics, coffee shops, and community message boards, utilizing a pre-existing database of families who had participated in previous research studies, and via social media. Recruitment materials did not specifically mention bullying or ADHD knowledge but instead focused on "helping to better understand the experiences of children with and without ADHD." Interested parents contacted the researchers and completed a brief pre-screening questionnaire to determine their child's eligibility for the study (e.g., ADHD diagnostic status, age, gender, English language proficiency, willingness to meet with the researchers).

Following consent procedures, parents completed their questionnaires in a quiet space while the participating child completed the test measures and questionnaires one-on-one with the graduate-level research assistant in an adjoining room. It was emphasized to parents that all information collected would be confidential and that their individual answers would not be known. Encouragement of honest answers was encouraged to ensure that we could accurately understand the struggles and successes of those with ADHD and their families. All questions were read aloud to the child to ensure that participants' reading abilities did not impact their comprehension of the questions. Upon completion, the family was provided with a debrief summary and thanked for their time. Children were given an age-appropriate toy of their choice and parents received a $25 family-friendly gift card as a token of appreciation for their time. All aspects of the study were approved by the university's Conjoint Faculties Research Ethics Board.

Results

Prior to completing the analyses pertinent to the research questions, normality of the data was analyzed using the skewness and kurtosis values for each variable.

All the measures met the acceptable range of −3 to +3 skewness values and −7 to +7 kurtosis values, with one exception. The skewness and kurtosis values for the BOSS Bullying Score fell above the cutoff points (skewness: 3.136; kurtosis: 9.069). These scores indicate that this score is skewed to the right, meaning that more children reported lower incidents of being a bully and that there may be some outliers in the dataset. Additionally, visual inspection of the distribution using histograms were conducted to ensure that rest of the dataset was normally distributed. It is common for children to report not being a bully, and thus, this skewness among this domain is not surprising. The BOSS Bullying Score was not used in any analysis.

To address the first research question—exploring the relationship between the severity of children's ADHD symptomology and levels of parent stress—Pearson correlation analyses were performed, incorporating ratings on the Conners-3 and factors on the PSI-4 (both parent and child characteristics); see Table 1. Within parent characteristics of stress, ratings of child's inattention was significantly negatively correlated with Role Restriction only, $r(27) = -0.388$, $p = 0.038$, 95% CI [−0.660, −0.025], indicating that higher levels of child inattention resulted in lower levels of parental sense of freedom. Within the child characteristics of parent stress, ratings of inattention were significantly and positively correlated with Distractibility/Hyperactivity ($r[27] = 0.572$, $p = 0.001$, 95% CI [0.259, 0.766]), Adaptability ($r[27] = 0.456$, $p = 0.013$, 95% CI [0.107,

Table 1. Correlations.

	Conners 3 - Inattention	Conners 3 - Hyperactive/ Impulsive	BOSS - Victim Score
PARENT STRESS INDEX (PSI)			
Overall Child Domain	0.560**	0.649**	0.106
Distractibility/Hyperactivity	0.572**	0.672**	−0.179
Adaptability	0.456*	0.560**	0.165
Reinforces Parent	−0.040	−0.093	−0.308
Demandingness	0.489**	0.623**	0.200
Mood	0.356	0.388*	0.442*
Acceptability	0.569**	0.558**	0.121
Overall Parent Domain	0.051	0.075	−0.203
Competence	0.061	0.079	−0.151
Isolation	0.130	0.121	−0.380*
Attachment	0.003	−0.025	−0.040
Health	0.105	0.107	−0.003
Role Restriction	−0.388*	−0.386*	−0.174
Depression	0.111	0.198	0.005
Spouse/Parenting Partner Relationship	0.258	0.293	−0.277
ADHD KNOWLEDGE & OPINION SCALE (AKOS)			
Knowledge	-	-	−0.475**
Medication Acceptance	-	-	−0.016
Counseling Acceptance	-	-	0.465*
Counseling Feasibility	-	-	−0.341

*$p < 0.05$
**$p < 0.01$

0.704]), Demandingness (r[27] = 0.489, p = 0.007, 95% CI [0.149, 0.725]), Acceptability (r[27] = 0.569, p = 0.001, 95% CI [0.255, 0.774]), and on the overall Child Domain score (r[27] = 0.560, p = 0.002, 95% CI [0.243, 0.768]). These scores indicate that as child levels of inattention increased, so did levels of parent stress related to their children.

Within parent characteristics of stress, ratings of child's hyperactive/impulsive behaviour was also significantly negatively correlated with Role Restriction only (r[27] = −0.386, p = 0.039, 95% CI [−0.659, −0.022]), indicating that higher levels of child hyperactive/impulsive behaviour resulted in lower levels of parental sense of freedom. Within the child characteristics of parent stress, ratings of hyperactive/impulsive behavior were significantly and positively correlated with Distractibility/Hyperactivity (r[27] = 0.672, p < 0.001, 95% CI [0.405, 0.833]), Adaptability (r[27] = 0.560, p = 0.002, 95% CI [0.243, 0.768]), Demandingness (r[27] = 0.623, p < 0.00, 95% CI [0.332, 0.805]), Mood (r[27] = 0.388, p = 0.037, 95% CI [0.025, 0.660]), Acceptability (r[27] = 0.558, p = 0.002, 95% CI [0.240, 0.767]), and on the overall Child Domain score (r[27] = 0.649, p = 0.001, 95% CI [0.370, 0.820]). These scores indicate that as child levels of hyperactive/impulsive behavior increased, as did levels of parent stress related to their children.

To address the second research question—examining the link between parenting stress and children's self-reported levels of victimization—Pearson correlation analyses were performed, incorporating child ratings on the BOSS (Victim score) and factors on the PSI-4 (both parent and child characteristics); see Table 1. Within parent characteristics of stress, ratings of child's victimization was significantly negatively correlated with parent Isolation (r[27] = −0.380, p < 0.05, 95% CI [−0.655, −0.015]), indicating that higher levels of child victimization was associated with parents endorsing lower levels of isolation. No other parent stress constructs correlated with child victimization scores. Within child characteristics of stress, ratings of child's victimization was significantly correlated with parent Mood (r[27] = 0.442, p = 0.016, 95% CI [0.090, 0.696]), indicating that higher levels of child victimization was associated with parents endorsing more negative mood affect. No other child-related stress constructs correlated with child victimization scores.

To address the final research question—exploring the relationship between parents' knowledge of ADHD (for example, parental willingness to accept various treatment modalities including counselor acceptance and medication acceptance), and children's self-reported levels of victimization—Pearson correlation analyses were performed, incorporating parent scores on the AKOS and child ratings on the BOSS (Victim score); see Table 1. There was a significant positive correlation between a child's Victim Score on the BOSS and parent scores on the Counseling Acceptance subscale of the AKOS (r[27] = 0.465, p = 0.013, 95% CI [0.118, 0.710]), indicating that as children experience higher levels of bullying, parents report higher levels of counseling

acceptance. Additionally, there was a significant negative correlation between victim scores and parent knowledge of ADHD ($r[27] = -0.475$, $p = 0.009$, 95% CI [−0.716, −0.131]), indicating that as parent knowledge increased, child victimization decreased. No other significant correlations were noted.

Discussion

This investigation sought to explore the relationships between parent stress and parental knowledge of ADHD on self-reports of being bullied and ostracized among children diagnosed with ADHD. The primary goal of this study was to better understand factors that may influence bullying and ostracism among this population. Previous studies have demonstrated that children with ADHD are at risk for being bullied and ostracized by their peers (Taylor et al., 2010). Subsequently, an understanding of factors that could potentially ameliorate these outcomes is critical in order to enable clinicians to better assist children and families.

The results of this investigation are promising on multiple levels but should be interpreted with caution given the small sample size. Nevertheless, this preliminary investigation demonstrated that as a child's symptoms of inattention increase, parental reports of freedom decrease. Thus, as children have more difficulties with inattention, parents are more likely to report social isolation, which is linked to increased overall parental stress. Additionally, parents of children who have greater levels of hyperactivity are more likely to have greater parental isolation. As a child's levels of hyperactivity increase so does parental stress. As recently demonstrated by Leigh-Hunt et al. (2017), the ramifications of social isolation and loneliness are significant and impact cardiovascular health, mental health, and overall morbidity and mortality. Additionally, the impacts of maternal social isolation have been shown to be greater than paternal social isolation and engagement of mothers in social activities has been found to improve children's social functioning and behavior (Ochi & Fujiwara, 2016). It is important that future investigations consider the reciprocal role of parental social isolation, and in particular, maternal social isolation, on childhood behavior among children with ADHD. Should future investigations demonstrate that reduced parental social isolation increases the well-being of children with ADHD, this finding would have important implications for practice. Specifically, parental self-care and the importance of social interactions of parents could become a central focus of proper care for children with ADHD.

This study also explored the impact of parenting stress on child victimization scores. One interesting finding was the relationship between parental isolation and childhood victimization. There was a significant negative relationship between parental isolation and victimization. Utilizing a strengths-based approach to interpret these results (Climie & Mastoras, 2015), it may be

that parents whose children experience greater victimization withdraw socially so as to "protect" their children. In other words, to keep their children from experiencing further victimization, parents of children with ADHD engage less frequently with others socially so as not to put their child at risk for negative social interactions. Alternative explanations might also include difficulties the child experiences with behavioral dysregulation (e.g., acting out) and social competence that might lead parents to avoid those situations. Instead of dealing with difficulties, they keep their family close and limit their interactions with others. While a more socially engaged parent may have better functioning (c.f., Farrell et al., 2017), parents may choose to protect their children from difficult situations and therefore may be limiting their own abilities to benefit from social engagement. Obviously this hypothesis would benefit from further exploration, but as a preliminary finding it is interesting and could have important implications including, as previously mentioned, the inclusion of parental self-care and social interactions in the treatment protocols for children with ADHD. An interesting study by Mikami, Jack, Emeh, and Stephens (2010) provides support for this explanation and the role of parent social functioning on the functioning and engagement of children with ADHD.

Another finding regarding reports of child victimization was the relationship among parents' reports of negative mood when their children are bullied or ostracized. This study suggests that parental stress is increased and they experience more negative mood when their children are victims of bullying and ostracism. Given the generally close relationship between parents and children, and parents' innate desire to care for and want the best for their children, it is not surprising that when their children experience negative social situations, parents are impacted. This finding does highlight the potential impact of a child being bullied on the mental health of parents. Kids who are bullied may have parents who are experiencing mental health concerns as a result. Consistent with this theme, Harcourt, Green, and Bowden (2015) have reported that parents of children who are bullied do experience mental health sequel including increased worry, anger and resentment toward schools, a sense of failure, and guilt. Additionally, in a systematic review of the literature, Harcourt and colleagues identified six themes common among parents of children who are bullied that include concerns about responsibilities in addressing bullying (Harcourt, Jasperse, & Green, 2014). The impact of a child being bullied on the overall functioning of the family cannot be overstated.

Parental knowledge of ADHD was also explored as it relates to childhood reports of victimization. Our investigation found a significant relationship between children's ratings of victimization and parents' willingness to engage in counseling for their children. In other words, knowledgeable parents of

children diagnosed with ADHD who are victims of bullying and ostracism are more likely to seek counseling for their children and accept this as an appropriate intervention. This finding is particularly encouraging, as it indicates that parents who have a good understanding of ADHD are aware of the need to provide supports for their children and actively seek out ways in which to provide this support (e.g., through accessing counseling services for their child). Finally, our study demonstrated a relationship between parental knowledge and victimization. As parental knowledge of ADHD increased, reports of victimization decreased, suggesting that parental knowledge of ADHD may serve as a protective factor for children being bullied and ostracized. Knowledge of condition and empowering parents to understand ADHD from a strengths-based perspective (Climie & Mastoras, 2015) may serve as the easiest and most available domain to impact change in both bullying and ostracism and ADHD outcomes.

Limitations

As with any research study, a number of limitations to this work are noted. First, it is acknowledged that the sample size reported here is modest and that with a larger sample size, additional results may have been revealed. However, the sample reported here provides initial support for the research questions, and we have worked within the limits of the data provided. Second, although the research measures used provide a good general understanding of the constructs of interest, we are limited by boundaries of quantitative data analysis. Additionally, while the AKOS has been utilized in research since 1996, the validity of this measure has not been reported, and thus, results should be interpreted with caution. Further exploration into the victimization experiences of children with ADHD and associated levels of parent stress and knowledge related to ADHD through qualitative means may provide additional information regarding the underlying mechanisms impacting these variables. Additionally, children's use of psychostimulant medication was not measured nor were parental symptoms of ADHD. Both of these factors could have implications for outcomes and should be included in future studies. This study also did not control for co-morbid diagnoses, such as learning disabilities, which may have confounded the results. Studies by Rose and others have indicated that children with learning disabilities are at increased risk for victimization (Rose, Monda-Amaya, & Espelage, 2011). Future investigations should control for co-morbid diagnoses whenever possible and verifiable by chart review and/or diagnosis by health care provider. Finally, it is important to note the limits to the generalizability of these findings. Given the small and relatively homogeneous sample size included in this study, generalizability to other populations or larger groups should be done with caution.

Implications for practice

Considering the number of children who present to primary care pediatric providers to address symptoms of ADHD, the implications of this study are numerous. First, it is important for pediatricians, psychologists, or others who work with this at-risk population to understand the impact of parental stress on outcomes among children with ADHD and the relationship between parental stress and child symptomology. Discussion of parental stress is critical to the appropriate management of ADHD in pediatric populations. Additionally, understanding parental social behavior and shedding light on the reasons why parents may elect to avoid social engagement in order to protect their children from ADHD is important. Exploring and understanding parental (and particularly maternal) social isolation has potential benefits on overall mental health and physical health of both children and families.

Another important implication of this study is the need to provide appropriate information to parents regarding ADHD. Much of what parents consume regarding ADHD is from the popular press and may have limited empirical support. A working knowledge of condition for parents empowers them to be able to advocate for their children and engage in interventions aimed at assisting their children across all facets of functioning.

Finally, the need for pediatricians and psychologists to engage in continued understanding of risk and protective factors for bullying and ostracism among children with ADHD cannot be overstated. It is critical that health care providers continue to explore protective factors, support parents in their efforts to assist their children, and engage outside agencies in an appreciation of the risk of being bullied and ostracized. This study provides a crucial step in the right direction.

Conclusion

Together, this study provides an initial insight into the important links between ADHD symptoms and parental stress. Parental knowledge of condition appears to be a protective factor, and this relationship should be explored in future studies. Greater parent knowledge may impact their child's social acceptance; given the links between social competence and positive long term outcomes (e.g., Masten & Coatsworth, 1998), it is critical that we provide as much support as needed for children with ADHD. With this support, these children may experience strong and positive peer relationships and become less impacted by bullying or ostracism.

Acknowledgement

This work was sponsored by Fulbright Canada through the Fulbright Palix Distinguished Chair in Brain Science and Child and Family Wellness and also Citadel Foundation provided support during my sabbatical when I worked on this research.

Disclosure statement

No potential conflict of interest was reported by the authors.

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