



RESEARCH ARTICLE

Predicting Use of Medications for Children with ADHD: The Contribution of Parent Social Cognitions

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Abstract

Objective: To explore how well parental social cognitions, guided by the Theory of Reasoned Action (TRA), contribute to the uptake and continuation of stimulant medication for children with ADHD. No previous study has explored this model in predicting medication use in a clinical sample. **Method:** Sixty-nine parents of children aged 6-13 years presenting to a tertiary ADHD clinic completed questionnaires, and a clinician documented their medication usage. **Results:** When controlling for medication status at baseline, both of the components of the TRA (i.e., attitudes and norms) predicted medication status following initial visit. Logistic regressions indicated that parents were more likely to enroll in or continue stimulant medication if they had lower stigma related to ADHD, a higher opinion of ADHD medications, and a greater knowledge of ADHD; this model classified 72.5% of the patients who started or continued stimulant medications. **Conclusions:** Findings suggest that the parents' knowledge about ADHD, opinion about treatment, and ADHD-related stigma are key factors to target in order to increase the uptake and continued use of evidence-based pharmacological interventions for children with ADHD.

Key Words: Attention-Deficit/Hyperactivity Disorder, parental cognitions, medication use

Résumé

Objectif: Explorer à quel point les cognitions sociales parentales, guidées par la théorie de l'action raisonnée (TAR), contribuent à l'utilisation et à la continuation de médicaments stimulants pour les enfants souffrant du TDAH. Aucune étude précédente n'a exploré ce modèle pour prédire l'utilisation de médicaments dans un échantillon clinique. **Méthode:** Soixante-neuf parents d'enfants de 6 à 13 ans qui se sont présentés à une clinique tertiaire du TDAH ont rempli des questionnaires, et un clinicien a documenté leur utilisation de médicaments. **Résultats:** Après contrôle de l'état des médicaments au départ, les deux composantes de la TAR (c.-à-d., les attitudes et les normes) prédisaient l'état des médicaments par suite de la première visite. Les régressions logistiques indiquaient que les parents étaient plus susceptibles de commencer ou de continuer les médicaments stimulants s'ils avaient moins de stigmates liés au TDAH, une meilleure opinion des médicaments du TDAH, et une meilleure connaissance du TDAH; ce modèle a classifié 72,5 % des patients qui ont commencé ou continué les médicaments stimulants. **Conclusions:** Les résultats suggèrent que les connaissances des parents au sujet du TDAH, leur opinion sur le traitement et les stigmates liés au TDAH sont des facteurs clés à cibler afin d'accroître l'utilisation nouvelle et continue des interventions pharmacologiques fondées sur des données probantes pour les enfants souffrant du TDAH.

Mots clés: Trouble du déficit d'attention avec hyperactivité, cognitions parentales, utilisation de médicaments

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Attention-Deficit/Hyperactivity Disorder (ADHD) is the most common mental health problem presenting to children's mental health services (American Psychiatric Association, 2013). While ADHD has a high prevalence, chronicity, and impact on daily functioning for children and their families, peers, and teachers, stimulant medication has been shown to be effective in treating core symptoms of this disorder (Kessler et al., 2006; Hall & Gushee, 2002). Despite the available and well-established pharmacological treatments for ADHD (Pelham & Fabiano, 2008), there are high rates (up to 64 %) of medication non-acceptance and non-adherence among children and adolescents (Brown, Borden, Wynne, Spunt, & Clingerman, 1987; Hoza, Johnston, Pillow, & Ascough, 2006; Pliszka et al., 2003). Parents of children with ADHD are key decision makers regarding the initiation and continued use of medication. Despite the pivotal role that parents play in their children's access to evidence-based treatment, and the related gains this treatment has on the psychological, academic and family functioning of youth with ADHD, it is surprising that relatively little empirical attention has been given to the role of parental social cognitions in making the decision to medicate their child with ADHD (Bekle, 2004; Hoza et al., 2006; DosReis et al., 2009). This is surprising given the widespread recognition that parental social cognitive variables are crucial factors in child and youth health care treatment and adherence, broadly (Bayer & Peay, 1997; Morrissey-Kane & Prinz, 1999). The present study seeks to address this gap by exploring factors influencing parents' decision to initiate and/or continue stimulant medication use for their children with ADHD.

There is some preliminary evidence suggesting an association between parent knowledge/beliefs about ADHD and parent treatment decision making, although most of this research is cross-sectional, descriptive (e.g., child and parent demographics variable), analogue (e.g., case vignettes) or qualitative based methods (Ahmed, Borst, Wei, & Aslani, 2017; Charach, Yeung, Volpe, Goodale, & DosReis, 2014; Johnston & Freeman, 2002; Johnston, Seipp, Hommersen, Hoza, & Fine, 2005; Liu, Robin, Brenner, & Eastman, 1991; Rostain, Power, & Atkins, 1993). Corkum, Rimer, and Schacher (1999) conducted the only prospective study exploring parent knowledge of ADHD and treatment beliefs in predicting enrollment in medication and behavioral treatment. They found that ADHD knowledge and positive opinion about medication predicted enrollment in medication, but did not predict adherence. This study offers initial support that parental social cognitive factors may impact treatment decisions for children with ADHD; however, it did not explore these constructs within a theoretically-driven model that encompasses a range of social cognitive variables that may be important in predicting treatment use. In summary, there is a significant gap in our understanding of parental views of ADHD medication and how this relates to treatment decisions.

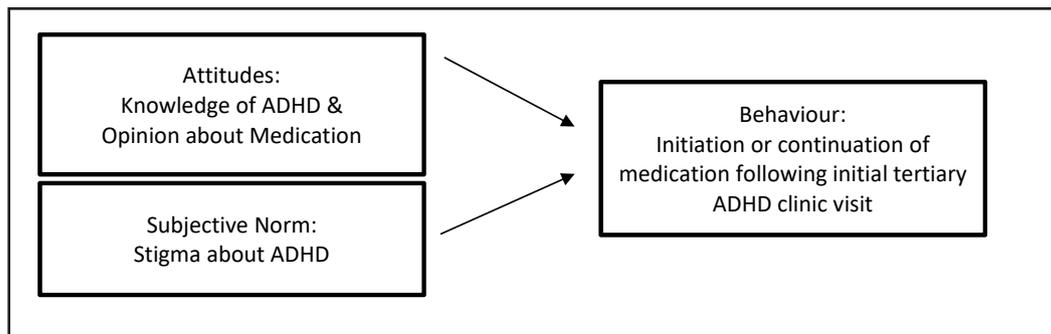
Our study seeks to address key gaps in the literature. First, we seek to understand the link between parental social cognitions and stimulant medication use for children with ADHD using a social psychological theory. Specifically, the Theory of Reasoned Action (TRA) was used to predict and explain whether or not parents/caregivers initiated or continued their child's stimulant medication use. According to this model, intention to perform a behaviour is determined by attitude (i.e., opinion toward the behaviour) and subjective norm (i.e., perceived social pressure about the behaviour) (Ajzen & Fishbein, 1980). This model has predicted a wide range of behaviors successfully (e.g., prediction of successful high school graduation, voting in election, mothers choice of feeding method for newborn babies), but has yet been applied to childhood ADHD (Ajzen 1991; Eagly & Chaiken, 1993; Sheppard, Hartwick, & Warshaw, 1988). Thus, in our study, we examined the relationship between parental attitudes (e.g., knowledge about ADHD and treatment opinions) and subjective norms (e.g., stigma about ADHD), and their impact on initiation and/or continuation of pharmacological interventions for their children (see Figure 1).

Secondly, relatively little research has been conducted in real-world clinical settings where children are most often seen, with most ADHD treatment research being conducted in university-based clinics (Weisz, 2000a; Weisz, 2000b). This study was conducted in an outpatient ADHD clinic within a tertiary level children's hospital. Moreover, this study offers a novel contribution to the literature by being the first to examine multiple parental social cognitive variables using a well-established theoretical framework (i.e., TRA) for predicting pharmacological use in a prospective pediatric ADHD clinical sample.

Method

Participants

The sample comprised of 69 parents (55 mothers, 12 fathers, 2 caregivers) who had a child (ages 6 - 13) referred to a multidisciplinary outpatient ADHD clinic within a tertiary children's hospital. All families included in this study had a child with a primary diagnosis of ADHD based on Diagnostic and Statistical Manual of Mental Disorders (DSM-V; American Psychiatric Association, 2013) as assessed by a psychiatrist/psychologist using clinical interview and parent and teacher rating scales. Children with co-morbid psychiatric disorders were included in this study, unless attention difficulties were only secondary to anxiety or affective disorders that were thought to be a primary concern. Moreover, children with a diagnosis of autism spectrum disorder, intellectual disability, or a chronic medical condition (e.g., cancer) were excluded from this study. Families were also excluded if they could not communicate in English.

Figure 1. Theory of Reasoned Action and Study Predictor and Outcome Variables.

The children had a mean age of 9.79 (SD = 3.40 years) and comprised of 52 males and 17 females. Most families were middle socio-economic status (SES; 49%), followed by low SES (31%), with the smallest proportion being high SES (19%). Eleven percent of the sample were single parents. The majority of parents had college/university education (75%), followed by high school (13%) and graduate school (10%). The sample was predominantly Caucasian (74%), but Asian (8.3%), Aboriginal (5.5%), African (1.7%), and multiracial/other (10.5%) ethnicities were also represented.

Procedures

The study was approved by the institutional review ethics board. The present quantitative study utilizes a self-report questionnaire method (parent and clinician report). Previous research has demonstrated that self-report survey methods are appropriate for collecting data regarding parents' knowledge and attitudes of ADHD, as well to obtain information about real world intervention practices/beliefs (Bekle, 2004; Kos, Richdale, & Jackson, 2004; Sciutto, Terjesen, & Frank, 2000; White et al., 2011). Parents completed the questionnaires prior to their child's diagnostic/initial clinic assessment, and only data from those who consented to have their data used for research purposes were used in this study. Clinic psychiatrists reported on medication use following the initial visit. The present data was collected in the context a larger clinic-based database, using Research Electronic Data Capture (REDCap) (Harris et al., 2009).

Measures

Demographic and background questions. Parents completed a demographic questionnaire (e.g., age, gender, education).

Knowledge of Attention Deficit Disorders Scale (KADDS). The KADDS is a 36-item questionnaire (True/False/Don't Know) that measures knowledge of ADHD in three sub-domains: symptoms/diagnosis, associated features, and treatment (Sciutto et al., 2000). The current study included

the Total Knowledge of ADHD score, as previous studies have shown high inter-correlations among subscales and total scores (e.g., range $r = .85$ to $.91$; Sciutto et al., 2000). Internal consistency of the KADDS total score has ranged from $.82$ to $.89$ (Herbert, Crittenden, & Dalrymple, 2004; Sciutto et al., 2000). In the current sample, internal consistency of the KADDS total score was 0.90 . Total scores were calculated based on the percentage of items that were answered correctly. KADDS scores have been related to prior experience with children with ADHD and level of training or education about ADHD, with comparable psychometric properties in studies conducted worldwide (Jarque Fernandez, Tarraga, & Miranda Casas, 2007; Perold, Louw, & Kleyhans, 2010).

ADHD Knowledge and Opinion Scale-Modified (AKOS-M). The AKOS-M is a 17-item revision of the AKOS, a questionnaire designed to assess parents' knowledge of ADHD and their attitudes about parent training and pharmacological interventions for ADHD (Rostain et al., 1993). The current study included the Medication Willingness subscale which included ratings from 1 [Strongly Disagree] to 6 [Strongly Agree]. Higher scores signify more positive attitudes toward medication use. This measure has been used in previous studies among parents of children with ADHD in tertiary hospital settings (Corkum et al., 1999; Rostain et al., 1993), which found that AKOS scores of treatment attitudes were related to knowledge of ADHD and treatment enrolment, with internal consistencies for the medication willingness subscale ranging from $.78$ to $.84$. Internal consistency of the medication willingness scale in this study was 0.70 .

ADHD Stigma Questionnaire (ASQ). The ASQ is a 26-item self-report measure of ADHD-related stigma across three factors: disclosure concerns, negative self-image, and concern with public attitudes (Kellison, Bussing, Bell, & Garvan, 2010). They report on a 4-point Likert scale ranging between "strongly disagree" to "strongly agree". The current study included an overall stigma score, with higher

scores meaning greater stigmatized beliefs. Previous studies found internal consistencies ranging from .85 to .94 (current study was 0.75), and ASQ scores were related to clinical maladjustment among a community sample of adolescents (Kellison et al., 2010), mental health treatment usage among an at-risk sample of adolescents (Bussing et al., 2011), knowledge about ADHD and attitudes towards inclusion or intention to refer students among education professionals in the U.S. and South Korea (Lee, 2014; Toye, Wilson, & Wardle, 2018).

Medication use. Clinic physicians provided data about the use of medication immediately following an initial appointment. Physicians rated starting and/or continuation of medication use on a Yes/No scale. Initiation and/or continuation to pharmacological treatment was considered positive if the parent received a stimulant medication prescription.

Analyses

The Statistical Package for Social Sciences (SPSS) was used for all analyses. First, descriptive statistics were explored. We then examined the correlations between all variables included in the logistic regression model in order to establish whether the factors were inter-correlated. To determine whether attitudes and norms predict initiation and/or continuation in treatment, logistic regressions were used. Specifically, the independent variables (predictors) used in the model were parent knowledge about ADHD, parent attitudes toward ADHD medication, and ADHD-related stigma. The dependent (outcome) variables used were the parents' initiation and/or continuation of ADHD medication, controlling for medication status at baseline.

Results

Child Medication Status

Forty-seven families (68% of the sample) started or continued their ADHD medication. The most prescribed medications amongst children with a diagnosis of ADHD was long-acting methylphenidate (i.e., 42% Biphentin®, 16% Concerta®), followed by mixed salts amphetamine (i.e., 21% Adderall®), and Guanfacine XR (15%). Three children with ADHD also received prescriptions for at least one antidepressant or antipsychotic in addition to ADHD stimulant medication. Table 1 presents descriptive statistics for all of the variables used in the regression model. Overall, parents had 52.7% accurate knowledge about ADHD, had generally negative attitudes towards medication use, and had a moderate degree of stigma about ADHD, which was comparable to education professionals and adolescents who have not used mental health services (Bussing et al., 2011; Toye et al., 2018).

Correlations between Predictor Variables

Table 2 shows the correlation matrix for predictor variables in our model. As shown, there was a statically significant, albeit weak, positive relationship between opinion of medication and total knowledge of ADHD. A score on the measure of stigma related to ADHD was not strongly correlated with scores on any of the other predictor variables.

Logistic Regression

The standard TRA components (attitude, subjective norms) were used to predict parents' initiation and/or continuation of medication for their child with ADHD. Specifically, scores on the KADDS Total Knowledge scale and the AKOS –Medication score were used to examine the attitude component of the TRA model. The ASQ Total Stigma scale was used to examine the subjective norm component of the TRA model. Logistic regression was conducted controlling for medication status at baseline. The final model was statistical significant ($p < .001$) and explained 35% of the variance in parent initiation or continuation of stimulant medication for their child with ADHD (see Table 3). Each component of the standard TRA made an independent and statistically significant contribution to our model predicting initiation or continued use of ADHD medication. Logistic regressions indicated that parents were more likely to enroll in or continue stimulant medication if they had lower stigma related to ADHD (Wald = 6.87, $p < 0.01$), a higher opinion of ADHD medications (Wald = 4.60, $p < 0.05$) and a greater knowledge of ADHD (Wald = 4.86, $p < 0.05$). This model's correct classification rate was 72.5%.

Discussion

Parental decision-making regarding ADHD medication remains an important yet under-studied area. This study contributes to our understanding of cognitive factors that may influence a parents' decision to initiate or continue one of the most effective treatments for individuals with ADHD. This study used the TRA model to explore factors influencing parents' decisions to initiate or continue medicating their child with ADHD. This is the first study to prospectively explore multiple aspects of parental social cognition, based on a theoretical framework, to understand how they impact real-world medication decisions at a tertiary children's hospital. Specifically, parent attitudes about ADHD and medication and subjective norms about ADHD, were used to predict parent treatment decision making outcomes. The key findings of this study are that parents with greater knowledge of ADHD, more positive opinions of ADHD medications, and lower stigma related to ADHD, were more likely to initiate or continue evidence-based medications for their children. Therefore, when determining whether a parent is likely to initiate or continue medication for their child, examining both the attitude of parents toward ADHD and medication, as well as assessing general knowledge about ADHD, appear to be critical factors.

Table 1. Descriptive Statistics for Variables Used in the Current Model

Construct	Items	Range of Scores	Mean (SD)
Knowledge of ADHD	36	0-33	19.05 (7.07)
Opinion of ADHD medication	6	0-31	9.04 (11.74)
Stigma related to ADHD	26	28-100	63.73 (9.95)

Table 2. Correlation Matrix for all Variables in the Model

	1	2	3
1. Knowledge of ADHD	-		
2. Opinion of ADHD medication	.195*	-	
3. Stigma related to ADHD	-.052	.022	-

*p <0.05

Table 3. Summary of logistic regression analysis for variables predicting medication use

Variable	B	SE B	P
Knowledge of ADHD	.095	.043	.027
Opinion of ADHD medication	.169	.079	.032
Stigma related to ADHD	-.098	.037	.009

These findings are consistent with the only study to explore this relationship in a real-world intervention trial (Corkum et al, 1999). Parent attitudes about ADHD and medication appear to be robust variables of importance across different clinical samples and research groups. While Corkum et al. used a single questionnaire to explore these constructs, the present study used several questionnaires (i.e., AKOS and KADDS), and added additional social cognitive variables (i.e., ADHD stigma), making it one of the most comprehensive exploration of parental social cognitive factors impacting ADHD medication decisions to date. Our study bolsters the small existing literature about the importance parental knowledge and opinions about ADHD, suggesting that these are variables worthy of attention when meeting with families considering medication for their child in a clinical setting.

This is also the first study to explore parent medication treatment decisions for ADHD within a broader theoretical context, in line with suggestions by Hoza and colleagues (2006). It appears that the TRA is a useful and robust model for understanding parental decision making in ADHD pharmacological treatments. Importantly we explored the role of a less frequently examined variable, ADHD-related stigma (i.e., concerns about disclosing diagnosis, negative self-image, and concern about public attitude toward ADHD). The importance of stigma in help-seeking is highlighted in other pediatric mental health contexts (Dempster, Wildman, & Keating, 2013; Shea & Yeh, 2008), although it has

received little attention to date when understanding stimulant medication use among children with ADHD.

Clinical Implications

The present study has important clinical implications. The results suggest that parent knowledge of ADHD, opinions about medication, and perceived stigma about ADHD are key factors that influence medication decision-making for parents of children with ADHD. As such, it may be important to target these factors at psychiatric consults and development of psychoeducational interventions (Culpepper & Mattingly, 2010). The present study suggests that clinicians should focus on providing information to parents about ADHD, including knowledge about stimulant medication, general knowledge of ADHD (e.g., neurobiological basis of the disorder), and an exploration of stigma related to treatment decisions, prior to, or alongside of, recommending and prescribing medication. Moreover, in order to promote ongoing medication adherence, psychiatrists may want to implement relevant/targeted questionnaires to assess these variables at initial assessment, followed by education and discussion prior to prescribing ADHD medication. Continued assessment and inquiry of these variables at subsequent follow-up visit may also be warranted.

As social stigma from ADHD plays a role in their decision, it may be important to invite close family members, with consent, to the meeting when offering psychoeducation. It is possible that with increased knowledge about ADHD

and effective pharmacological treatments provided to family and close social support networks (e.g., grandparents, best friend), that parents may have more positive opinions of this intervention. Relatedly, more positive knowledge and attitudes about ADHD medication may result in families being more willing to engage in treatment. This is an important area for future research as children who engaged in evidence-based treatment are shown to have positive long-term outcomes in terms of social, academic and family outcomes.

Limitations and Future Research

There are several limitations to the present study. First, initiation and continuation of medication were combined for the present study due to questionnaire constraints and low numbers of medication naïve participants upon presentation to the clinic. Although controlling for baseline medication status revealed that this variable did not impact study findings, the way we combined these factors may not generalize to each construct when examined separately. Second, we defined initiation and continuation of medication based on psychiatrist prescription and it is not known whether the patient filled the prescription. Third, parent/patient reported medication effectiveness data (i.e., whether medication was reportedly helpful in reducing ADHD symptoms) was not measured in the present study; it will be important to explore the impact of this variable on parent willingness to continue medication in the future. Finally, this is the first study to quantitatively assess stigma related to ADHD among parents, and it was unexpected for the stigma score to be unrelated to ADHD knowledge or attitudes towards medication; use of the stigma measure on another parent sample may shed light on this matter.

Future studies may explore interventions aimed at modifying these social-cognitive factors in order to help families' access and use evidence-based treatments for their children with ADHD. For example, Barnett, Corkum, and Elik (2012) have begun to explore this area with some promise through the use of both parent psychoeducation videos at the time of diagnosis and teacher video modules to improve knowledge of ADHD/evidence based behavioural approaches at school, with the aim of increasing use of evidence-based approaches to improve the functioning of children with ADHD. Furthermore, Hoza and colleagues (2006) proposed a heuristic model that could guide future research to explore additional parental cognitions (e.g., attributions and self-efficacy) and at different stages of decision-making (e.g., how treatment experience may change pre-existing parental cognitions, which in turn change treatment adherence and ultimately impacts on family functioning).

Acknowledgments / Conflicts of Interest

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