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ORIGINAL ARTICLE

Adherence to stimulants in adult ADHD

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Abstract Although stimulant medication can reduce symptoms and lessen the degree of functional impairment associated with attention deficit hyperactivity disorder (ADHD), the adherence rate in adults diagnosed with ADHD is reportedly <12 %. The article explores the contexts that influence stimulant medication adherence in adults diagnosed with ADHD. Using a mixed-method design, data on ADHD-related quality of life and stimulant adherence were collected from 67 adults with ADHD. Next, 18 of those adults, based on adherence/quality of life, completed semi-structured interviews. Qualitative data were analyzed using thematic narrative inquiry, based on the Health Belief Model. Findings revealed no direct relation between stimulant adherence and quality of life. Instead, the doctor/patient relationship was a strong predictor of a person's quality of life. Physicians treating adults with ADHD must be aware of individual variation in stimulant response, seek to understand the functional limitations of their patients and strive to communicate effectively.

Keywords Adherence/compliance · Attention deficit hyperactivity disorder (ADHD) · Quality of life · Patient–provider relationships

Introduction

Attention deficit hyperactivity disorder (ADHD) is a chronic condition that pervasively impacts the life of patients, their families and society. An estimated eight million adults in the United States have ADHD, making it the second most common psychiatric condition (Faraone et al. 2006; Kessler et al. 2006). Many adults diagnosed with ADHD experience academic underachievement, underemployment and impaired social interactions relative to their peers (Barkley et al. 2008; Biederman et al. 2006). The successful use of pharmacological treatment has been shown to reduce symptoms and lessen the degree of functional impairment associated with adult ADHD (Brod et al. 2006), making it easier for patients to learn new skills, develop more effective habits and accomplish meaningful personal goals (Weiss et al. 1999). Although approximately 70 % of adults experience a positive response to medication (Torgersen et al. 2008), the adherence rate for adults prescribed medication for ADHD is reported to be less than 12 % after three months following an initial prescription (Hodgkins et al. 2006; Safren et al. 2007; Weisler 2007). Research of non-adherence to stimulant treatment for adult ADHD has been limited to clinical trials and administrative claims from pharmacy databases (Curtis and Fairman 2007). Therefore, the aim of the study is to increase the understanding of adherence to stimulant treatment in adults with ADHD and provide the perspective of patients on their medication-taking behaviors.

Efficacy of stimulants

A favorable response for adults diagnosed with ADHD to stimulant treatment is most commonly defined as a

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reduction by at least 30 % of total ADHD symptoms on a DSM-IV-based checklist (Torgersen et al. 2008). The consensus is that, for adult ADHD, there is a substantial and significant difference in efficacy between stimulant treatment and no treatment (Faraone et al. 2006; Biederman et al. 2005; Weisler et al. 2006; Jadad et al. 1999). There is some concern that pharmacological trials might overestimate drug efficacy, due in part to a lack of uniformity in how medication efficacy is assessed, with significant heterogeneity and poor reporting of methodology among the studies (Biederman et al. 2007). Furthermore, a meta-analysis of efficacy of medications for ADHD in adults, comparing 29 trials of 15 drugs, found larger effect sizes were associated with physician ratings of outcome (Faraone et al. 2006). These findings might relate to medication adherence, as it is unknown if participants had an awareness of symptom reduction.

Although stimulant treatment works well for the majority of adults with ADHD in a controlled setting, efficacy studies do not demonstrate effectiveness in community samples (Weiss et al. 2006). In clinical trials, the relative benefits of medication classes are documented by comparative effect size. Effect size is a statistical measure that attempts to reflect the magnitude of the difference between two treatments, or in the case of placebo trials, treatment versus no treatment. However, there is no evidence that this measure translates into effectiveness for individual patients (Weisler 2007). Therefore, it is important to describe the effectiveness of stimulant treatment from the perspective of adults with ADHD.

Adherence to stimulants

The high rate of non-adherence to treatment for adult ADHD is often mentioned in the literature, but few studies directly investigate adherence, leaving the factors that contribute to continuity of stimulant therapy largely unknown (Olfson et al. 2007). In an investigation of self-reported medication adherence in adults with clinically significant ADHD symptoms despite medication treatment, individuals with less than 80 % adherence had substantially more ADHD severity compared to those whose adherence was higher. The authors cited lack of consistent stimulant adherence as a potential cause of residual symptoms of ADHD in adults (Safren et al. 2007). The scope of non-adherence in adult ADHD has been investigated via a review of pharmacy databases. Researchers examined the monthly renewal of prescriptions for ADHD medication (mixed amphetamine salts extended release, methylphenidate extended release, methylphenidate long acting and atomoxetine, a non-stimulant) for a 15-month period. During the first 3 months after an initial prescription for ADHD medication was filled, 50 % of adults were no longer taking medication, and at the end of the 15-month observation, 80 % of patients had stopped treatment. The rates of non-adherence were identical for all four medications. Furthermore, race, age, gender or payor source did not impact the lack of adherence (Weisler et al. 2006; Perwien et al. 2004).

These findings are not unique. Studies show that patients with other behavioral health disorders, such as depression, schizophrenia and bipolar (Aikens et al. 2008; Jonsdottir et al. 2009), have higher rates of non-adherence compared to other health conditions, but their reasons for not taking their medication are similar (Osterberg and Blaschke 2005). Morris and Schulz (1992) conducted an extensive review of research on non-adherence, across multiple health conditions; the authors concluded that demographic variables (age, sex, marital status and social class) and disease factors are poor indicators of adherence. Researchers have found that even the potential for serious harm may not be enough to motivate patients to take their medicines appropriately. Among 17,000 US patients prescribed beta-blocker drugs following a heart attack, only 45 % regularly took these medications during the first year following their heart attack, with the biggest drop in adherence during the initial months after treatment began (Kramer et al. 2006). Cramer (1991) reported similar findings in glaucoma patients, after having been told they would go blind if they did not comply, only 42 % of patients met minimal criteria for adherence. In general, across all medical conditions, non-adherence is thought to occur in 30–50 % of all patients (Vermeire et al. 2001).

In chronic disorders, the belief held by a patient about their specific treatment appears to be a major predictor of their adherence (Horne and Weinman 1999). In a cross-sectional study of 324 patients diagnosed with chronic illness (asthma, renal, cardiac and oncology), patients with higher beliefs about the necessity of their prescribed medication had higher reported adherence, while patients with higher concerns about the dangers of dependence or long-term effects of their medication had lower reported adherence (Horne et al. 1999). In a sample of 165 patients with unipolar non-psychotic major depression, lower adherence was associated with beliefs that their symptoms were randomly caused and a poor understanding of their symptoms; while higher adherence was associated with beliefs of greater severity of symptoms, that symptoms will last a long time and that symptoms were caused by a chemical imbalance (Aikens et al. 2008).

Although these studies provide insight into the beliefs patients' hold concerning medication, they do not provide the patients' perspective on their medication-taking behaviors. Additional research is necessary to understand the patients' experience living with chronic behavioral health disorders, the factors influencing their choice of treatment and on the interactions between patient and provider regarding behavioral health disorders and its treatment (Roberson 1992). Therefore, the aim of the study is to increase the understanding of adherence to stimulant treatment in adults with ADHD and provide the perspective of patients on their medication-taking behaviors.

As the vast majority of ADHD research employs quantitative methodology, it fails to obtain subjective information on the social and historical context of medication use in the patients' own words (Vermeire et al. 2001), even though research has established an association between beliefs and attitudes toward medication and patients' adherence patterns in psychiatric disorders (Aikens et al. 2008; Jonsdottir et al. 2009). Therefore, this study describes the participants' experience based on the Health Belief Model (HBM), a theory of health behavior that attempts to explain and predict health behaviors by focusing on the attitudes and beliefs of individuals (Munro et al. 2007). The HBM was one of the first models that adapted theory from the behavioral sciences to health problems, and it remains one of the most widely recognized conceptual frameworks of health behavior (Munro et al. 2007). In relation to medication adherence, the HBM considers five variables likely to influence whether a patient will choose to adhere to a prescribed treatment. These include the following: perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy (Glanz and Rimer 2005). Therefore, the HBM postulates that a patient is adherent when the patient understands the potential impact of the diagnosis and that the consequences of the condition could be serious. The patient must believe that the prescribed treatment will help, value the outcome of treatment more than its cost and believe that he or she can carry out the treatment plan (Berger and Felkey 2001).

The study employs a sequential explanatory mixed methods design, consisting of two distinct phases (Ivankova et al. 2006): quantitative followed by qualitative. The quantitative data identified adults diagnosed with ADHD based on their levels of ADHD-related quality of life and stimulant adherence to purposefully select the participants for the qualitative phase. The qualitative data describe the attitudes, beliefs and experiences of adults diagnosed with ADHD concerning stimulant medication based on the components of the HBM. The study is focused on two primary research questions:

1. What have adults diagnosed with ADHD experienced in terms of stimulant medication as a treatment choice?
2. What contexts have influenced the decision to use/not use stimulant medication to treat ADHD?

Methodology

Quantitative phase

Inclusion criteria for the first phase of the study include the following: (1) participants must be between 18 and 64 years old, (2) diagnosed with ADHD by a healthcare professional and (3) not living at home or under the care of their parents. The sample included 67 adults diagnosed with ADHD, 22 men and 45 women between the age of 19 and 64 years ($M = 40.8$, SD $= 12.2$). The majority of the participants ($n = 38$) were recruited by a coordinator for ADHD mentors, while 21 participants were recruited from the membership of a support group for adults with ADHD and 8 participants were recruited from an urban community college. ADHD-related quality of life was assessed by the adult ADHD quality-of-life questionnaire (AAQoL). Adherence was measured by the question: Are you currently using stimulants to treat ADHD? Participants selected one of three options: Yes, everyday; Sometimes, when needed; No, not at all.

The Adult ADHD Quality of Life Scale is a patient reported outcome measure containing 29 items used to assess the impact of ADHD on functional impairments and quality of life (Brod et al. 2005). Participants rate the degree or frequency they find each item troublesome or problematic during the past 2 weeks on a five-point Likert-like scale. The scale is divided into four domains based on "areas of impact": life productivity, psychological health, life outlook and relationships. The life productivity domain contains 11 items including getting things done on time, completing tasks, remembering important things and balancing multiple projects. The psychological health domain contains 6 items including feeling anxious, overwhelmed and fatigued. The life outlook domain includes 7 items including perceptions that energy is well spent, people enjoy spending time with you, you can successfully manage your life, and you are as productive as you would like to be. The relationships' domain contains 5 items including tension, annoyance and frustration in relationships. The AAQoL is scored using an algorithm to create a total score and four subscale scores. A higher score indicates greater quality of life; lower scores indicate greater impairment in functioning. The reliability and concurrent validity, in relation to the Short Form-36 (a general health measure) and Endicott Work Productivity Scale, have been well established (Brod et al. 2006). The AAQoL has been used in three investigations of ADHD medications; all report reliability and validity findings consistent with Brod et al. (2006); (Able et al. 2007; Adler et al. 2008; Matza et al. 2007).

Data analysis and results

Using Predictive Analytics Software 17.0 (PASW, SAS Institute Inc., Cary, NC), both univariate and multivariate statistical procedures were carried out for the AAQoL total score, sub-scale scores data and demographics. Participants were categorized based on reported adherence to stimulant medication: daily ($n = 41$), partial or sometimes as needed ($n = 14$) and not taking stimulant medication ($n = 12$). No significant differences were found for age, age at diagnosis of ADHD or years of education between the three adherence categories. Men were more likely to be diagnosed as children than women and, on average, participants taking stimulants daily were better educated than those not taking stimulant medication.

The AAQoL total and subscale scores were calculated utilizing the scoring algorithm. Participants with an AAQoL total score above the sample mean score were categorized as having high quality of life, whereas participants with an AAQoL total score below the sample mean score were categorized as having low quality of life. Analysis of the AAQoL total score and subscale scores revealed no significant differences between the three adherence categories. Although, on average, participants who took stimulants "as-needed" had a higher AAQoL total score than those who take stimulants daily, participants not taking stimulants had the lowest AAQoL total score.

Qualitative phase

For the next phase of the study, a random protocol of inviting participants to complete semi-structured telephone interviews, based on their willingness and availability, was employed for each category of quality of life/adherence. The qualitative sample consisted of 18 adults with ADHD, 11 women and seven men, with at least one male in each category. Individual telephone interviews lasted an average of 45 min; interview notes were manually recorded. The following semi-structured questions guided each interview:

1. Explain your experiences with stimulants for the treatment of ADHD.
2. Explain ways stimulants could be beneficial to treat ADHD.
3. Explain ways stimulants could be a barrier to treat ADHD.
4. Explain how you made the decision to use/not use stimulant treatment.

Data analysis and results

The qualitative data was analyzed using thematic analysis described by Fereday and Muir-Cochrane (2006). This process entails an exhaustive review of the interview data, reading and re-reading the entire data set to become familiar with the "depth and breadth" of the data (Braun and Clarke 2006). From the interview transcripts, 72 significant statements were extracted and categorized using the template of codes (Table 1) based on the five categories of the HBM: perceived barriers, perceived benefits, perceived severity, cue to actions and self-efficacy. Within each category, themes were identified and defined (Crabtree and Miller 1999). The relationship of the themes to the HBM is presented in a thematic map (see Fig. 1).

All participants experienced stimulant medication at least once since receiving a diagnosis of ADHD. In sharing their stories, participants touched on many of the same

Table 1 Template of codes

Code	Definition	Description	Theme
Severity of ADHD	Beliefs about the seriousness of a condition and its consequences	Feelings concerning the seriousness of contracting an illness or of leaving it untreated (including evaluations of both medical and clinical consequences and possible social consequences)	Job loss School failure Impaired relationships
Barriers of stimulants	Beliefs about the material and psychological costs of taking action	The potential negative consequences that might result from taking particular health actions, including physical, psychological, and financial demands	Physical side effects Psychological side effects Lack of effectiveness
Benefits of stimulants	Beliefs about the effectiveness of taking action to reduce risk or seriousness	The believed effectiveness of strategies designed to reduce the threat of illness	Increased focus Decreased impulsivity
Cues to action	Factors that activate "readiness to change"	Events, either bodily (physical symptoms of a health condition) or environmental (media publicity) that motivate people to take action	Positive or negative relationship with healthcare professional
Self-efficacy	Confidence in one's ability to take action	The belief in being able to successfully execute the behavior required to produce the desired outcomes	

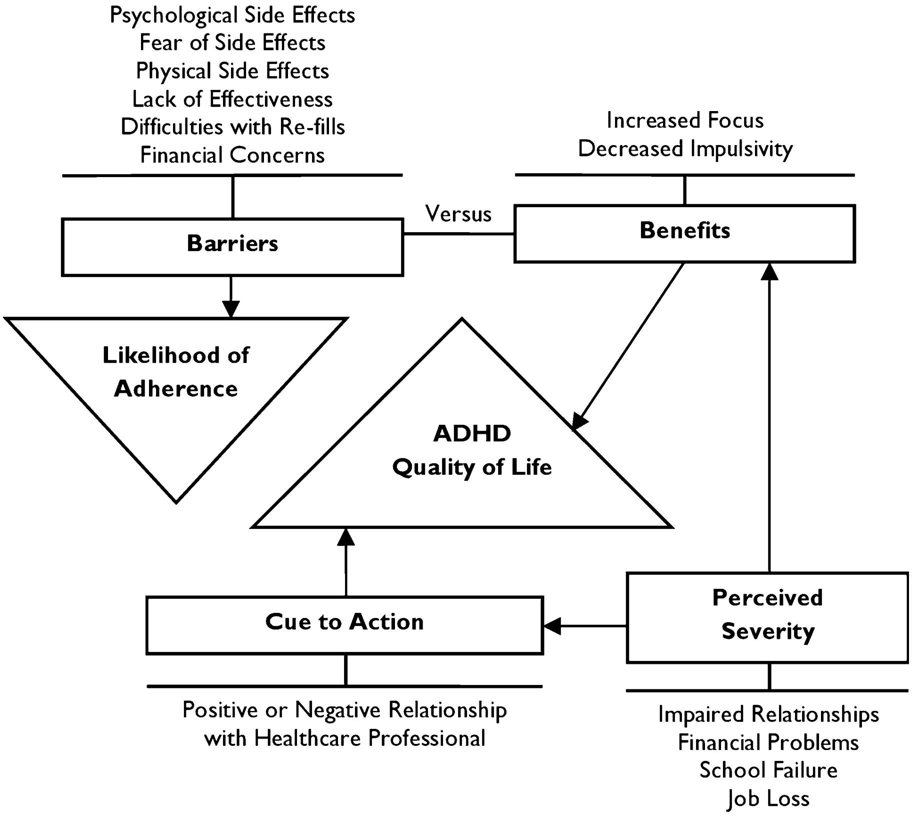

Fig. 1 Health belief model

themes. They revealed the contexts that influenced their decision to adhere (or not adhere) to stimulant treatment by describing their everyday experiences and the way in which the medication affected their perceptions of well-being. Following are the categories and themes with representative quotations included to convey the experiences of the participants.

Barriers to stimulant medication

All of the participants mentioned some type of barrier in their experience with stimulant treatment, representing almost half of the significant statements. Common barriers included the following: physical side effects, psychological side effects and lack of effectiveness. Physical side effects included heartburn, increased blood pressure, insomnia and weight loss; these types of side effects were overwhelmingly reported by individuals with high ADHD-related quality of life. Physical side effects were reported in a matter-of-fact manner as though they were expected and could be controlled, such as "I have to watch my weight as I tend to become quite thin." Psychological side effects included feeling anxious, irritable and emotionally out of control; these types of side effects were reported only by participants with low ADHD-related quality of life. The experiences of psychological side effects were recalled in vague and undefined terms, such as "I don't feel like myself when I'm on it" and "They make me feel flat." One participant complained that stimulants stifled their creativity and spontaneity. "It makes me enjoy things a lot less, when I take it every day, I can never forget about my to-do list." For others, stimulants created an unbearable situation, defined as "a general feeling of going crazy," that resulted in stopping all pharmacological ADHD treatment.

Other barriers included fear of side effects, difficulty refilling prescriptions and the monetary cost of stimulant medication. A 56-year-old woman diagnosed with ADHD for 20 years explained: "Many times I've considered stopping the medication for no other reason than the difficulty of getting prescriptions filled. They [the pharmacists] always quiz me as if I'm a criminal, asking are these for you? Do you have kids?" Two participants reported they were not taking stimulants because they did not have health insurance and/or prescription coverage, "If I could afford them I would consider using stimulants every day." The fear of side effects were reported by two individuals, one currently taking stimulants and one whose fear is the reason for not taking stimulants; both indicated a fear of cardiac problems.

Benefits to stimulant medication

The benefits of stimulants were described as a dichotomy of sorts, producing an increase in positive behaviors, such as focus, or a reduction in negative behaviors such as impulsivity. Participants with high ADHD-related quality of life experienced the positive aspects of stimulants, while adults with low ADHD-related quality of life described a reduction in core symptoms. A 24-year-old man who was diagnosed with ADHD as a child and using stimulants "as-needed" described the benefit of increased focus as follows: "The stimulant medication helps me when I need to complete detailed, long-term projects". Another participant stated, "Stimulants provide better focus, better memory and the ability to organize". A reduction in symptoms was attributed to stimulants by a participant as providing an opportunity to gain control of her life, "I've learned to keep my mouth shut and stop interrupting people". A participant also described the benefit of stimulant as "Feelings of being out of control are much less frequent".

Severity of ADHD

The severity of ADHD was expressed by several participants as they recounted the events that occurred before they received a diagnosis of ADHD or when they stopped stimulant treatment, including school failure, job loss, impaired relationships and financial problems. A college student diagnosed with ADHD as a child stopped taking medication his freshman year: "I thought I didn't need medicine when I started college, but I ended up not getting much of anything done and never ever going to class". The consequences of untreated ADHD resulted in repeated job loss for several participants. A 50-year-old woman diagnosed with ADHD at age 36 explained the consequences of untreated ADHD: "I did not seek treatment until after I had lost my job primarily due to a temper outburst". Reported a 49-year-old man diagnosed with ADHD at age 7, "My life did not work at all before stimulant medications. I was never able to keep a job more than 9 months, could not sustain relationships. I moved a lot". A 52-year-old woman diagnosed with ADHD as an adult reported that emotional outbursts resulted in impaired relationships before her diagnosis. Participants attributed a variety of financial problems to their ADHD, including bounced checks, late bill payments and impulsive spending.

Cue to action

A cue to action represents exposure to factors that motivate adherence to treatment, such as social support, positive patient–doctor relations and media publicity that motivate people to take action. For the participants, this was defined as their relationship with a medical professional, either a positive or negative interaction that influenced their decision to use/not use stimulant medication.

Participants with a high ADHD-related quality of life described positive caring relationships with their physician or mental health professional, leading to positive health outcomes. One participant described her doctor as "an incredibly intelligent and compassionate fellow. My doctor is very careful to tweak my medication to the exact amount that will help most". Another reported reluctance to try stimulants until being referred to a psychiatrist specializing in ADHD, "I had to do several medication trails before finding on that gave me a significant level of improvement". Furthermore, a participant not taking stimulants due to side effects reported that meeting with a counselor worked much better than stimulants.

Participants with a low ADHD-related quality of life expressed frustration and dissatisfaction with their physician, regardless of their adherence, "My doctor seems particularly uneducated on ADHD in women" and "I stopped taking stimulants because I could not find a good doctor".

Self-efficacy

The belief in being able to successfully carry out a particular treatment regime was not a significant part of the experiences of study participants. Only one participant described her experience in terms of self-efficacy. She reported a negative experience with stimulant medications because her lack of confidence in being able to keep monthly appointments for medication management.

These results are only partially in line with the HBM. When considering the relationship between the main overarching themes and sub-themes, it became clear that the model identified efficacy of stimulant treatment, defined by the AAQoL total score, to a greater degree than it predicted adherence to stimulant treatment. In other words, participant's experiences with stimulant medication were not accounted for by the adherence category, but rather by their ADHD-related quality of life. The divergence in experience based on ADHD-related quality of life became evident when participants described how they weighed the positive benefits against the negative barriers of stimulant medication. Individuals with high ADHD-related quality of life and daily adherence described the balance between barriers and benefits as one-sided, with the benefits of stimulants clearly outweighing the physical side effects. In contrast, participants with low ADHD-related quality of life who also took medication daily perceived far greater barriers to stimulant treatment than benefits, with some expressing a dilemma deciding if the costs associated with stimulants were worth the limited benefits they provide. For individuals longer taking stimulant medication, the imbalance between the barriers and benefits of treatment were described as the reason they stopped: “I didn’t think it helped enough for the side effects”.

The perceived severity of ADHD was important for participants using stimulant treatment regardless of their adherence category or their level of ADHD-related quality of life. All participants using stimulants described their decision to use medication as being directly influenced by past negative consequences of ADHD. For many, receiving a diagnosis allowed them to attribute negative past experiences to ADHD: “Simply getting the diagnosis meant I could stop beating myself up for all the stupid and bad things I’d done all my life such as failed classes in high school and college, divorce, late bill payments and bounced checks”. Self-efficacy was not relevant to study participants’ experience with stimulant treatment.

The component of the model found to be most influential to the participants’ quality of life was cue to action, viewed as either a positive or negative relationship with a healthcare provider. Participants with high ADHD-related quality of life described a positive patient/doctor interaction. For individuals taking stimulants, with either daily or partial adherence, their doctor lowered the perceived barriers to stimulant treatment by finding the correct medication/dosage combination. Furthermore, participants with high ADHD-related quality of life who chose not to use stimulants also reported positive interactions with their doctors when the doctors helped them pursue alternative forms of treatment. For those individuals with a low ADHD-related quality of life, the patient/doctor relationship was a source of frustration. Participants described their physicians as uneducated about ADHD and their attempts to find an appropriate medication regime as “a shot in the dark”.

Discussion

The aim of the study is to describe the attitudes, beliefs and experiences of adults diagnosed with ADHD concerning stimulant medication based on the components of the HBM. An additional goal is to identify the contexts that influence participants’ decisions to use or not use stimulant medication to treat their ADHD. In relation to these objectives, there are two main findings. First, the doctor–patient relationship is a strong predictor of a person’s ADHD-related quality of life, but not their adherence. Second, the perception of barriers to stimulant medication is dependent on the person’s ADHD-related quality of life.

The importance of a positive doctor-patient relationship in achieving positive health outcomes is well founded (Serradell et al. 1990). Nonetheless, ADHD in adults is a new phenomenon, compared to ADHD in children, and many non-psychiatric physicians are less sophisticated concerning stimulant treatment. A medical sociological investigation found many mental health practitioners harbor varying degrees of ambivalence about the diagnostic criteria, treatment methods and biological basis of ADHD (Rafalovich 2005). An additional challenge in treating adults with ADHD is the likelihood that patients will not follow the advice given by their doctor (Vermeire et al. 2001). For an adult diagnosed with ADHD, following a doctor’s instructions can be very difficult, as explained by a study participant with daily adherence and high ADHD-related quality of life:

> I left with both an ADHD diagnosis and two prescriptions accompanied by detailed explanations of how to do a drug trial by increasing dosage in small daily amounts. By then I was so remarkably ready to feel better I immediately went to the Day 3 dosage amount.

Therefore, it is imperative that the physician treating adults with ADHD understand the functional limitations of their patients and strive to communicate effectively to reach positive treatment outcomes.

The direct impact of the doctor–patient relationship on participants’ ADHD-related quality of life signifies the importance of compassionate care. Unfortunately, a survey of 800 hospitalized patients found only 53 % of patients report that most healthcare professionals provide compassionate care (Lowen et al. 2011). Furthermore, a discourse analysis of interviews with mental health professionals found decreased compassionate mentality indicating an emotional distancing between physicians and patients (Crawford et al. 2013). Findling et al. (2009) found, during medication management appointments, physicians rarely addressed specific behavior modification strategies to manage barriers related to medication with ADHD patients. It has been recommended that professionals relate to adults with ADHD not as “patients” who are ill, but as people who have unique traits that might be seen as advantages (Fleischmann and Fleischmann 2012). The current findings illustrate a need for additional research on treatment preferences of adults with ADHD. Patient preference data can contribute to guidelines for clinical decision-making, broader treatment recommendations and inform clinicians on how to initiate and facilitate treatment discussions (Brunt et al. 2011).

The second main finding of the study is that the perceived barriers to stimulant treatment differed depending on the individual’s ADHD-related quality of life. Participants with high ADHD-related quality of life reported physical side effects while those with low ADHD-related quality of life reported psychological side effect such as mood changes, irritability and anxiety. The findings that perceived barriers to stimulant treatment played a prominent role in the efficacy of treatment are typical of the HBM in general. In a literature review of all HBM studies published from 1974 to 1984, perceived barriers were identified as the most influential variable to predict and explain health-related behaviors (Janz and Becker 1984). In a recent review of ADHD medication adherence in adolescents found psychological side effects, including psychotic symptoms, accounts for a substantial proportion of treatment discontinuation (Charach and Fernandez 2013).

Although stimulant medication is considered the first line of treatment for ADHD and can reduce the core symptoms of inattention, hyperactivity and impulsivity, medication alone does not directly improve daily functioning (Ramsay and Rostain 2008). According to Rostain and Ramsey (2006), stimulants improve functioning from the bottom up, whereas psychosocial strategies are helpful by addressing functional problems and building coping strategies. Findings in the current study that participant's with high ADHD-related quality of life who are non-adherent to stimulant treatment support the idea that an alternative treatment such as support groups, coaching and cognitive therapy might be equally effective in the treatment of adults with ADHD. Fleischmann and Fleischmann (2012) reported similar conclusions in a narrative analysis of adult's biographical essays posted on the internet, concluding that when ADHD is portrayed positively, there is an increased confidence about future success and perseverance when coping with challenges.

The low ADHD-related quality of life in the daily adherence group demonstrates that the core symptoms of ADHD and health-related quality of life are overlapping but distinct concepts. Studies on children and adolescents with ADHD have demonstrated similar findings that quality of life provides clinically relevant data beyond the therapeutic response in core symptoms (Escobar et al. 2010). Montoya et al. (2013) investigated prognostic factors in children with ADHD found that for some children with low baseline scores on sub-domains of a health-related quality of life measure predicted lower treatment outcomes. Similar findings have been reported with college students and adults with ADHD, suggesting that psychological and social factors associated with ADHD effect satisfaction with life to a greater extent than ADHD symptomology or pharmacological treatment (Gudjonsson et al. 2009; Stern et al. 2013). Additional research is needed to qualify how adults with ADHD rate their well-being in general and how ADHD-specific measures of quality of life correlate to treatment outcome for individuals without significant symptomatology improvement (Agarwal et al. 2012).

The study has several limitations. It is not possible to claim generalizability for this study in the sense in which that concept is understood by quantitative researchers (Pope et al. 2000). The results represent the experiences and views of adults with ADHD participating in the study and may not be generalizable to other adults diagnosed with ADHD. However, the analysis of the qualitative data revealed similarities in the participant's experiences with stimulant treatment. Therefore, the findings can serve to increase the understanding of how adults with ADHD experience stimulant treatment. Furthermore, the HBM is a psychosocial model and therefore useful only to explain that part of an individual's health-related behavior that is because of beliefs and attitudes (Janz and Becker 1984). Additional limitations include several sample characteristics. The majority of the participants were female, had attended and/or graduated from college and were diagnosed with ADHD as adults. The study does not address symptom severity, explore the presence of comorbid conditions or confirm ADHD diagnosis. It is unclear how these factors may have influenced the current findings.

In conclusion, it is clear that stimulant medication does not offer a quick fix for ADHD. Rather, treatment is an ongoing process that requires consistent input of energy if gains are to be maintained. Treating ADHD is much like managing any other chronic health condition—it is less a destination than a lifestyle.

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