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 JOURNAL OF
**ADOLESCENT
 HEALTH**

www.jahonline.org

Original article

Attention-Deficit/Hyperactivity Disorder Medication Use in Adolescents: The Patient's Perspective


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Article history: Received January 31, 2017; Accepted May 19, 2017

Keywords: ADHD; Adolescent; Drug therapy; Illness perception; Medication adherence; Medication beliefs

 A B S T R A C T

Purpose: The purpose of the study was to gain more insight into the attitudes of adolescents using medication for attention-deficit/hyperactivity disorder (ADHD).

Methods: A cross-sectional study among adolescents (aged 12–18 years) who filled at least two prescriptions for ADHD medication in the preceding year was conducted. Adolescents were invited to fill in an online questionnaire containing questions on sociodemographics, health status, illness perceptions, medication adherence, and medication beliefs.

Results: We invited 1,200 adolescents of whom 181 adolescents (122 males, mean age 14.2 ± 1.7 years) completed the online questionnaire. They mostly used methylphenidate (n = 167; 92%) as a pharmacological treatment for ADHD. Half of the study population (n = 93; 51%) experienced side effects, such as decreased appetite and sleep problems. Most participants (n = 150; 83%) had an indifferent attitude (perceived low necessity and low concerns) toward their ADHD medication. More than half of the study population (n = 111; 61%) reported to be non-adherent based on the Medication Adherence Report Scale. The highest score of the Brief Illness Perception Questionnaire was on “treatment control,” suggesting that adolescents do think their medication is effective, despite their indifferent drug attitude.

Conclusions: Most adolescents using ADHD medication had an indifferent attitude toward their medication and reported low adherence rates. These findings should be taken into account when treating adolescents with ADHD; regular counseling and monitoring of the pharmacological treatment might be useful to optimize treatment.

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**IMPLICATIONS AND
 CONTRIBUTION**

This study reveals adolescents' perspective on attention-deficit/hyperactivity disorder medication use, by means of self-reported measurements. Low adherence rates, side effects, and an indifferent attitude are shown. Physicians and pharmacists should be aware of this, since it might affect treatment outcomes. Counseling and evaluating the pharmacological treatment with the patient is suggested.

Attention-deficit/hyperactivity disorder (ADHD) is a neuropsychiatric disorder characterized by having a short attention span, easily being distracted, excessive activity, or difficulties with controlling behavior, which is not appropriate for a person's age.

Conflicts of Interest: The authors have no conflicts of interest to disclose.

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This results in suboptimal performances in social, educational, or work settings [1]. The highest prevalence of ADHD is found in children and adolescents; approximately, 63 million children and adolescents are diagnosed with ADHD worldwide [2].

Adolescence is a distinctive life phase which is characterized by psychological, physical, and emotional changes. During transition from childhood to adolescence, there is a shift in ADHD symptoms and behavior from hyperactivity and impulsivity to more antisocial behavior [3]. Substance misuse and lower educational performance are often observed in adolescents with

ADHD. They also display higher rates of oppositional defiant disorder, anxiety, depression, and they report a lower quality of life compared with their unaffected peers [3–5].

In addition to behavioral therapy, pharmacotherapy is used to control ADHD symptoms, that is, reduce hyperactivity and increase focus. The pharmacological options in the Netherlands are stimulants (methylphenidate and amphetamines) and nonstimulants (e.g., atomoxetine) [6]. Currently, the number of medication users is increasing with 12,000 each year, with approximately 215,000 users in 2015 [7]. Methylphenidate is the most commonly prescribed ADHD treatment worldwide, and it improves teacher-reported ADHD symptoms and behavior. Parents even reported an increased quality of life among younger children. However, the use of methylphenidate is also associated with adverse effects [8,9]. Several studies have shown that a substantial proportion of ADHD patients discontinue medication or are poorly adherent; nonadherence rates of children and adolescents using ADHD medication vary between 10% and 64% [10].

Adolescents undergo psychosocial changes and they start to develop their own attitudes and beliefs, which may affect their medication use and adherence levels [11–13]. Therefore, adolescence is an important life phase for medication intake behavior. However, most previous research has focused on attitudes and beliefs of parents and teachers toward ADHD medication, focused on younger children, or take children and adolescents together as one group [9,13–15], while the highest use of methylphenidate is during adolescence (age 14 years) [16].

Some studies have been done regarding the beliefs of adolescents about the disorder ADHD, while the specific beliefs of adolescents regarding ADHD medication have not yet been studied. There are also some doubts about the effectiveness of pharmacological treatments, and the adolescents' opinion might be important to improve this [9,13]. The aim of our study was to gain more insight into adolescents' actual use of ADHD medication and their attitudes toward medication use and disease.

Methods

Study design and setting

A cross-sectional study among adolescents using ADHD medication was conducted. Adolescents were selected from community pharmacies affiliated with the Utrecht Pharmacy Practice Network for Education and Research. This network contains over 1,300 community pharmacies and provides internship and research opportunities [17]. In April 2015, all community pharmacies in the network received an e-mail to participate in the study.

Participants

Adolescents (aged 12–18 years) were selected from the pharmacy information system in the participating pharmacies based on filling of at least two prescriptions for methylphenidate (Anatomical Therapeutic Chemical Classification System N06BA04) [18], dexamphetamine (N06BA02), and/or atomoxetine (N06BA09) in the preceding year. Adolescents who filled these criteria received a postal letter with a link to an online questionnaire.

Data collection

The online questionnaire consisted of sociodemographic questions (age, gender, educational level, and ethnicity), a health status question, medication-related questions (type, duration of use, and side effects), and questions about the role of parents and friends. It also contained validated questionnaires on self-reported adherence (Medication Adherence Report Scale [MARS]) [19], beliefs about medicines (Beliefs about Medicines Questionnaire-specific [BMQ-specific]) [20], and illness perceptions (Brief Illness Perception Questionnaire [Brief-IPQ]) [21]. The focus of the online questionnaire was on ADHD medication use, which was clearly stated in the introduction and above every part of the questionnaire.

Outcomes: adherence, medication beliefs, and illness perceptions

The MARS was used to assess self-reported adherence. This questionnaire consists of five questions covering both intentional and unintentional nonadherence. All items were scored on a five-point Likert scale ranging from 1 (very often) to 5 (never) resulting in a total score between 5 and 25, where a higher MARS score indicates higher self-reported adherence [19,22]. MARS scores were dichotomized by using a cutoff point of ≥ 23 for sufficiently adherent, based on previous studies [23,24]. The online questionnaire included three additional multiple choice (with "other option") questions on medication use to assess (reasons for) nonadherence and to get an insight into medication use during weekends or holidays.

The BMQ-specific was used to assess adolescents' beliefs about the necessity of their ADHD medication and their concerns about potential adverse consequences of taking ADHD medication. The questionnaire consists of 10 items divided over two subscales; five items on necessity (e.g., my life would be impossible without my medicines) and five items on concerns (e.g., having to take medicines worries me). All items were scored on a five-point Likert scale (strongly disagree to strongly agree), resulting in a score of 5–25 for each scale. A higher score indicates a stronger belief in the concepts represented by the subscale [20]. Scores above the scale midpoint (score > 15) were considered as strong beliefs, resulting in four attitudinal groups: accepting (high necessity, low concerns), ambivalent (high necessity, high concerns), indifferent (low necessity, low concerns), and skeptical (low necessity, high concerns) [25].

The Brief-IPQ was used to assess adolescents' illness perception. This questionnaire measures cognitive and emotional representation of their illness and it covers nine different dimensions: consequences, timeline, personal control, treatment control, identity, coherence, emotional representation, concerns, and causes. The causes item was excluded, because this open-ended item was perceived as complicated by young adolescents in a previous study. The remaining eight dimensions were measured on a 0 (not at all) to 10 (very much) response scale [21].

Ethics and confidentiality

Before start of the study, approval was obtained from the institutional review board of the Division of Pharmacoepidemiology and Clinical Pharmacology, Department of Pharmaceutical Sciences, Utrecht University. The first page of the online questionnaire contained an informed consent form. Adolescents aged < 16 years additionally had to ask their parents to agree with

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