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REVIEW

Preferences related to attention-deficit/hyperactivity disorder and its treatment

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Objectives: A growing body of literature has highlighted the importance of considering patient preferences as part of the medical decision-making process. The purpose of the current review was to identify and summarize published research on preferences related to attention-deficit/hyperactivity disorder (ADHD) and its treatment, while suggesting directions for future research.

Methods: A literature search identified 15 articles that included a choice-based assessment of preferences related to ADHD.

Results: The 15 studies were grouped into four categories based on preference content: preference for a treatment directly experienced by the respondent or the respondent's child; preference for general treatment approaches; preference for a specific treatment attribute or outcome; and preference for aspects of ADHD-related treatment. Preference assessment methods ranged from global single items to detailed choice-based procedures, with few studies using rigorously developed assessment methods. Respondents included patients with ADHD, clinicians, parents, teachers, and survey respondents from the general population. Factors influencing preference include treatment characteristics, effectiveness for specific symptoms, side effects, and respondent demographics. Minimal research has examined treatment preferences of adults with ADHD.

Discussion: Because there is no dominant treatment known to be the first choice for all patients, ADHD is a condition for which individual preferences can play an important role when making treatment decisions for individual patients. Given the potential role of preferences in clinical decision-making, more research is needed to better understand the preferences of patients with ADHD and other individuals who are directly affected by the disorder, such as parents and teachers.

Keywords: patient preference, ADHD, parent preference, utility

Objectives

A growing body of literature has highlighted the importance of considering patient preferences as part of the medical decision-making process.[1–3] Consequently, studies have assessed patient preferences for treatment options across a wide range of medical and psychiatric conditions such as cancer,[4–6] allergic rhinitis,[7] depression,[8] migraine,[9] diabetes,[10] and osteoporosis.[11] Several studies have examined preferences for treatment of attention-deficit/hyperactivity disorder (ADHD), which is characterized by symptoms of inattention, hyperactivity, and impulsivity.[12] Research on preferences for treatment of childhood ADHD raises methodological questions as studies often examine preferences of individuals other than the children themselves, such as parents, teachers, clinicians, and the general public. In addition, although awareness of adult

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ADHD is growing,[13–16] little is known about preferences of adults with ADHD. Thus, the purpose of the current review was to identify and summarize published research on preferences related to ADHD and its treatment, while suggesting directions for future research.

Background: patient preference

Despite the range of definitions in the literature, there appears to be a consensus that the term 'patient preference' refers to a patient's perception of the relative desirability of more than one health-related option.[17–20] Research has been conducted to identify and quantify patient preferences for a wide range of treatment options and health states. For example, some studies have asked patients to indicate which treatment option they preferred after receiving multiple treatments in a clinical trial with a crossover design.[7,9,21] Research participants have also been asked to express preferences among hypothetical health states that they have not necessarily experienced.[22] Preferences of individual patients may also be considered in clinical settings as part of a shared patient–clinician decision-making process.[17]

Patient preference is considered important for several reasons. First, there is growing awareness that active patient participation in the medical decision-making process may have potential treatment benefits.[17,18] Patients often want to be involved in these decisions,[23] and studies have found that greater patient involvement in health care decisions may be associated with increased treatment adherence, symptom relief, and treatment satisfaction.[8,24–27] When making treatment decisions with individual patients, the patient's preferences are likely to be consistent with evidence-based medicine and generally accepted clinical practices.[3] However, there are circumstances when individual patient preferences diverge from those of health professionals and the general public.[19] Individual patient preferences may be most important when clinical trial results have not yet indicated which treatment option tends to be more effective or when similarly effective treatment options could have different effects on quality of life.[17]

Patient preference data collected in clinical trials and other studies could substantially contribute to large-scale health care decision-making. Patient preferences identified within studies involving larger samples can provide an indication of comparative treatment effectiveness in the total sample and among meaningful patient subgroups, which may help guide clinicians when deciding how to treat individual patients. In addition, preference data may shape broader treatment recommendations, as these data provide an indication of the patient's perspective that could be used by decision-makers when drafting treatment guidelines and health policy.[17] Patient preferences are also used to quantify the health-related quality of life of health states. These resulting estimates called utilities, with values of 1 corresponding to full health and 0 corresponding to death, quantify health outcomes and treatment benefits and are used in cost-utility analyses which inform medical decision-making.[28,29]

Patient preferences are assessed with a wide variety of methods, ranging from global items to more detailed choice-based assessment methods. Some studies, including many clinical trials, have used straightforward single items asking patients which they prefer among two or more treatment options. In clinical trials with crossover designs, these single items may be used to assess preferences among treatments that the patients have recently experienced.[30–32] In other studies, patients may be asked to express preferences among a range of treatments or health-related options that they have not personally experienced.[33–36] Occasionally, global preference questions may be followed by Likert scale items assessing the strength of preference for the various options.[19] Studies aiming to quantify preferences in terms of utilities often use more complex methodology involving choices between hypothetical health state options. These methods, such as standard gamble (SG) and time-trade-off procedures, have been summarized previously.[29,37,38] The current review summarizes literature using any of these methods to assess preferences associated with ADHD.

Literature review methods

A literature search was conducted using the PubMed database with no restrictions on date of publication. An initial search for citations mentioning ADHD or any terms related to the disorder yielded 13,495 citations. Then, a second search identified articles relating to preference, using search terms corresponding to preference in a general sense, terms referring to a specific preference assessment method, and terms that could be related to preference such as acceptability and decision-making. These search terms included all forms (eg, singular and plural, abbreviations, alternative spellings, noun, and verb forms) of the following: health state utility, utility, discrete choice, standard gamble, time trade-off, quality-adjusted life year, conjoint analysis, patient preference, preference, prefer, satisfaction, acceptability, decision, and choice. The preference search, which yielded 757,804 citations, was then crossed with the ADHD search resulting in 1005 abstracts.

The 1005 abstracts, and full-text articles when necessary, were reviewed to identify articles meeting inclusion/exclusion criteria. For this literature review, 'preference' was conceptualized based on the definition proposed by Brennan and Strombom:[18] 'statements made by individuals regarding the relative desirability of a range of health experiences, treatment options, or health states'. For a study to be considered a 'preference study', it was required that respondents were given a choice among multiple health-related options. Questionnaires or interviews assessing perceptions of a single treatment without comparison to an alternative option were not considered to be preference assessments, even if articles used terms that initially appeared to be relevant, such as 'prefer' or 'choice'. Both informal methods (eg, unvalidated single items or interviews) and formal methods (eg, SG, time-trade-off, and discrete choice experiments) for assessing preference were included. Preferences of children with ADHD, adults with ADHD, parents, teachers, clinicians, and the general public were all considered to be relevant for the current review.

The following citations were excluded: review articles, conference presentations, letters, practice guidelines, case studies, and editorials. Cost-effectiveness and cost-utility analyses were not included, but these articles were examined in order to identify any utility or preference data that may have been cited. Articles focusing on conceptually related topics such as treatment acceptability, treatment satisfaction, treatment-related attitudes, and decision-making were excluded if respondents were not asked to indicate a preference among multiple health-related options. Although multiattribute measures such as the EQ-5D® and Health Utilities Index have scoring algorithms that were derived via preference-based tasks, studies administering these instruments were not included in the current review because respondents do not explicitly indicate preferences when completing these questionnaires.

Results: ADHD preference studies

Summary of preference studies

A total of 15 articles were identified that included a choice-based assessment of preference related to ADHD. For the current review, these 15 studies are organized into four categories based on the content of the preference assessment: 1) five studies assessing preference for a treatment directly experienced by the respondent or the respondent's child with ADHD, 2) four studies assessing preference for general treatment approaches, 3) four studies assessing preference for a specific treatment attribute or outcome, and 4) two studies that did not fit into the three other categories because they did not examine preference for a treatment-related aspect of ADHD.

Seven studies that were excluded from this review used the term 'preference' when describing methods or results, but did not appear to include a choice-based assessment of preference among health-related options. Three of these seven studies used qualitative interview or focus group methods to elicit open-ended responses,[39–41] and the remaining four studies administered rating scales that assessed related constructs such as importance and acceptability.[42–45] These seven studies were excluded from the current review because they were not consistent with generally accepted definitions of 'preference', which involves a choice between two or more options.

Studies assessing preference for a specific experienced treatment

Five studies assessed preference for a treatment directly experienced by the respondent or the respondent's child (Table 1). Three of the five studies presented results from clinical trials of medication treatment for ADHD in children and/or adolescents.[46–48] Because these studies focus on efficacy and safety of medication treatment, the published articles do not provide a detailed description of the preference assessment methods. The study by Efron et al[46] specified that a single-item assessment was completed by parents of children treated for ADHD, while the articles by Quintana et al[47] and Pelham et al[48] do not specify the preference assessment method. In the study by Efron et al,[46] the single-item assessment was completed at the end of the 4-week crossover trial of methylphenidate (MPH) and dexamphetamine (DEX), with findings indicating that more parents preferred the 2-week MPH treatment period over the 2-week DEX treatment period (46.6% vs 36.8% of parents). In the placebo-controlled, three-way crossover trial by Pelham et al,[48] children received treatment with immediate-release (IR) MPH three times daily, MPH once daily, and placebo, each for a 7-day period. Results from the unspecified preference assessment completed by parents at the end of the three treatment periods found that 47% of parents selected the once daily MPH formulation as the treatment of choice for their child versus 31% of parents who selected the immediate-release formulation taken three times daily. Finally, the study by Quintana et al[47] presents results from a 6-week clinical trial in which children and adolescents switched from psychostimulant treatment to treatment with atomoxetine. Although the preference assessment method and preference evaluator were not clearly specified in the

Table 1 Studies assessing preference for treatments directly experienced by the respondents or their children

Citation	Preference assessment method	Preference content	Respondent (N)	Key results
Efron et al[46]	Single-item assessment of preference at end of treatment period in a crossover trial (no further details provided)	Children received treatment with MPH and DEX, each for 2 weeks in a double-blind, crossover trial. After both treatment periods, parents were asked to specify which treatment they preferred	Parents of children (mean age of 8.73 years) with ADHD (N = 125)	46 of 104 parents (36.8%) indicated that they preferred the DEX treatment period, and 58 parents (46.4%) indicated that they preferred the MPH treatment period
Fredericks and Kollins[49]	Double-blind choice procedure	Participants received double-blind treatment with either placebo or MPH during four study 'sampling sessions'. During eight subsequent 'choice sessions', participants chose which treatment they would receive: placebo, MPH, or neither	Adults with ADHD (N = 10)	MPH was preferred in 50% of the choices; placebo 32.5%, neither 17.5% (significant difference among choices; $\chi^2 = 52.5$, $P < 0.001$)
MacDonald Fredericks and Kollins[50]	Double-blind choice procedure	Participants received double-blind treatment with either placebo or MPH during six study 'sampling sessions'. During six subsequent 'choice sessions', participants chose which treatment they would receive: placebo, MPH, or neither	Children/adolescents (aged 10–14) with ADHD (N = 5)	MPH was preferred in 60% of the choices; placebo 20%; neither 20% (significant difference among choices; $\chi^2 = 9.6$, $P < 0.01$)
Pelham et al[48]	Unspecified preference assessment completed at end of double-blind, placebo-controlled, clinical trial	Children received treatment with placebo, IR MPH (three times daily), and a once daily MPH formulation in a randomly selected order. At the end of the three 7-day treatment periods, parents were asked to choose which of the treatment weeks they preferred for their child	Parents of children with ADHD (aged 6–12) (N = 68)	47% of the parents selected once daily MPH as the treatment of choice, 31% selected IR MPH, 15% chose their child's previous MPH treatment, and 7% either chose placebo or had no preference
Quintana et al[47]	Unspecified preference assessment completed at end of clinical trial	In this 6-week study, children and adolescents with incomplete response or intolerance to stimulant treatment switched to atomoxetine after the first week. The two treatments were compared using an unspecified preference assessment method	Children and adolescents (aged 6–17 years) with ADHD (N = 58)	65.5% of subjects reported a preference for atomoxetine treatment over their previous psychostimulant

Abbreviations: MPH, methylphenidate; DEX, dexamphetamine; ADHD, attention-deficit/hyperactivity disorder; IR, immediate release.

study results, the abstract of this article reported that 65.5% of respondents expressed a preference for atomoxetine treatment over their psychostimulant.

The remaining two studies assessing preference for a directly experienced treatment were double-blind choice procedures performed in small samples of adults (N = 10)[49] and children/adolescents (N = 5)[50] who were receiving treatment with MPH at the time of enrollment in the study. In both studies, participants received double-blind treatment with either placebo or MPH during each of the study 'sampling sessions', which were followed by the 'choice sessions' in which participants were asked to choose which treatment they would receive. Treatment options at these sessions included placebo, MPH, or neither treatment, with authors considering each participant's choice to be an indicator of drug preference. In the choice procedure conducted with adult patients, MPH was chosen as treatment 50% of the time, placebo was chosen 32.5% of the time, and neither treatment was chosen 17.5% of the time, with the difference among treatment choices being significant ($\chi^2 = 52.5$, $P < 0.001$). In the study conducted with children, differences were also significant among treatment choices, with participants choosing MPH 60% of the

time, placebo 20% of the time, and neither treatment 20% of the time ($\chi^2 = 9.6$, $P < 0.01$).

Although heterogeneity in study designs, variation in preference assessment methods, and differences in the ADHD treatments make it difficult to draw overall conclusions from these five studies, some general trends did emerge. Results of the double-blind choice procedures suggest a preference for MPH over placebo among adults and children who received both treatments, while the crossover trial by Efron et al[46] found that parents prefer MPH over DEX as treatment for their children. Results from the double-blind trial by Pelham et al[48] suggest that less frequent dosing may be preferable among parents, while the study by Quintana et al[47] suggests that a nonstimulant treatment might be preferable for some children and adolescents. Overall, these studies indicate that a preference assessment may be a useful approach for quantifying and comparing patients' or parents' experiences with drug treatments.

Studies assessing preference for general treatment approaches

Table 2 presents results from the four studies assessing preference for a general treatment approach.[51–54] All four studies assessed preference using a survey or questionnaire. In three of the studies, participants responded by indicating their choice among multiple options. In the study by McLeod et al,[53] participants were asked yes/no questions regarding their opinions of counseling and medication treatment for ADHD. The authors then derived preferences based on the pattern of responses to these two questions. These four studies were conducted in samples of parents, teachers, and the general public. Across the four studies, the treatment approaches under investigation included medication-only regimens, nonmedication regimens (eg, counseling or behavior modification approaches), and combined approaches of medication and nonmedication treatments.

Results of these four studies generally suggested that combined treatment approaches may be preferred to monotherapy treatment approaches for children with ADHD, but there is some variability in preferences. Three of the four studies found that a majority of respondents chose a combined treatment approach (ie, medication plus counseling or behavior modification) over a monotherapy treatment approach.[52–54] The respondents varied across these three studies, with samples consisting of teachers, the general public, and ethnically diverse parents of children with and without ADHD. The questionnaire included in the fourth study by Dos Reis et al[51] included an item relating to preference, with authors reporting results specific to racial-ethnic comparisons groups. Findings suggested that nonwhite parents were less likely than white parents to prefer medication over counseling as a treatment option for children with ADHD (59% of white parents vs 36% of nonwhite parents, $P < 0.0001$).

Studies assessing preference for treatment attributes or treatment outcomes

Four studies were identified that assessed preference for treatment attributes or outcomes (Table 3). Unlike the studies presented in Table 1, participants in these studies were not asked to report preferences for treatments that they, or their children, directly experienced. Instead, respondents were asked to indicate a preference for attributes or outcomes relating to hypothetical treatment choices. In these four studies, preference was assessed by a discrete choice experiment,[55] a SG utility assessment interview,[56,57] or a survey mail-out.[58] Across the three studies involving a formal preference procedure (ie, discrete choice or SG), samples included parents of children or adolescents with ADHD. The sample in the study by Stockl et al[58] consisted of 365 physicians who were treating children and adolescents with ADHD.

Several treatment attributes and outcomes were assessed in these studies, including the type of treatment (eg, stimulant vs nonstimulant), duration of effect, side effect profile, overall treatment efficacy, and impact on school and family functioning. Although the attributes and outcomes varied across these four studies, there was some consistency in results. Results from three studies suggested that nonstimulants may be preferred over stimulants for the treatment of children with ADHD.[56–58] In the utility studies by Matza et al[56] and Secnik et al,[57] parents expressed their preference for a nonstimulant treatment option over a stimulant treatment option when both hypothetical treatments were otherwise equal in terms of efficacy, side effect profile, and other treatment attributes. The survey results reported in Stockl et al[58] found that 38% of physicians strongly agreed or agreed that they would prefer prescribing a nonstimulant instead of a stimulant for the treatment of ADHD in children, provided that such options are available and Food and Drug Administration-approved. However, because the respondents did not necessarily have direct experience with nonstimulant medications and they were not provided with information on risks and benefits of stimulant treatment, these findings likely represent preconceived biases rather than preferences based on direct experience.

Table 2 Studies assessing preference for general treatment approaches

Citation	Preference assessment method	Preference content	Respondent (N)	Key results
Dos Reis et al[51]	ASK-ME survey (a 47-item, self-administered questionnaire)	Parents recruited from six pediatric primary care clinics completed the ASK-ME. One item asks respondents to indicate level of agreement with the following statement: '[I] prefer medication over counseling'. Study results were presented by racial/ethnic comparison groups (white vs nonwhite parents)	Parents of youth diagnosed with ADHD (N = 254)	Nonwhite parents were less likely than white parents to 'prefer medication over counseling' for their children (59% of white parents vs 36% of nonwhite parents, $P < 0.0001$)
Glass and Wegar[52]	Surveys distributed to teachers	Surveys assessed teachers' perceptions of ADHD etiology and treatment options. Teachers were given a choice of the following treatment options: medication, behavior modification, medication plus behavior modification, and no treatment	Teachers of children in kindergarten through fifth grade (N = 225)	94.7% of respondents (N = 213) chose the 'medication and behavior modification' option as the most appropriate treatment regimen
McLeod et al[53]	A short battery of questions included in the 2002 General Social Survey, followed by face-to-face interviews	A subset of respondents to the 2002 General Social Survey's National Stigma Study (Children module) who had indicated a prior knowledge and awareness of ADHD and participated in follow-up face-to-face interviews. Interviews included yes/no questions relating to ADHD beliefs and treatment preferences, including 'Should children be given counseling for ADHD?' and 'Should children be given medication to treat ADHD?' Authors used respondents' answers to the above yes/no questions to indicate beliefs and treatment preferences	General public survey respondents (N = 725)	Most respondents believed that children with ADHD should be given a combination of counseling and medication (65%, N = 471). 21% expressed a preference for counseling only (N = 151), 5% expressed a preference for medication only (N = 39), and 9% (N = 64) indicated that children with ADHD should receive neither counseling nor medication
Pham et al[54]	Questionnaire developed specifically for this study	Parents of children with and without ADHD completed a survey on ADHD-related beliefs and treatment. The survey included an item on treatment preference that asked parents to select from one of the following treatment options: medication only, counseling only, and a combined treatment approach. If parents did not have a child with ADHD, they were provided with a hypothetical situation in which their child did have ADHD	Ethnically diverse parents of children (aged 5–12) with ADHD (N = 58) and without ADHD (N = 61)	53.8% of parents preferred a combined treatment approach for their child, 24.4% preferred counseling only, 16.8% preferred medication only, and 5.0% responded 'none of the above' to the provided treatment options

Abbreviations: ASK-ME, attitudes, satisfaction, knowledge, and medication experiences survey; ADHD, attention-deficit/hyperactivity disorder.

Two additional trends that emerged across these studies were a preference for treatments with no known abuse potential and a preference for treatments with better (ie, more tolerable) side effect profiles. Physicians completing the survey administered by Stockl et al[58] and parents participating in the discrete choice experiment described by Muhlbacher et al[55] indicated their preference for treatments with no known abuse potential over treatments with evidence of abuse potential. Parents participating in the utility study by Matza et al[56] and the discrete choice experiment by Muhlbacher et al[55] indicated that the side effect profile of a hypothetical ADHD medication was important in the selection of and preference for an ADHD treatment. Specific side effects that influenced preference in these studies included incidence of nausea, changes in weight and appetite, and whether the medication made the children feel drowsy or more 'wired'.

Apart from the trends that emerged in the treatment attributes discussed above, the discrete choice experiment

Table 3 Studies assessing preference for treatment attributes or treatment outcomes

Citation	Preference assessment method	Preference content	Respondent (N)	Key results
Matza et al[56]	SG utility interviews	Parents of children with ADHD indicated preferences among 11 hypothetical health states that contained variations of the following five domains: ADHD symptom profile (mild, moderate, and severe symptoms), typical ADHD behaviors, impact on school functioning, impact on family functioning, and type of treatment with corresponding side effect profiles (stimulant, nonstimulant, and no treatment)	Parents of children (mean age of 10.2 years) diagnosed with ADHD (N = 43)	When both treatments were associated with an adequate response and tolerable side effects, parents significantly preferred the nonstimulant health state over the stimulant health state ($t = 2.3$, $P = 0.03$). When either the treatment response was inadequate or the side effects were intolerable, there were no significant differences in preferences for the stimulant and nonstimulant health states
Muhlbacher et al[55]	DCE and questionnaire	Parents' preferences of therapy characteristics were evaluated using a DCE and a 23-item questionnaire assessing importance of ADHD-therapy characteristics (including duration of effect, impact on school performance, and dosing options). The following therapy characteristics were included in the DCE: duration of treatment effect (long vs short), side effects (weight loss vs none), dosage form (always the same vs variable/combinable), discretion (intake of drug obvious vs not obvious), emotional state (mood swings vs none), social situation (problems with friends, hobbies vs no problems)	Mothers and fathers of adolescents (mean age 15 years) with ADHD (N = 219)	Results from the 23-item questionnaire found the following therapy characteristics to have the greatest relevance to parents: 'improving the child's emotional state', 'little or no addictive potential', and 'improved ability to concentrate'. Results of the DCE found the following characteristics to influence the selection of treatment: 'enabling social contacts' and 'emotional state: no mood swings' (relative importance 40%). 'Duration of effect: long (all day)' was also desirable (relative importance 18%), as were the characteristics of 'discretion', 'dosage', and 'side effects'
Secnik et al[57]	SG utility Interviews	Parents indicated preferences among 14 hypothetical health states,which described ADHD-related characteristics that varied according to treatment option (untreated ADHD, ADHD treated with a nonstimulant, immediate-release stimulant, or extended-release stimulant) and the nature of response (responder or nonresponder, with or without side effects)	Parents of children (mean age of 12.6 years) with ADHD (N = 83)	Generally, nonstimulant health states were preferred over otherwise identical stimulant health states
Stockl et al[58]	Survey mailing of a 30-item questionnaire	A survey was mailed to 1000 physicians who had prescribed stimulant medications to children and adolescents. The following preference-related questions asked clinicians to indicate their level of agreement with the following statements: Question 17: 'If available and with a FDA indication for treating ADHD in children or adolescents, I would prefer prescribing a medication that is not a stimulant versus a stimulant'. Question 18: 'If available and with a FDA indication for treating ADHD in children or adolescents, I would prefer prescribing a noncontrolled medication that does not have evidence of abuse potential versus one that is controlled [and has] evidence of abuse potential'	Physicians treating children and adolescents with ADHD (N = 365)	38% of physicians strongly agreed or agreed that they would prefer prescribing a nonstimulant instead of a stimulant if a nonstimulant with an FDA indication were available. 58% of physicians strongly agreed or agreed that they would prefer prescribing a noncontrolled medication that does not have evidence of abuse potential versus one that is controlled and has evidence of abuse potential

Abbreviations: SG, standard gamble; ADHD, attention-deficit/hyperactivity disorder; DCE, discrete choice experiment; FDA, Food and Drug Administration.

by Muhlbacher et al[55] assessed additional treatment characteristics that were not investigated in the other studies. This study found that treatments with a longer duration of action, greater potential for improvements in emotional state, and enhanced ability to enable social contacts would have the most influence in the parents' selection of treatment for their children with ADHD. These findings suggest that real-world outcomes, in addition to treatment efficacy, contribute to preferences for their children's treatment.

Studies not assessing a treatment-related aspect of ADHD

Finally, two additional studies were located that assessed preference for an aspect of ADHD that was not related to treatment. One study recruited a sample of 99 parents of children with ADHD to complete a survey assessing the importance placed on types of ADHD information and the preferred modes of receiving this information.[59] Parents were asked to preferentially rank the following ways of receiving information about their child's ADHD: verbal, written, DVD/video, seminars, parenting class, audio, Internet, video, and CD-ROM. Authors found the most preferred mode of information delivery to be verbal information received directly from a professional, with written information being the second most preferred option.

Another study involved semistructured follow-up interviews with 19 teachers of elementary school students with ADHD who had participated in a 2-month clinical trial of an unspecified ADHD treatment.[60] The teachers were asked to compare the Web-based ADHD symptom rating scale that they completed during the trial (the T-SKAMP) to their previous experience with paper-and-pencil ADHD scales. Results of the interviews found teachers to generally prefer the Web-based scale, with 89.5% of teachers indicating that it was easier to complete than the paper-based scale.

Discussion

ADHD may be treated with a range of potentially effective pharmacological and behavioral treatment options. Because there is not a dominant treatment known to be the first choice for all patients, ADHD is a condition for which individual preferences can play an important role when determining a treatment approach for individual patients. In studies identified for the current review, a wide range of measurable treatment preferences were reported by patients with ADHD, clinicians, parents, teachers, and survey respondents from the general population. However, this literature search found only 15 studies using a choice-based preference assessment related to ADHD. Given the potential role of preferences in clinical decision-making, more research is needed to better understand the preferences of patients with ADHD and other individuals who are directly affected by the disorder, such as parents and teachers.

Five studies were identified that assessed preference between two treatment options directly experienced by the respondent or the respondent's child, and all five studies yielded clear preferences (Table 1). Parents expressed preferences among stimulant treatment options,[46,48] children expressed preferences for a nonstimulant over a stimulant,[47] and small samples of children and adults expressed preferences for MPH over placebo.[49,50] One limitation of the current review is that clinical trials assessing preferences among ADHD treatment options would not have been located if they did not mention 'preference' or a related term in the published abstract. Therefore, it is possible that the current literature search failed to identify some published clinical trials that included a preference measure, but did not mention it in the abstract. Despite this limitation, results of the five identified studies suggest that preference data can complement clinical symptom measures by providing insight into the experiences of individuals directly affected by treatments. Based on these five studies, assessment of preference can be recommended for inclusion as an outcome measure in future clinical trials with study designs that allow patients to experience more than one treatment option. These preference assessments are more likely to yield useful results if the assessment tools are carefully developed and validated in the target population.

Additional studies assessed preferences for treatment approaches and attributes among respondents who did not necessarily have recent direct experience with the treatment options. Although these preferences were not assessed in the context of a controlled clinical trial, results may still provide useful information for clinical decision-makers. For example, parents, teachers, and general public survey respondents expressed preferences for combined treatment approaches involving both medication and nonpharmacological treatment such as counseling and behavioral modification.[52–54] Three additional studies revealed preferences for nonstimulant medications over stimulants among clinicians and parents.[56–58] Another study identified several therapy characteristics that may influence parents' treatment preferences, such as addictive potential, improvement in concentration, effects on social functioning, emotional impact, duration of effect, dosage, and side effects.[55] Finally, one study found that parent preferences for medication and counseling may vary as a function of racial/ethnic background.[51] Taken together, these

studies provide insight into factors that may influence patient, parent, and clinician preferences for ADHD treatment, such as treatment characteristics, effectiveness for specific symptoms, side effects, and respondent demographics. The variety of available treatment approaches and factors that can influence treatment preference underscores the importance of customizing treatment decisions based on the needs and preferences of each individual patient, as no single treatment approach will be suitable for all patients. Additional research on treatment and patient characteristics that influence preference could provide useful guidance for clinicians involved in choosing among treatment options for individual patients.

One significant gap identified in the current literature review is the minimal available research on treatment preferences of adults with ADHD. Although ADHD is often believed to be a disorder of childhood, symptoms such as inattention and impulsivity often persist into adulthood.[14–16,61] Furthermore, pharmacological and psychosocial treatments are being developed, tested, and implemented in adults with ADHD.[62–68] However, the current literature search identified only one study examining preferences of adults with ADHD, and this study was conducted with a small sample.[49] Since there is a wide range of potentially effective treatment approaches for adult ADHD, research is needed to understand the treatment preferences of this population.

Another limitation of this literature is that most studies did not use carefully developed and validated instruments to assess preference. Some studies used invalidated global items,[46] while others did not clearly describe the method of preference assessment.[47,48] Since the introduction of the Food and Drug Administration guidance on patient-reported outcomes, there has been a growing awareness of the importance of using carefully developed instruments that are validated for use in the target population.[69] We recommend that future studies of ADHD treatment incorporate more rigorously developed preference assessment methods, which can be clearly described in published articles.

Despite limitations of the currently available literature, findings of this review suggest that preference assessment could provide a useful indication of patients' experiences with various treatment options. Across the 15 studies in this review, patients, parents, clinicians, and teachers were able to provide quantifiable preferences among multiple treatment options, and research has begun to identify treatment- and respondent-related factors that influence these preferences. As research on preferences related to ADHD grows, findings may be applied in clinical decision-making. Although current ADHD treatment guidelines acknowledge that parents and families may play a role in choosing a treatment,[70,71] no guidance based on preference research is provided. As preference data accumulate in ADHD studies, findings could be incorporated into the decision-making process as described in treatment guidelines. Furthermore, such guidelines could encourage clinicians to include patients and families in the decision-making process. Additional research findings may help clinicians know how to initiate and facilitate these discussions. Finally, decision aids, such as booklets or Web sites, may be developed to provide information that will assist patients and parents as they contribute to their own treatment decisions.[72] Such decision aids have helped patients with other conditions develop their treatment preferences based on knowledge and information.[73] It is likely that patients and families affected by ADHD may experience similar benefits. ADHD may be particularly appropriate for consideration of patient preferences in the use of decision aids because it is a condition with a range of potentially effective treatment options. ADHD can be addressed with behavioral treatment, stimulant medication, nonstimulant medication, and a combination of behavioral and pharmacological treatments. Treatment approaches that help educate patients and parents while considering their preferences may be more effective than treatment decisions based on efficacy alone.

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