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Life Impairments in Adults With Medication-Treated ADHD

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Abstract

Objective—In developing psychosocial approaches to augment outcomes for medication-treated adults with ADHD, it is important to understand what types of life-impairments are most affected by continued ADHD symptoms that occur despite medication treatment. This may assist in delineating targets for interventions, as well as assessments of functional outcomes that are sensitive to change in this population.

Method—The sample consists of 105 adults with ADHD presenting for entry into clinical trials of CBT for residual ADHD. Life impairments are rated by a clinician using the LIFE-RIFT, which has subscales for work impairment, interpersonal impairment, life-satisfaction, and recreation, ADHD symptoms using the ADHD Rating Scale, overall ADHD severity using the clinical global impression, and associated distress using the Hamilton Depression and Anxiety Rating Scales.

Results—The most problematic impairments are in the domain of work, followed by interpersonal. Generally, the subscales of the LIFE-RIFT are associated, at the bivariate level, with all 4 symptom indices. Work and interpersonal impairments are uniquely associated with overall severity of ADHD symptoms using both the CGI and the ADHD Rating Scale. However interpersonal and life-satisfaction impairments are uniquely associated with depression, and life-satisfaction is uniquely associated with anxiety.

Conclusion—In medication-treated adults with ADHD, work and interpersonal impairments appear to be the most problematic areas of life-impairment, which are uniquely associated with ADHD severity. Life-satisfaction appears to be uniquely associated with distress as defined by anxiety and depression symptoms, with interpersonal impairments also playing a role. Psychosocial treatments for medication treated adults should target work and interpersonal domains and should include skills for managing associated distress.

Keywords

adults; life impairments; life satisfaction; quality of life

Adults with ADHD have been shown to experience a variety of functional impairments, such as unemployment or underemployment, economic problems, and relationship difficulties (Biederman et al., 1993; Brod, Perwien, Adler, Spencer, & Johnston, 2005; Murphy & Barkley, 1996; Ratey, Greenberg., Bemporad, & Lindem, 1992). Additionally, adult ADHD is also associated with a history of educational impairments, such as having lower grade point averages, attending special classes, and being held back in school (Barkley, 2002; Biederman, Faraone, Monuteaux, Bober, & Cadogen, 2004; Faraone et al., 2006). Beyond functional impairment, adults with ADHD have directly reported

significantly lower quality of life than adults without ADHD, (Brod, Johnston, Able, & Swindle, 2006; Mick, Faraone, Spencer, Zhang, & Biederman, 2008) with quality of life being negatively correlated with ADHD severity (Mick et al., 2008). These quality of life impairments may be ameliorated with psychosocial interventions to augment effects of medication management.

In controlled studies of stimulant medications, and open studies of tricyclic, monoamine oxidase inhibitor, and atypical antidepressants, 20–50% of adults are considered nonresponders because of insufficient symptom reduction or inability to tolerate these medications (Wender, 1998; Wilens, Spencer, & Biederman, 2002). Though the non-stimulant Atomoxetine is quite tolerable, and effective in reducing ADHD symptoms in adults (Faraone et al., 2005; Michelson et al., 2003), meta-analysis indicates that short acting stimulants are still the best first line of medication treatment for adults with ADHD (Peterson, McDonagh, & Fu, 2008). Adults who are considered responders to stimulant and other medications for adult ADHD typically show a reduction in only 50% or less of the core symptoms of ADHD (Wilens, Biederman, & Spencer, 1998; Wilens et al., 2002). Hence, many adults treated with medications for ADHD continue to show significant residual symptoms, which may continue to cause significant impairments.

Although psychopharmacology may ameliorate many of the core symptoms of ADHD (attentional problems, high activity, impulsivity), it does not provide a patient with concrete strategies and skills. Consequently, psychosocial treatment for ADHD in adults is recommended to go along with medication. There are few small uncontrolled and controlled studies of this approach that have employed psychosocial treatments designed to target dysfunctional cognitions, which negatively affect emotions and behavior, and develop skills to cope with the symptoms of ADHD (Hesslinger et al., 2002; Safren et al., 2005; Stevenson, Stevenson, & Whitmont, 2003; Stevenson, Whitmont, Bornholt, Livesey, & Stevenson, 2002; Wilens et al., 1999). However, compared with the literature on psychosocial treatments for other *DSM-IV* disorders such as anxiety and depression (e.g. Butler, Chapman, Forman, & Beck, 2006; Dobson, 1989; Gould & Johnson, 2001; Gould, Safren, Washington, & Otto, 2004; Gould, Otto, & Pollack, 1995) the body of research on psychosocial treatments for adults with ADHD is in its infancy. This is despite current clinical guidelines suggesting that combining psychosocial with psychopharmacological approaches is the recommended approach for treating adults with ADHD. The purpose of using a combined approach is twofold: (a) medications alone do not generally fully treat the disorder, and (b) psychosocial treatments can further reduce symptoms and increase functioning and quality of life.

In childhood, ADHD has repeatedly been linked with academic, social, and behavioral impairments (DuPaul & Weyandt, 2006). In adolescents with ADHD, parental concerns about poor schoolwork, peer difficulties, and behavior toward parents or other authority figures are more often the reason for referral rather than the core symptoms of ADHD per se (Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001; Weiss & Hechtman, 1993). As adults, people with ADHD are involved in an even wider variety of settings that can be impacted by ADHD symptoms and also have more independent responsibility for their behavior in such settings. Not surprisingly, then, adults with ADHD report more impairment than their non-ADHD peers across domains including academic, occupational, home, marital, and social functioning. However, the severity of these impairments is not uniform across domains—that is, ADHD symptoms are more strongly associated with impairments in some domains than in others. These effects may also differ with respect to the sample of ADHD adults being considered. For example, Barkley, Murphy, and Fisher (2008) found that clinic-referred and longitudinally followed adults with ADHD both reported

significantly more impairment in all domains than controls. The clinic-referred patients reported a stronger negative impact on educational functioning, however.

As part of an ongoing program of research to develop and test CBT for residual ADHD in adults (Safren et al., 2005), the current analyses were designed to better articulate which domains of life-impairment are most affected by ADHD in medication-treated adults. This information is important to the development and refinement of psychosocial approaches to augment medication treatments in adult ADHD for at least two reasons. First, because medications do work in reducing symptoms, and because psychosocial treatments are designed to provide skills, knowing which domains of life-impairment are most affected by symptoms provides empirical justification for training concrete skills to reduce such impairments. This can help guide the selection of psychosocial techniques to be implemented. Second, with psychosocial treatments for adult ADHD only beginning to emerge, it is important to utilize assessments in a way that will be sensitive to change. For example, if an overall “life-impairment” score is utilized, but only specific domains are generally affected by adult ADHD, then factoring all the domains would weaken the ability to find a treatment effect. Hence, the present study sought to address this by exploring the relationships of life-impairments to ADHD symptoms. Because psychiatric comorbidity in adults with ADHD is common (Miller, Nigg, & Faraone, 2007), we also explored the relationship of anxiety and depressive symptoms to domains of functional impairment and life satisfaction in our sample.

Methods

Participants were 55 men and 50 women (total $N = 105$) who met *DSM-IV* criteria for ADHD in adulthood and who were participating in our studies of CBT for medication-treated adults with ADHD. Data were taken from the initial diagnostic evaluation to determine study eligibility and a baseline clinician assessment of ADHD symptom severity. The initial diagnostic assessment was conducted by a clinician who would go on to become the patient’s therapist should they be assigned CBT, and the clinician assessment of ADHD severity was done by an evaluator who would go on to be blind to treatment condition.

To be included in the current study, individuals needed to be between the ages of 18 and 65 and be on medications for ADHD. Participants must have already had a diagnosis of ADHD from a provider outside of the study and have been prescribed medications for ADHD.

Assessment Measures and Procedures

To confirm the diagnosis of ADHD, an evaluator administered a diagnostic interview using the Structured Clinical Interview for *DSM-IV* (SCID-IV; First, Spitzer, Gibbon, & Williams, 1995), supplemented by sections of the Kiddie Schedule for Affective Disorders and Schizophrenia-Epidemiologic Version (Kiddie-SADS-E; Orvaschel, 1985) to assess ADHD and other childhood disorders. In previous studies conducted in our affiliated clinic, the Pediatric Psychopharmacology Clinic at Massachusetts General Hospital, diagnostic reliability of ADHD has been high, with a Kappa of 1.0 being obtained, and a 95% confidence interval of 0.8 to 1.0 (Spencer et al., 1995).

The ADHD symptom and distress assessments occurred after the evaluation and included the ADHD Rating Scale (Barkley, 1990; DuPaul, 1990). This scale, based on the *DSM-III-R* diagnostic criteria, assesses each of the 20 individual symptoms of ADHD using an identical 4-point severity grid (0 = *not present*; 3 = *severe*; minimum total score = 0, maximum total score = 60). The 20 *DSM III* ADHD symptoms assessed comprised the 18 *DSM-IV* items plus 2 additional items, one inattentive and one hyperactive-impulsive.

The evaluator also administered the Structured Version (Williams, 1988) of the Hamilton Depression Scale (HAM-D; Hamilton, 1960) and the structured version (Shear et al., 2001) of the Hamilton Anxiety Scale (HAM-A; Hamilton, 1959). Lastly, the independent evaluator rated Clinical Global Impression (CGI; National Institute of Mental Health [NIMH], 1985) for severity (1 = *not ill*, to 7 = *extremely ill*).

Assessment of quality of life impairments—The assessment of quality of life impairments was the Range of Impaired Functioning Tool (LIFE-RIFT; Leon et al., 1999). This is a semi-structured interview that targets functioning in four domains: work, interpersonal relationships, recreation, and global satisfaction. The clinician rates the extent to which the past week has been impaired as a result of psychopathology, and, in this case, as a result of ADHD symptoms. This instrument had adequate reliability (.81–.83), was developed through factor analysis revealing one construct (functional impairment) which remained invariant over time, and revealed predictive and convergent validity (Leon et al., 1999). For each subject, only relevant items (i.e., those that were not marked as “NA”) were included in the computation. This applied to the work domain, where ratings can occur for employment, household, or school, and the interpersonal domain, where ratings can occur for spouse, children, friends, and other relatives.

Results

Participant Characteristics

Data were available for 105 individuals, of which 52% ($n = 55$) were men and 48% ($n = 50$) were women, with an overall mean age of 41.96 ($SD = 10.95$). Race/ethnicity was as follows: 84.80% Caucasian, 6.70% African American, 2.90% Asian, 2.90% Hispanic or Latino, and 2.90% Other. Educational level was as follows: 3.80% high school or GED, 11.40% 2 years of post-high school education (e.g., associate or technical school degree), 44.80% college education, 28.60% master’s degree, and 11.40% doctorate (including J.D.).

Descriptive Data on Quality of Life Impairments

For each of the nine areas of functioning, as per the LIFE-RIFT (Leon et al., 1999) instructions, ratings were only described when they were relevant to the participants’ situation (e.g., impairment in schoolwork was rated only if the person was in school).

The average total LIFE-RIFT score across the whole sample was 11.19 ($SD = 2.35$).

The mean score for work (most impaired across employment, household, and school) was 3.95 ($SD = .79$), indicating moderate impairment. Of the sample, 98% (103/105) had at least some impairment in the work domain as evidenced by at least “mild” ratings and 73% (77/105) had at least “moderate” impairment because of ADHD psychopathology.

The mean score for interpersonal relations (most impaired across spouse, children, other relatives, and friends) was 2.64 ($SD = .96$), ranging between “good” and “fair”; 50% (52/105) had at least some impairment as evidenced by “fair” or worse ratings, and only 17% (18/105) had “poor” or worse interpersonal relations related to ADHD psychopathology.

The mean score for satisfaction was 2.59 ($SD = .66$), which falls between “good” and “fair”; 59% (62/105) had at least some impairment as evidenced by ratings of “fair” or worse, and 5% (5/105) had ratings of “poor” because of ADHD psychopathology.

The mean score for recreation was 2.01 ($SD = 1.01$), falling at the “good” designation. Here, 29% (30/105) had ratings of “fair” or worse, and 9% (9/105) had ratings of “poor” or worse impairment because of ADHD psychopathology.

With the exception of one pair (interpersonal vs. satisfaction), all of the subscales were significantly different from each other using paired samples t -tests, with impairments in work because of ADHD psychopathology being the most severe, followed by overall satisfaction, interpersonal impairment, and recreation impairment. See Table 1 for statistics for each paired test.

Impairments and Psychopathology

Bivariate associations of impairments to ADHD, depression, and anxiety severity

—Bivariate associations of impairments on the LIFE-RIFT to symptom scores on the four symptom severity ratings (ADHD CGI, ADHD Rating Scale, Hamilton Depression, Hamilton Anxiety) are depicted in Table 2. The total LIFE-RIFT score and all subscales were associated with every index of symptom severity with the exception of the LIFE-RIFT satisfaction subscale not being significantly associated with the ADHD Rating Scale score. Generally, these correlations were in the moderate-to-large effect ranges, and all in the expected direction.

Unique associations of impairments to ADHD, depression, and anxiety severity

—We next sought to examine the degree to which the various domains of impairment as assessed on the LIFE-RIFT were most associated with overall ADHD psychopathology, as well as symptoms of depression and anxiety. Linear regression equations were used with the four LIFE-RIFT domains as predictor variables and the indices of ADHD psychopathology (CGI, ADHD Rating Scale total score) and depression (HAM-D) and anxiety (HAM-A) as outcome variables.

Table 3 has the detailed results of the regressions predicting ADHD severity from the four LIFE-RIFT subscales. For the CGI, the four LIFE-RIFT domains together accounted for 35% of variance, with the work subscale contributing 13% of unique variance, and the interpersonal subscale contributing 13% of unique variance. The other two domains, satisfaction and recreation, did not contribute independent variance. A similar pattern emerged with the ADHD total Rating Scale score as rated by the clinician assessor. In this analysis, the four domains of impairment together accounted for 14% of the variance. Again, the work (5%) and the interpersonal (4%) subscales each contributed unique significant variance, and the other two did not.

A different pattern of results, however, emerged for the two indicators of distress: depression and anxiety. For depression on the HAM-D, the four domains of life impairment accounted for 29% of the variance and for anxiety on the HAM-A, the four domains accounted for 20% of the variance. For depression, interpersonal and satisfaction were both significant unique predictors, but work and recreation were not. For anxiety, satisfaction was a significant unique predictor and interpersonal a trend. Results are depicted in Table 4.

Discussion

This is a sample of individuals with ADHD who were treated with medications and still had residual symptoms. Given the studies showing that most individuals with ADHD who are treated with medications show improvements, but also show continued symptoms (Wilens et al., 1998, 2002), this is a population in need of psychosocial approaches to augment symptom and functional outcomes. Although substantial numbers of individuals in this sample experienced a variety of types of life-impairments because of ADHD, almost all

experienced at least some impairment in work settings. From a public health perspective, with the estimated prevalence of adult ADHD at 4.4% (Kessler et al., 2006), looking at ways to decrease impairments in work because of ADHD may not only assist patients with increasing their success and potentially their income in employment situations, but may also be a way to increase overall productivity from the perspective of employers (Barkley, Fischer, Smallish, & Fletcher, 2006).

Although generally all subscales of the LIFE-RIFT are associated with the four indices of psychopathology (ADHD CGI, ADHD Rating Scale, HAM-D, HAM-A), an interesting pattern of results occurs across ADHD versus distress ratings. For ADHD (CGI and ADHD Rating Scale), work and interpersonal impairments are uniquely associated with ADHD severity. For distress (HAM-A and HAM-D), work does not add unique variance over and above other significant impairments. In this case, overall satisfaction is uniquely and significantly associated with both anxiety and depression, but only satisfaction is uniquely significant for anxiety. This pattern of results may have implications both for treatment approaches and also for the way in which core symptoms of ADHD, associated distress, and functional impairments interact in adults with ADHD. The *DSM-IV* does not include distress resulting from symptoms as part of the criteria for diagnosing ADHD (American Psychological Association [APA], 1994), and it appears that core ADHD symptoms of inattention (e.g., poor attention to details/ carelessness mistakes, problems with follow-through, difficulty organizing, forgetfulness) and hyperactivity/impulsivity (e.g., talks excessively, blurts out answers, interrupts) are particularly likely to cause problems in work or relationship situations. Similarly, one can see how depression or anxiety symptoms would be strongly associated with overall life-satisfaction.

There are several notable limitations to the present study. First, data are cross-sectional so we are unable to examine the fluctuations of ADHD symptoms and functional impairments over time. It would be informative if this could be examined in future investigations. One might hypothesize a lag in improvements in functional domains, should ADHD be successfully treated. For example, once symptoms are in better control, it might take some time for patients to make significant changes in their work or relationships such that they would score differently on measures of quality of life. Second, the analyses are unable to address the possibility of more complex relationships among ADHD symptoms, internalizing symptoms, and impairments. The principal aim of these analyses is to explore which domains of life impairment are most prevalent in medication-treated adults with ADHD, and which are most closely linked to ADHD symptoms in this sample so that we could target these impairments in future interventions. Future research should examine these associations across development and also specifically examine how the relationship between ADHD symptoms, impairments, and distress changes with psychosocial treatments. Third, the goal of the study is to delineate what impairments exist in this sample, versus to compare the levels of impairment across groups of individuals with ADHD to the normal population. Hence, there is not a comparison group of individuals without ADHD or individuals with ADHD who are not on medications. Lastly, the education level of the sample may be high, with 44.8% reporting a college education. This may therefore be a group that is less impaired than the population of individuals with ADHD in general.

While the current study provides data that speak to the development of interventions for ADHD in adults, additional research devoted to issues of functional impairment and comorbid internalizing disorders from a developmental perspective will be critical to prevention of these negative outcomes. Though an increasing number of studies document the increased risk of anxiety and depression conferred by ADHD in children, adolescents, and now adults, no large-scale study has identified risk and protective factors for these internalizing outcomes in adulthood. In contrast, much more is known about the relationship

of ADHD to other externalizing disorders and outcomes such as conduct disorder and substance abuse. Emerging research documents mediators relevant to explaining the relationship between ADHD and depression in children, including locus of control in later childhood (Ostrander & Herman, 2006). Understanding how ADHD symptoms interact with challenges in adolescence and young adulthood to impact self-acceptance and other cognitive and behavioral patterns relevant to anxiety and depression will be a key step in preventing the functional impairments associated with these comorbid disorders.

The current study adds to the literature to document that life-impairments in adults with ADHD extends to those who are treated with medications, the most widely studied and widely used treatment for this disorder. Additionally, it provides a continued justification for the importance of additional approaches such as adjunctive psychosocial treatments to assist in reducing not only core ADHD symptoms, but also associated functional impairments. Lastly, it identifies work and interpersonal domains of impairments as being the most prevalent in adults with ADHD who are treated with medications, and the most closely associated with the severity of continued symptoms. Accordingly, when impairment outcomes of psychosocial treatments for adults with ADHD who are on medications are measured, these domains may be important targets and potentially more sensitive to change as a result of treatment.

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Biographies

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Table 1LIFE-RIFT Subscale Severity- Paired Samples *T*-Tests

| Subscale | 1 | 2 | 3 | 4 |
|------------------|---|--------------------|-------------------------|--------------------|
| 1. Work | - | $t(104) = 11.75^*$ | $t(104) = 15.32^*$ | $t(104) = 17.97^*$ |
| 2. Interpersonal | - | - | $t(104) = 0.51$ n.s. | $t(104) = 5.58^*$ |
| 3. Satisfaction | - | - | - | $t(104) = 6.34^*$ |
| 4. Recreation | - | - | - | - |

Note:

* $p < .001$.n.s. = not significant ($p > .05$).

Table 2

Bivariate Correlations of Symptom Scores and Life-Impairment Ratings

| | LIFE-RIFT Work | LIFE-RIFT Interpersonal | LIFE-RIFT Satisfaction | LIFE-RIFT Recreation | LIFE-RIFT Total |
|-----------------------|-------------------|----------------------------|---------------------------|-------------------------|--------------------|
| ADHD Rating Scale | .27** | .27** | .10 | .20* | .32** |
| Baseline CGI Severity | .44** | .45** | .21* | .22* | .49** |
| Baseline GAF | -.38** | -.41** | -.38** | -.31** | -.54** |
| HAM-A | .23* | .31** | .35** | .31** | .44** |
| HAM-D | .26** | .36** | .47** | .34** | .51** |

Note:

 $p < .05 = *$; $p < .01 = **$ ADHD Rating Scale $N = 105$; Baseline CGI Severity $N = 105$; Baseline GAF = 105.HAM-A (Hamilton Anxiety) $N = 104$; HAM-D (Hamilton Depression) $N = 105$.

Table 3

Prediction of ADHD Severity From the LIFE-RIFT Subscales

| Regression Models | R ² | P-value | F or t | df | Semi-Partial r ² |
|----------------------------|----------------|---------|-----------|-------|-----------------------------|
| ADHD CGI | .35 | .000 | F = 13.27 | 4,100 | |
| Work | | .000 | t = 4.5 | | .13 |
| Interpersonal | | .000 | t = 4.5 | | .13 |
| Satisfaction | | .95 | t = 0.0 | | .00 |
| Recreation | | .98 | t = 0.0 | | .00 |
| ADHD IA Rating Scale Score | .14 | <.01 | F = 3.94 | 4,100 | |
| Work | | <.03 | t = 2.3 | | .05 |
| Interpersonal | | <.03 | t = 2.3 | | .04 |
| Satisfaction | | .53 | t = -0.6 | | .00 |
| Recreation | | .39 | t = 0.9 | | .01 |

Note: CGI = Clinical Global Impression; IA = Independent Assessor.

Table 4

Prediction of Distress Severity from the LIFE-RIFT Subscales

| Regression Models | R ² | P-value | F or t | df | Semi-Partial r ² |
|---------------------|----------------|---------|-----------|-------|-----------------------------|
| Hamilton Depression | .29 | .000 | F = 10.41 | 4,100 | |
| Work | | .15 | t = 1.5 | | .01 |
| Interpersonal | | <.05 | t = 2.2 | | .03 |
| Satisfaction | | <.002 | t = 3.5 | | .08 |
| Recreation | | .324 | t = 1.0 | | .00 |
| Hamilton Anxiety | .20 | .000 | F = 6.27 | 4,99 | |
| Work | | .18 | t = 1.4 | | .01 |
| Interpersonal | | .06 | t = 1.9 | | .03 |
| Satisfaction | | <.05 | t = 2.1 | | .04 |
| Recreation | | .19 | t = 1.3 | | .01 |