

Studying the Emotional Intelligence and Emotion Regulation Skills in Adults with Attention-Deficit/Hyperactivity Disorder (ADHD)

Changiz Rahimi ^{1*}, Mohammad Amir Shojaei²

1. Professor of Clinical Psychology, Department of Clinical Psychology, Faculty of Education and Psychology, Shiraz University, Shiraz, Iran.

2. MA in Clinical Psychology, Department of Clinical Psychology, Faculty of Education and Psychology, Shiraz University, Shiraz, Iran.

(*Corresponding author: Department of Clinical Psychology, Faculty of Education and Psychology, Shiraz University, Shiraz, Iran. E-mail: crahimi2016@hotmail.com)

(Received:21 Oct 2017 ; Revised: 6 Nov 2017 ; Accepted:28 Dec 2017)

Abstract

Introduction: Several Studies have shown that the clinical symptoms of Attention Deficit/Hyperactivity Disorder (ADHD) include an emotional dysregulation and deficits in emotional intelligence. Present study aimed to study emotional intelligence and emotion regulation skills in adults with ADHD.

Methods: Participants were 40 newly diagnosed adults with ADHD (65% female, 35% male, mean age 27.5 years, ranged from 19 to 43 years old). Symptoms were assessed using Conner's Adult ADHD Rating Scales. The control group included 40 subjects who were selected using convenient sampling method. Both groups completed the 36-item Difficulties in Emotion Regulation Scale (DERS) and the 90-item Persian version of Bar-On Emotional Quotient Inventory (EQ-i). Data were analyzed using MANOVA.

Results: Findings showed that clinical group differed significantly from control subjects with respect to their overall emotion regulation skills and emotional intelligence scores ($p < 0.01$).

Conclusions: Adults with Attention-Deficit/Hyperactivity Disorder had more difficulties in emotion regulation and more deficits in emotional intelligence compared to normal subjects.

Declaration of Interest: None.

Key words: Emotional Intelligence, Emotion Regulation, Attention-Deficit/Hyperactivity Disorder (ADHD)

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is defined by a cluster of age inappropriate, persistent and impairing symptoms of inattention and/or hyperactivity/impulsivity. Associated features of the disorder that yield to the diagnoses of ADHD include low tolerance for frustration and mood irritability (1). It has been suggested that poor emotional functioning, like mood instability and emotional impulsiveness, might also constitute a core aspect of ADHD (2, 3). With an estimated worldwide prevalence of about 5% in school-aged children, ADHD is one of

the most commonly diagnosed neuropsychiatric disorders in children (4). Whilst in the past ADHD was considered to remit after adolescence, available evidence shows that impairing symptoms of ADHD can persist in up to 65% of cases in adulthood (5), other researchers estimated that 2.5% to 5% of the general adult population suffer from this disorder (6,7). ADHD in adulthood is associated with severe psycho-social impairments such as low socio-economic status, less academic and professional success, high rates of changing jobs, unemployment,

driving accidents, jail time, interpersonal problems (i.e., conflicts in partnerships, divorce, loss of relationships), higher rates of substance abuse, anti-social disorders and behaviors (8-13).

Although the main body of research focused on the core symptoms including inattention, hyperactivity, and impulsivity and their contribution to psychopathology and functional impairment (14-16), lately there has been a focus on emotional symptoms (16-19). On the other hand, while executive functioning deficits have been central to cognitive theories of ADHD in children, a recent work has suggested that emotion dysregulation may also play a key role in understanding the impairments suffered by youth and adults with ADHD (20). This notion is supported by research which has shown that emotion dysregulation is highly prevalent in both children and adults with ADHD (19), and that symptoms such as being quick to anger, easily frustrated and loss of temper are linked to impairments in a variety of different domains (family, work, social interactions) in this population (18,21). Moreover, there is some evidence that these impairing emotional effects may be additional to those associated with inattention/hyperactivity-impulsivity (18, 22). Despite its clinical significance, however, the role of emotion regulation deficits in the development and maintenance of clinical difficulties has not been adequately researched in adults. Although emotional dysregulation is not part of the current defining criteria for ADHD, mounting evidence from clinical, neuroimaging and genetic studies suggests that it should be considered as a pivotal component of ADHD (15), at least in a subgroup of patients, as it contributes to the burden of ADHD, in terms of impairment on social and occupational functioning, such as the level of psycho-social functioning, risky driving, delinquency, poorer parenting skills, and more partnership problems (12). Barkley (2015), also assumes that the core symptoms including inattention, hyperactivity, and impulsivity in adult ADHD stem from a deficit in emotional-motivational regulation (13).

Results of some researches highlight the importance of emotional dysregulation in

adults suffering from ADHD (24). Studies on emotional dysregulation in adult ADHD demonstrate for instance that patients were less able to regulate and control their emotions than control group (25, 26), and that those deficits influence self-concept and quality of life more negatively than ADHD core symptoms alone (27). Furthermore, the impairments observed in close relations, family-, work-, and academic life are noticeable in groups of patients with adult ADHD and emotional dysregulation, but not in those possessing intact regulation skills (28), even when controlling for severe comorbidity such as conduct disorder (29).

ADHD among adults also has profound effect on their interpersonal relationships. Results showed that children and adolescents with ADHD display substantial difficulty interacting with peers and forming relationships. These interpersonal problems are pervasive and remain fairly stable over time, with long-term implications for social adjustment in adulthood (30). Perceived inability to regulate and manage one's emotions predicted both higher hyperactivity-impulsivity and inattentiveness, whereas perceived inability to identify and understand one's emotions uniquely predicted higher inattentiveness (31). Among young adults (but less so for the adolescent sample), the intrapersonal dimension was also found to be a moderate unique predictor of inattentive symptomatology. This relationship replicates past studies with college students (31, 32).

According to what Posner and colleagues (33) termed the "decontrol hypothesis", emotional dysregulation in ADHD arises from impairments in executive dysfunctions in ADHD. More specifically, deficits in top-down inhibitory processes, which are found in a sizeable portion of individuals with ADHD, would lead to abnormal emotional reactions, whilst emotional processing per se would be largely normal. The concept proposed by Barkley of deficit of "emotional self-regulation" should be considered within this model (12).

Emotion dysregulation is a dimensional trait that is not unique to ADHD; rather, it undercuts the traditional divide between internalizing and externalizing diagnoses and, indeed, may

partly explain their high correlation (34). Within the ADHD literature, emotion dysregulation has been conceptualized as emotional impulsiveness, difficulty in effortful regulation of induced emotions, and/or difficulty inducing positive, more acceptable mood states (2,35). According to Shaw and colleagues, emotional dysregulation can be defined as a dysfunction in modifying an emotional state in an adaptive and goal oriented way, resulting in individuals being easily excitable, quick to anger, and prone to intense mood lability (19).

Emotion dysregulation is a multi-faceted construct involving: (a) a lack of awareness, understanding, and acceptance of emotions; (b) the inability to control behaviors when experiencing emotional distress; (c) lack of access to adaptive strategies for modulating the duration and/or intensity of aversive emotional experiences; and (d) an unwillingness to experience emotional distress as part of pursuing meaningful activities in life (36). According to Gratz & Roemer (36) difficulties in emotion regulation has six dimensions; (1) Accept: Lack of Emotion Acceptance; (2) Goals: Inability to Engage in Goal Directed Behavior When Distressed; (3) Impulse: Impulse Control Difficulties; (4) Aware: Lack of Emotional Awareness; (5) Strategies: Lack of Effective Emotion Regulation Strategies; (6) Clarity: Lack of Emotional Clarity.

Clinical observations suggest that adults have more diverse deficits than children with ADHD. These seem to entail difficulties with emotionality, self-concept and emotion regulation in particular, along with the cardinal symptoms of inattention, impulsivity, and hyperactivity for adult patients (37).

Another construct that is discussed in this study is Emotional Intelligence (EI). The multidimensional construct of EI can provide a useful theoretical framework for systematizing and advancing this emerging research area. Emotional intelligence has been defined as a form of intelligence that reflects a general capacity to perceive emotions both in ourselves and in others, to regulate emotions, and to cope effectively with emotional situations. EI involves perceiving, understanding and

managing one's own emotions and those of others in an adaptive or effective way (38).

The Bar-On model provides the theoretical basis for the Emotional Intelligence (EQ-i), which was originally developed to assess various aspects of this construct as well as to examine its conceptualization. According to this model, emotional-social intelligence is a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand ourselves and others, how express ourselves, being able to relate to people and possessing the ability to adapt and cope with our surroundings' which in term will increase our chances of success when dealing with environmental demands. The emotional and social competencies, skills and facilitators referred in this conceptualization include a set of interrelated abilities organized along five dimensions; (a) intrapersonal skills, the ability to recognize, understand and express emotions and feelings; (b) interpersonal skills, the ability to understand how others feel and relate with them; (c) stress management, the ability to manage and control emotions; (d) adaptability, the ability to manage change, adapt and solve problems of a personal and interpersonal nature; and (e) general mood, the ability to generate positive affect and be self-motivated (39).

Positive emotional intelligence is a strong predictor of better psychological adjustment and higher self-esteem, whereas low or negative emotional intelligence is significantly related to depression, damaging and disturbing behavior (40). Gardner and Qualter (41) found that interpersonal relational difficulties, poor impulse control, stress, loneliness, depression, anxiety, low self-esteem, aggressive behaviors, suicidal thoughts, drug and alcohol consumption seem to be significantly linked with poor emotional intelligence.

The stress management dimension of emotional intelligence was, by far, the strongest predictor of both hyperactive-impulsive and inattentive symptomatology (42). This finding is also congruent with past results for college students (31,32). The adaptability dimension of emotional intelligence was found to be another unique predictor of inattention and, to a

somewhat lesser extent, hyperactive–impulsive symptomatology of ADHD (43). Furthermore, self-perceptions are stronger predictors of mental health than observable EI abilities (44).

Present study aimed to study emotional intelligence and emotion regulation skills in adults with ADHD.

Methods

The research design is causal-comparative. Independent variable in this study is ADHD, while dependent variables included Emotional Intelligence and Emotion Regulation Skills. Participants were 40 newly diagnosed adults with ADHD who were recruited from the psychiatric specialties service in Shiraz, Iran (65% female, 35% male, mean age 27.5 years, ranged from 19 to 43 years old) and received a diagnosis of ADHD by psychiatrist in last 3 months and 40 persons without ADHD as control group. All participants completed the Emotional Quotient Inventory (EQ-i, Bar-On & 2002) and the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The patients were assessed by experienced clinical psychologists on the basis of a detailed clinical history, the diagnostic criteria for adult ADHD according to the DSM-5 and Conner's Adult ADHD Rating Scales. The control group includes 40 subjects who were selected using convenient sampling method.

The Difficulties in Emotion Regulation Scale (DERS)

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a brief 36item self-report questionnaire on a five-degree likert scale to assess multiple aspects of emotion regulation difficulties. DERS items focus primarily on the regulation of negative emotional states. Participants answer on a 5-point scale ranging from 1: almost never to 5: almost always. The overall DERS-18 score ranges from 18 to 90 and, in the absence of a score threshold, analyses are conducted by comparing the values between the groups based on either the overall score or the six factors.

The measure yields a total score as well as scores on six subscales: (1) non-acceptance of

emotional responses, (2) difficulties engaging in goal-directed behaviors, (3) impulse control difficulties, (4) lack of emotional awareness, (5) limited access to emotion regulation strategies, and (6) lack of emotional clarity. The DERS has good test-retest reliability and construct and predictive validity (36,46). In the present study, the Persian version of DERS (47) was used. Psychometric properties of the Persian version of DERS have been confirmed. The Cronbach's alpha of this scale was 0.90 (47).

The Bar-On Emotional Quotient Inventory (EQ-i)

The original version of Bar-On Emotional Quotient Inventory (EQ-i) is a 133-item scale, that provides a measure of total EI (designated as Emotional Quotient, EQ) and the five composite scales of Intrapersonal EQ (associated with awareness of one's own feelings and positivity), Interpersonal EQ (interpersonal/social skills), Adaptability EQ (ability to cope flexibly with everyday problems), Stress Management EQ and General Mood EQ (happiness and optimism). The EQ-i is in the form of short sentences and employs a 5-point response Likert scale with a textual response format ranging from "very seldom or not true of me" (1) to "very often true of me or true of me" (5). The EQ-i is suitable for individuals 17 years of age and older and takes approximately 30 minutes to complete (48).

Satisfactory psychometric properties have been reported in the technical manual accompanying the EQ-i. For the EQ-i overall EI score the internal reliability was 0.87. For the EQ-i: subscales internal reliabilities were Interpersonal 0.79, Intrapersonal 0.78, Adaptability 0.79, Stress Management 0.79, General Mood 0.83. Internal consistency scores for the EQ-i (Cronbach's alpha) range from $r = 0.69$ to $r = 0.86$ with an overall average coefficient of $r = 0.76$ for the full scale score. Scores on the five EI subscales can also be summed to provide a total EI score. Higher scores on the total EI scale and the four EI subscales reflect higher levels of self-perceived emotional and social competency (48).

In this study, to avoid cross-cultural differences and to make sure Iranian subjects completely comprehend the content, the translated Persian version of this questionnaire was employed. This adjusted final form was decreased into 90 items and the Cronbach's Alpha reliability index was reported as 0.80 (49). In another study, Dehshiri (2003) reported that the Persian version has generally good internal consistency, test-retest reliability, and construct validity. Cronbach's Alpha coefficient was 0.76 and the results of the factor analysis provided convincing support for the inventory hypothesized structure. This test and its subscales have reliability and validity in Iranian culture (50).

Sampling procedure took place at the psychiatric centers in Shiraz, Iran. Participants were given a complete oral description of the study. Following informed consent, participants first took part in the clinical interview conducted by the examiner and then the questionnaires were completed. The Ethics Committees in each center approved the study and all participants gave their written informed consent.

In order to analyze data, descriptive statistics methods, including mean and standard deviation were used; and in order to examine research hypotheses, inferential statistics, including multivariate analysis of variance (MANOVA) were performed. Data analysis was done using statistical software package, i.e. SPSS/24.

Results

In this study, 80 participants (40 ADHD and 40 without ADHD) were examined. Means and standard deviations for the Difficulties in Emotion Regulation Scale (DERS) are presented in Table 1.

Table 1: Means and standard deviations for the Difficulties in Emotion Regulation Scale (DERS)

Variables	Normal Subjects <i>M (SD)</i>	ADHD <i>M (SD)</i>
Total Score	97.78 (23.51)	77.58 (17.19)
Accept	15.53 (5.11)	11.06 (3.84)
Goals	16.61 (4.87)	12.26 (3.79)
Impulse	17.95 (5.73)	11.20 (3.13)
Aware	16.97 (5.77)	15.80 (6.05)
Strategies	21.79 (7.22)	15.42 (4.33)
Clarity	12.43 (3.78)	10.98 (3.79)

In addition, means and standard deviations for the Bar-On Emotional Quotient Inventory (EQ-i) are presented in Table 2.

Table 2: Means and standard deviations for the Bar-On Emotional Quotient Inventory (EQ-i)

Variables	Normal Subjects <i>M (SD)</i>	ADHD <i>M (SD)</i>
Total EQ-i	282.64 (39.57)	250.96 (45.19)
Intrapersonal	59.06 (9.91)	56.92 (12.79)
Interpersonal	59.74 (10.87)	52.36 (10.79)
Stress Management	62.55 (9.53)	55.22 (11.13)
Adaptability	62.79 (10.22)	55.42 (11.33)
General Mood	53.16 (9.77)	51.06 (10.05)

To analyze the data, at first, the assumptions of the MANOVA including homogeneity of variances, Box and Levene's tests were employed. Based on the Box test, which was not significant for any variable, the homogeneity of variance/covariance matrices was considered (Box=532.11, F=4.65, p=0.68). Also, based on the Levene's test, which was not significant for any variable, the equality of group variances was met. Therefore, the multivariate variance analysis was computed. The results obtained from the multivariate variance analysis on the aspects of Difficulties in Emotion Regulation in two groups indicated that the significance level of all tests permits the application of multivariate variance analysis. These results showed that in the studied groups, there is a significant difference at least in one of dependent variables (Lambdai Vilkez=0.03, F=563.98, p<0.001).

Table 3: Results of MANOVA on the Difficulties in Emotion Regulation in two groups

Sources	F	p
DERS Total Score	17.57**	0.004
Accept	5.67*	0.026
Goals	7.43*	0.037
Impulse	14.91**	0.001
Aware	1.07	0.593
Strategies	17.96**	0.002
Clarity	0.86	0.191

As can be seen in Table 3, there is a significant difference in Difficulties in Emotion Regulation between adult ADHD and normal adult ($p < 0.01$). This means that people with ADHD had more Difficulties in Emotion Regulation than normal people. In addition, there was a significant difference in Accept and Goals aspects of DERS between adult ADHD and normal adult ($p < 0.05$). On the other hand, Impulse and Strategies aspects of DERS was significantly different between adult ADHD and normal adults ($p < 0.01$).

Then, in order to examine next hypotheses, MANOVA was performed. Before using the parametric test of multivariate variance to compare the Emotional Quotient between two groups, the Box and Levene tests were employed. Based on the Box test, which was not significant for any variable, the homogeneity of variance/covariance matrices was confirmed (Box=323.41, $F=6.45$, $p=0.58$). Also, based on the Levene test, which was not significant for any variable, the equality of group variances was met. Therefore, the MANOVA faced no difficulty. The results obtained from MANOVA on the aspects of Emotional Quotient in two groups indicated that the significance level of all tests permits the application of multivariate variance analysis. These results showed that in the studied groups, there was a significant difference at least in one of the dependent variables (Lambdai Vilkez=0.037, $F=41.48$, $p < 0.001$).

Table 4: Results of MANOVA on the Bar-On Emotional Quotient in two groups

Sources	F	p
EQ-i Total	20.37**	0.001
Intrapersonal	3.63	0.461
Interpersonal	9.43*	0.047
Stress Management	10.71*	0.035
Adaptability	17.07**	0.003
General Mood	0.96	0.862

As can be seen in Table 4, there is a significant difference in Emotional Quotient between adult ADHD and normal adult ($p < 0.01$). This means that people with ADHD had less Emotional Intelligence than normal people. In addition, there was a significant difference in Interpersonal and Stress Management aspects of EQ-i between adult ADHD and normal adult ($p < 0.05$). On the other hand, Adaptability

aspects of EQ-i was significantly different between adult ADHD and normal adult ($p < 0.01$).

Conclusion

The present study aimed to compare the emotional intelligence and emotion regulation skills in adults with ADHD and normal adults. Findings showed that clinical group differed from control with respect to their overall emotion regulation skills and emotional intelligence score ($p < 0.01$). In other words, people with ADHD had more difficulties in emotion regulation than normal people. Parker et al., (WHAT YEAR) (31) demonstrated that inability to regulate and manage one's emotions predict symptoms of ADHD including hyperactivity, impulsivity and inattentiveness, whereas inability to identify and understand one's emotions uniquely predicted higher inattentiveness.

In addition, results showed that adult with ADHD had lower scores than normal adult in terms of accept, goals, impulse and strategies aspects of DERS. In the other words, people with ADHD encountered with more lack of emotion acceptance (accept), enable to engage in goal-directed behavior when distressed (goals); had difficulties in impulse control (impulse) and also encounter with more lack of effective emotion regulation strategies (strategies). According to Barkley (2) and Bunford, Evans, & Wymbs (YEAR) (35), emotion dysregulation has been conceptualized as emotional impulsiveness, difficulty in effortful regulation of induced emotions. According to Shaw and colleagues, Emotional dysregulation can be defined as a dysfunction in modifying an emotional state in an adaptive and goal oriented way (19). According to Gratz & Roemer (YEAR) (36) emotion dysregulation is a multi-faceted construct involving lack of awareness, understanding, and acceptance of emotions; the inability to control behaviors when experiencing emotional distress; lack of access to adaptive strategies for modulating the duration and/or intensity of aversive emotional experiences; and an unwillingness to experience emotional distress as part of pursuing meaningful activities in life.

On the other hand, people with ADHD had less emotional intelligence score than normal subjects. According to Bar-On (39), Emotional Intelligence define as a form of intelligence that determine how effectively we understand ourselves and others, how express ourselves, being able to relate to people and possessing the ability to adapt and cope with our surroundings' which in term will increase our chances of success when dealing with environmental demands. Emotional Intelligence, also was found to be unique predictor of inattention and, to a somewhat lesser extent, hyperactive-impulsive symptomatology of ADHD (43). Within the Emotional Intelligence literature, positive emotional intelligence is strong predictor of better psychological adjustment and high self-esteem, whereas low or negative emotional intelligence is significantly related to depression, damaging and disturbing behavior (40). In addition, results showed that adults with ADHD have more deficits and difficulties with emotionality, self-concept and emotion regulation in particular, along with the cardinal symptoms of inattention, impulsivity, and hyperactivity (37).

Furthermore, results showed that adult with ADHD had lower scores than normal adult in terms of interpersonal, stress management and adaptability aspects of EQ-i. In the other words, people with ADHD encounter with more inability to understand how others feel and relate with them (interpersonal), more inability to manage and control emotions (stress management) and more inability to manage change, adapt and solve problems of a personal and interpersonal nature (adaptability) (39). Gardner and Qualter (41) found that Interpersonal relational difficulties, poor impulse control, stress, loneliness, depression, anxiety, low self-esteem, aggressive behaviors, suicidal thoughts, drug and alcohol consumption seem to be significantly linked with poor emotional intelligence.

ADHD among adults also has profound effect on their interpersonal relationships. Results showed that children and adolescents with ADHD display substantial difficulty interacting with peers and forming relationships. These interpersonal problems are

pervasive and remain fairly stable over time, with long-term implications for social adjustment in adulthood (30). The Intrapersonal EQ scale was also designed to capture "individuals who are in touch with their feelings and able to express their feelings" (48). Furthermore, the impairments observed in close relations, family-, work-, and academic-life are noticeable in groups of patients with adult ADHD and emotional dysregulation, but not in those possessing intact regulation skills (28). Among young adults (but less so for the adolescent sample), the intrapersonal dimension was also found to be a moderate unique predictor of inattentive symptomatology. This relationship replicates past studies with college students (31,32).

The Stress management composite scale showed a pattern of results similar to that of the Adaptation and Intrapersonal EQ scales. The stress management dimension of emotional intelligence was strong predictor of both hyperactive-impulsive and inattentive symptomatology (42). This finding is also congruent with past results for college students (31,32). The Adaptability dimension of emotional intelligence was, by far, the strongest predictor of both hyperactive-impulsive and inattentive symptomatology. The adaptability dimension of emotional intelligence was found to be another unique predictor of inattention and, to a somewhat lesser extent, hyperactive-impulsive symptomatology of ADHD (42). These findings are consistent with socio-cognitive models of ADHD, which highlight deficits in social perspective taking, social information processing, and the subsequent ability to devise personal and peer-oriented solutions to routine problems (43).

This study has some limitations. The size of the sample may make it difficult to obtain significant results, but it has been compensated by obtaining a size effect of the differences obtained from moderate to large, which has allowed us to generalize results. Another limitation of this study is the use of self-report data. It is suggested that in future studies, an emotional regulation-based interventional study should be used for patients with emotional intelligence deficiency and to

evaluate the changes in the disease after the treatment is provided.

In summation, this study demonstrated that adults with ADHD differed from control group with respect to their overall Emotion Regulation skills and Emotional Intelligence score. Based on extensive literature, these results support the hypothesis that emotional dysregulation is a distinct symptom of adult ADHD. We obtained a good agreement with existing literature for the variance of emotion regulation difficulties and emotion intelligence deficit in clinical group and control group.

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