Change in quality of life after cognitive behavior therapy for anxiety disorders: an Egyptian prospective study

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Introduction

Despite increased prevalence, chronic course, and high morbidity rate of anxiety disorders, little is known about the effectiveness of various therapeutic approaches especially cognitive behavior therapy (CBT) in improving the quality of life of anxiety patients. This study aimed at quantifying the impact of CBT in anxiety disorder patients on quality of life (QOL), and to address the question of its long-term effect.

Methods

Forty patients diagnosed with anxiety disorders according to the standard Structured Clinical Interview (SCID-I) of *DSM-IV* were asked to complete the *DSM-IV* semi-Structured Clinical Interview for diagnosis section for anxiety and depression, sociodemographic sheet, medical history sheet, and Beck Depression Inventory. A structured and manual CBT protocol was applied to all participants. An assessment battery tapping QOL issues and the major clinical dimensions of the anxiety disorders was administered at baseline pretreatment (week 0), posttreatment (week 9), and at 6-month follow-up (week 35) to evaluate treatment outcomes on QOL and test its durability. Two male patients dropped from continuing their CBT protocol.

Results

CBT had a positive clinical outcome on anxiety disorders, which was significantly evident in changes in clinical diagnosis, changes in used doses of medications, and changes in outcome tools' scores. With regard to QOL, CBT made statistical significant improvement in the QOL questionnaire score for both anxiety disorders as a whole and subtypes of anxiety disorders posttreatment and at 6-month follow-up. There was a statistically significant difference in improvement between pretreatment and posttreatment, pretreatment and follow-up, but not between posttreatment and follow-up. QOL in anxiety patients was negatively correlated with pretreatment duration of anxiety symptoms and Beck Depression Inventory scores.

Conclusion

We concluded that CBT is effective for the management of anxiety disorders with short term (8 weeks) and long term (35 weeks), with positive impact on QOL. Considering the limited number of studies in this area, it is recommendable to set studies designed to evaluate a diverse range of QOL indicators across different interventions in anxiety disorder patients.

Introduction

Lifetime prevalence of anxiety disorders is 16.6% all over the world [1]. In Arab, we lack such global data; however, in Lebanon, the Evaluation of the Burden of Ailments and Needs of the Nation study was carried out on a nationally representative sample of the Lebanese population and anxiety disorders were found in 16.7% of their sample [2]. In Morocco [3], we found that 25.5% met criteria of at least one current anxiety disorder distributed as 2% panic disorder (PD)_, 7.6% agoraphobia, 3.4% social phobia, 6.1% obsessive–compulsive disorder (OCD), 3.4% posttraumatic stress disorder, and 4.3% generalized anxiety disorder in the studied sample.

In Egypt, anxiety states are common [4], and were diagnosed in 36% of university students [5], and represented approximately 22.6% of diagnoses made in a psychiatric outpatient clinic in a selective Egyptian sample [6]. The most common symptoms were worrying (82%), irritability (73%), free-floating anxiety (70%), depressed mood (65%), tiredness (64%), restlessness (63%), and anergia and retardation (61%). Panic attacks were present in 30%, situational anxiety in 35%, specific

phobias in 37%, and avoidance in 53% of the sample [7]. In a recent initial study for the National Survey of Prevalence of Mental Disorders in Egypt conducted by Ghanem *et al.* [8], anxiety disorders were the second most prevalent psychiatric disorders after mood disorders diagnosed in 4.75% of the surveyed sample. PDs were present in 0.68%, agoraphobia in 0.50%, social anxiety disorders (SAD) in 0.23%, specific phobia in 1.35%, OCD in 0.68%, posttraumatic disorder in 0.11%, generalized anxiety disorder (GAD) in 0.91%, and mixed anxiety depression in 0.29% of sample.

Anxiety disorders are usually chronic disorders that are associated with enduring symptoms with significant disability, distress, and impairment in social functioning often many years after disease onset [9]. Onset is frequently early in life, between the age of 20 and 30 years with large health-care costs for the individual and the community [10]. Comorbidity with depression is high and an important predictor of the outcome of anxiety disorders [11].

Despite increased prevalence, chronic course of anxiety disorders, and the associated high rate of morbidity, little is known about quality of life (QOL) in anxiety disorders. The effectiveness of various therapeutic approaches to improve the QOL in anxiety patients is not well understood.

QOL, including a patient's sense of well being and function, can be affected by thoughts, behavior, and poor coping skills and associated depressive symptoms in different anxiety disorders. A major limitation of treating anxiety disorders with medication alone is that patients do not come to evaluate their conditioned dysfunctional patterns of behavior or their unhealthy coping strategies, which may be the root of maintenance of their suffering with poorer QOL [12].

CBT is predicated on the philosophy of the ancient Greeks, which stipulates that 'Nothing in life is actually bad, lest we perceive it to be so'. Fundamentally, it is based on the assumption that behavior develops and is maintained according to the principles of learning. On the basis of this, a model of the causes of each anxiety disorder could be formulated in terms of dysfunctionally learned cognitions and behaviors [13,14].

CBT is a directive form of counseling that uses a collaborative process, which is termed 'guided discovery' [15]; this makes the individual aware of his/her own thinking style, its strengths and limitations, thus acquiring him/her new ways of thinking and alternative ways of behaving. By using this newly acquired knowledge, the individual develops more effective and satisfying ways of dealing with challenges with a positive impact on QOL [16].

Few studies have compared the impact of different anxiety disorders on different domains of QOL; however, instruments generally used to assess QOL in this population have varying specificity, considerable redundancy, and, occasionally, inappropriate content [17]. Although the assessment of therapeutic outcome in the published literature has been of high quality, including multiple symptom indices and composite measures of end-state functioning, the impact of CBT on anxiety patients' QOL is yet to be evaluated in practice [18].

The purpose of this study was to quantify the impact of CBT in anxiety disorder patients on QOL and to address the question of its duration. We hypothesized that treatment would have a significant beneficial impact on QOL, and that these gains would be maintained at follow-up.

Patients and methods
Participants

All anxiety disorder patients presenting to the general outpatient clinics of the Institute of psychiatry, Ain Shams University hospital during April 2008 were invited to participate in our study after obtaining a written informed consent. Patients were excluded if age was less than 18 years, were uncooperative, had secondary anxiety disorder either due to general medical condition and/or substance abuse, had a current diagnosis of substance abuse within the past 6 months, was a mentally subnormal patient as clinically judged, had a current/history of acute fulminating physical disorder, change in psychotropic medication type or dose during the 12 weeks before treatment, unwillingness to keep medication status stable all over the duration of the study, evidence of other primary Axis I psychiatric disorder, and/or previous CBT treatments and no any other additional structured psychosocial therapies during the treatment period.

The mean age of participants was 33.6 ± 10.2 years ranging between 20 and 54 years. Twenty patients (50%) were in the 20s group of age, 10 patients (25%) were in the 30s group of age, seven (17.5%) were in the 40s group of age, and three (7.5%) were in the 50s group of age. Of the participants, 57.5% (23 of 40) were female patients and 42.5% (17 of 40) were male patients; 80% (32 of 40) passed a college degree of education and 20% (eight of 40) passed diploma degree; however all finished their high school. Of the participants, 52.5% (21 of 40) were married, 40% (16 of 40) were single, and 7.5% (three of 40) were divorced; 60% (24 of 40) were employed and 40% (16 of 40) were unemployed.

With regard to their clinical diagnoses, distribution of subtypes of anxiety disorder as assessed by SCID-I described as eight (20%) had OCD with a male-to-female ratio (4 : 4), eight (20%) had PD with a male-to-female ratio (3 : 5), six (15%) had GAD with a male-to-female ratio (2 : 4), six (15%) had SAD with a male-to-female ratio (4 : 2), six (15%) had posttraumatic stress disorder (PTSD) with a male-to-female ratio (2 : 4), and six (15%) had phobias with a male-to-female ratio (2 : 4) (Fig. 1).

The duration of anxiety symptoms ranged from 1 month to 17 years, with a mean of 7.8 ± 5.1 years; 27.5% (11 of 40) had a duration of less than 5 years, 50% (20 of 40) had a duration ranged between 5 and 10 years, and 22.5% (nine of 40) had a duration of more than 10 years.

Of the participants, 87.5% (35 of 40) were maintained on psychotropic drugs before participating in the study,

Figure 1
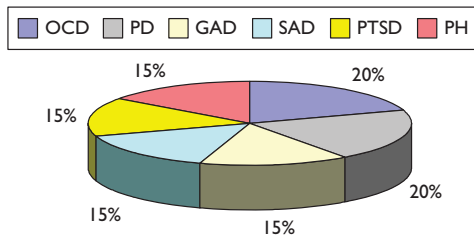
Distribution of diagnoses of subtypes of anxiety disorders among the sample of the study. GAD, generalized anxiety disorder; OCD, obsessive–compulsive disorder; PD, panic disorder; PH, phobic disorder; PTSD, posttraumatic stress disorder; SAD, social anxiety disorder.

including benzodiazepines in 57.5% (23 of 40), anti-depressants in 67.5% (27 of 40), and/or antipsychotics in 35% (14 of 40), either individually or in combination. All patients (100%) with OCD, PD, GAD, and PTSD, 66.7% (four of six) of SAD patients, and 50% (three of six) of phobia patients were on psychotropic treatment.

The duration of receiving treatment ranged from 1 month to 10 years, with a mean of 3.3 ± 3.3 years. The benzodiazepines dose used by participants ranged between 3 and 5 mg/day of bromazepam equivalents [19], with a mean of 1.78 ± 1.8 mg/day. The antidepressants dose used by participants ranged between 20 and 60 mg/day of fluoxetine equivalents [20], with a mean of 22.6 ± 21.9 mg/day. The antipsychotics dose used by participants ranged between 0 and 400 mg/day chlorpromazine equivalents [21], with a mean of 94.7 ± 150 mg/day.

Procedure

Forty patients diagnosed as anxiety disorders according to the standard clinical SCID-I [22] of *Diagnostic and Statistical Manual of Mental Disorders, fourth edition* (*DSM-IV*) [23] met the study inclusion criteria and agreed to participate. All participants were asked to complete the semi-Structured Clinical Interview for Diagnosis based on *DSM-IV,* section for anxiety and depression, to validate the diagnosis. Several participants

in the study had concurrent depressive symptoms not mounting to clinical depression diagnosis as defined by Yemi and Jeffery [24]. Hence, Beck Depression Inventory (BDI) was applied to measure the severity of coexisting depression with the studied anxiety disorders, and to illuminate the correlation of the depressive symptoms and QOL in anxiety disorders.

The study started at the beginning of April and completed by the end of December 2008. This period was distributed in four phases: (i) case recruitment and pretreatment assessment phase that lasted for 4 weeks during April 2008, (ii) treatment phases that lasted for 8 weeks during May and June 2008, (iii) posttreatment phase immediately after treatment during the first week of July 2008, (iii) follow-up phase was done 6 months later at December 2008.

Cognitive behavior therapy

A structured and manualized CBT protocol was applied to all participants (40 anxiety patients). Our CBT program was deigned based on published evidence-based protocols for CBT in subtypes of anxiety disorders [25–30]. Each treatment protocol was divided into assigned eight weekly sessions; each session lasted for 60 min and used specified techniques and exercises accordingly (Table 1).

Generally, the elements of a CBT session were an initial mood check, an update from the previous session, setting an agenda for the session, reviewing homework, discussing agenda items, summarizing the session content, assigning homework, and finally, obtaining patients' feedback about the session. The final session was devoted to a discussion of what the patients had learned and what they needed to exercise more in the future. A maintenance program should be written down for the patient to consult. Rehearsal of cognitive restructuring techniques, maintaining exposure exercises, and elaborating the concept of self therapist were all addressed. At the end, participants were handed over into their own care, but were also instructed to send in reports on how

Table 1 Different cognitive behavior therapy techniques used for subtypes of anxiety disorders

Sessions	PD	OCD	PTSD	SAD	Phobia	GAD
First	Aimed generally for socialization, information gathering, and psycho education / In PTSD trauma education was added					
Second Third	Aimed generally for behavioral analysis (daily recording of dysfunctional thoughts) and identification of faulty appraisals / Cognitive restructuring techniques					
Fourth	Relaxation training / BE and PMR	Hierarchy of fears / Behavioral experiments	Imaginable exposure		Relaxation training / BE and PMR	
Fifth	Interoceptive exposure exercises	ERP	In-vivo exposure exercises	Role play	Imaginable exposure	Worry time / Worry free zone / Short relaxation
Sixth	In-vivo exposure therapy	ERP	In-vivo exposure exercises	Imaginable exposure role play	In-vivo exposure	Applied relaxation imaginable exposure
Seventh	In-vivo exposure	ERP	In-vivo exposure exercises	Social skills training / In-vivo exposure / Self love	Continue exposure exercises	Fast relaxation / In-vivo exposure
Eighth	Relapse prevention					

BE, breathing exercises; ERP, exposure and response prevention; GAD, generalized anxiety disorder; PD, panic disorder; PMR, progressive muscular relaxation; PTSD, posttraumatic stress disorder; OCD, obsessive–compulsive disorder; SAD, social anxiety disorder.

well they were able to keep to their maintenance program.

Treatment integrity

Treatment integrity was rated by the senior researchers on a random sample of sessions using a checklist for assessing compliance with the treatment manual. Compliance was high (i.e. more than 95% of exercises rated as completed and consistent with manual description) across all sessions that were assessed ($n = 32$). In addition, we considered the competencies that are required to deliver effective CBT as proposed by Roth and Pilling [31].

Assessment

The sociodemographic sheet includes information about age, sex, level of education, marital status, and occupation, and the medical history sheet includes information about clinical diagnosis of anxiety disorder, duration of symptoms, and current history of psychotropic drugs, both type and dose.

An assessment battery tapping QOL issues and the major clinical dimensions of the anxiety disorders was administered at baseline pretreatment (week 0), posttreatment (week 9) and at 6-month follow-up (week 35) to evaluate treatment outcomes on QOL and test its durability. Participants who did not meet the specified deadline were reminded through e-mail and/or telephone.

Assessment battery

The assessment battery consisted of seven tools (self-rating/therapist rating); one for QOL questionnaire, five for measuring the anxiety outcome namely Hamilton Anxiety Rating Scale (HAM-A), Beck Anxiety Inventory (BAI), Penn State Worry Questionnaire (PSWQ), Liebowitz Social Anxiety Scale (LSAS), and Yale-Brown Obsessive Compulsive Scale (YBOCS), and one for assessing the severity of associated depression namely BDI-II. Along with these tools, results of the semi-structured clinical interview were obtained and used as indicators of change on the dependent variables.

All the study tools were translated and proved to be a good interrater reliability with relative ease of administration as shown in a pilot study that lasted for 3 months (January to March 2008).

HAM-A is a 14-item test measuring severity of anxiety symptoms with a cutoff score of 15 [32,33]; BAI is a 21-item self-reporting instrument used to measure severity of anxiety symptoms especially the panic ones with a cutoff score 18.4 for female patients and 15.3 for male patients [34–36]; PSWQ is a 16-item self-reporting questionnaire designed to measure trait worry with a cutoff score of 50 [37,38]; LSAS is a 24-item inventory assessing fear and avoidance in several social situations with a cutoff score of 30 [39,40]; and YBOCS is a 10-item semistructured interview that yields symptom severity scores separately for obsessions and compulsions with a cutoff score of 16 [41].

BDI-II is a 21-item commonly used self-reporting questionnaire for assessing the severity of depression with cutoff scores 10, 19, higher than or equal to 30 indicative of mild-to-moderate, moderate-to-severe, and very severe depression, respectively [42,43].

QOL questionnaire/interview [44] is a 7-item clinical tool assessing the degree of efficiency and patient's satisfaction in several domains of life, such as general health, social life, and work. Patients were instructed to rate the personal importance of these domains. Patients were asked to rate their satisfaction with these domains on a scale ranging from 1 (very dissatisfied/very affected) to 5 (very satisfied/not at all affected). The QOL has been validated on clinical samples and had good internal consistency (> 0.82) and test–retest reliability (70–0.80). In addition, it possesses good convergent, discriminate, and criterion-related validity [45]. The instrument is sensitive enough to discriminate between mental health and nonmental health community residents, and has been used in several treatment evaluation studies. The cutoff score of this questionnaire was calculated according to Jacobson and Truax [46] to be 30 points.

Statistical analysis

Data coded and revised were introduced to an EXCEL database to be later manipulated and analyzed using the SPSS version 16 (SPSS, Inc., Chicago, IL, USA). Results were analyzed for the whole sample except for dropped out participants. For the sake of description, categorical data were presented as frequency and percentage, and continuous data as means, standard deviation, and 95% confidence limit. This was followed by a graphic representation whenever needed to assess the distribution of the data and determine an appropriate statistical test for inferential statistical analysis. Independent sample t-test (Student's t-test), χ^2 test, one-way repeated measures analysis of variance (ANOVA), and two-factor repeated measures (ANOVA) were used in inferential statistical analysis of our results. An effect size (ES) is a measure of the strength of the relationship between two variables in a statistical population. It estimates the strength of an apparent relationship, rather than assigning a significance level reflecting whether the relationship could be due to chance. The ES was computed using Cohen's d-tests [47]. Pearson's correlation coefficient was calculated to determine the strength of correlation. Statistical significance level was set at a value of less than 0.05; highly significant level at a value of less than 0.01; and very highly significant at value of less than 0.001.

Results will be presented through changes in outcome tools and changes in clinical diagnosis according to the clinical significant improvement 'change' proposed by Jacobson and Truax [46] who described a broadly and widely applicable method to investigate the clinically significant change in psychotherapy research. Accordingly, patients will be classified in three groups; (i) cured patients with clinically significant (CS) improvement, patients with improvement that is above measurement error but still unresolved (statistically significant changes, SS), and patients with no improvement (NS).

Results

Treatment compliance

This study started with 40 patients in the pretreatment phase, and decreased to 38 in the posttreatment phase. Two male patients dropped out; one had OCD and the other had GAD. Drop out was defined as failing to receive at least three sessions of CBT.

Pretreatment assessment

Means and standard deviations of the used assessing tools at the pretreatment baseline assessment were as follows: HAM-A scored in the range of 25–45, with a mean of 30.5 ± 6.3 and BAI scored in the range of 22–40, with a mean of 28.2 ± 6.7. For patients with a primary diagnosis of PD, the range was 35–40 with a mean of 38.2 ± 2.6. PSWQ scored in the range of 40–69 with a mean of 55.2 ± 9.9. For patients with a primary diagnosis of GAD, the range was 60–69 with a mean of 64.6 ± 2.6. LSAS scored in the range of 40–65 with a mean of 47.4 ± 11.1. For patients with a primary diagnosis of SAD, the range was 55–65 with a mean of 61.3 ± 3.6. YBOCS scored in the range of 0–21 with a mean of 6.1 ± 7.1. For patients with a primary diagnosis of OCD, the range was 10–21 with a mean of 14.3 ± 5.6. QOL scored in the range of 23–29 with a mean of 24.8 ± 1.3.

BDI-II revealed that all participants (40 patients) were suffering from comorbid depression with a mean 17.1 ± 3.3, 70% (28 of 40) had mild degree, and 30% (12 of 40) had moderate degree.

Outcome of cognitive behavior therapy on anxiety disorders

For the purpose of assessing the outcome of CBT on anxiety disorders, ANOVA analysis was reapplied to examine differences from pretreatment to posttreatment for the assessment of the outcome of CBT, and from posttreatment to follow-up and from pretreatment to follow-up to assess whether outcome gained at posttreatment will be maintained or not.

Positive clinical outcome of CBT on anxiety disorders was SS in several domains: (i) changes in clinical diagnosis, changes in used doses of medications, and changes in outcome tools' scores, for all participants and in-between subtypes of anxiety disorders.

With regard to clinical diagnosis, there was posttreatment clinical improvement of 55% (21 of 38) participants who did not fulfill the diagnostic criteria of anxiety disorders anymore as measured by SCID-I. However, follow-up assessment 6 months later revealed no significant changes from posttreatment results.

With regard to medications, 55.2% (21 of 35) of participants were still continuing using psychotropic medications with reduction in doses of all psychotropic drugs compared with the pretreatment phase ($P < 0.001$); in benzodiazepines, the daily intake was reduced to a mean of 0.17 ± 0.47; in antidepressants, the daily intake was reduced to a mean of 6.2 ± 8.37; in antipsychotics, the

Table 2 Comparing used tools and medications intake in precognitive behavior therapy and postcognitive behavior therapy

Item	Pre-CBT	Post-CBT	P value
BZPS intake	1.7 ± 1.8	0.17 ± 0.47	<0.001
AD intake	22.6 ± 11.9	6.2 ± 8.37	<0.001
AP intake	94.7 ± 150	12.2 ± 37.2	<0.001
HAM-A	30.5 ± 6.3	17.6 ± 2.7	0.001
BAI	28.2 ± 6.7	16.5 ± 7.7	<0.001
PSWQ	55.2 ± 9.9	44.4 ± 6.1	<0.001
LSAS	47.4 ± 11.1	41.3 ± 1.8	<0.001
YBOCS	6.1 ± 7.1	5.4 ± 3.1	<0.001
BDI-II	17.1 ± 3.3	9.6 ± 1.6	<0.001
QOL	24.8 ± 1.3	39.8 ± 1.7	0.006

Statistical significance level was set at <0.05; highly significant level at <0.01; and very highly significant at <0.001.
AD, antidepressants; AP, antipsychotics; BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory-second edition; BZPS, benzodiazepines; CBT, cognitive behavior therapy; HAM-A, Hamilton Anxiety Scale; LSAS, Liebowitz Social Anxiety Scale; PSWQ, Penn State Worry Questionnaire; QOL, quality of life scale; YBOCS, Yale-Brown Obsessive Compulsive Scale.

daily intake was reduced to a mean of 12.2 ± 37.2 (Table 2).

Follow-up assessment shows no changes in the total number of patients using medications, but with nonsignificant reduction in the dose of benzodiazepines to a mean of 0.09 ± 1.2, antidepressants to a mean of 5.9 ± 9.5, and antipsychotics to mean of 11.9 ± 38.6 ($P = 0.56$) (Table 3).

With regard to anxiety clinical tools, ANOVA results proved that participants had improved significantly on posttreatment tools; HAM-A (0.001), BAI (< 0.001), PSWQ (< 0.001), LSAS (< 0.001), and YBOCS (< 0.001), that is, the mean scores reduced posttreatment. The improvement remained SS after 6 months in the follow-up phase (Tables 2 and 3).

ANOVA tests showed that participants had improved significantly between pretreatment and follow-up; HAM-A (0.001), BAI (< 0.001), PSWQ (< 0.001), LSAS (< 0.001), and YBOCS (< 0.001), but no significant improvement was shown between posttreatment and

Table 3 Comparing used tools and medications intake immediately postcognitive behavior therapy and at 6-month follow-up

Item	Post-CBT	At follow-up	Value
BZPS intake	0.17 ± 0.47	0.09 ± 1.2	0.56
AD intake	6.2 ± 8.37	5.9 ± 9.5	0.56
AP intake	12.2 ± 37.2	11.9 ± 38.6	0.56
HAM-A	17.6 ± 2.7	16.4 ± 3.1	0.37
BAI	16.5 ± 7.7	15.2 ± 8.3	0.23
PSWQ	44.4 ± 6.1	43.7 ± 7.5	0.24
LSAS	41.3 ± 1.8	39.9 ± 2.6	0.38
YBOCS	5.4 ± 3.1	5.1 ± 2.9	0.27
BDI-II	9.6 ± 1.6	8.5 ± 2.4	0.17
QOL	39.8 ± 1.7	40.1 ± 2.5	0.19

Statistical significance level was set at <0.05; highly significant level at <0.01; and very highly significant at <0.001.
AD, antidepressants; AP, antipsychotics; BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory-second edition; BZPS, benzodiazepines; CBT, cognitive behavior therapy; HAM-A, Hamilton Anxiety Scale; LSAS, Liebowitz Social Anxiety Scale; PSWQ, Penn State Worry Questionnaire; QOL, quality of life; YBOCS, Yale-Brown Obsessive Compulsive Scale.

Table 4 Showed the mean ± standard deviation changes and effect sizes (Cohen's d) for the used tools precognitive behavior therapy, postcognitive behavior therapy and 6-month follow-up

Tool	Pre-CBT (M ± SD)	Post-CBT (M ± SD)	At follow-up (M ± SD)	Effect size within (M ± SD)
HAM-A	30.5 ± 6.3	17.6 ± 2.7	16.4 ± 3.1	2.66 ± 0.79
BAI	28.2 ± 6.7	16.5 ± 7.7	15.2 ± 8.3	1.62 ± 0.63
PSWQ	55.2 ± 9.9	44.4 ± 6.1	43.7 ± 7.5	1.3 ± 0.55
LSAS	47.4 ± 11.1	41.3 ± 1.8	39.9 ± 2.6	0.77 ± 0.36
YBOCS	6.1 ± 7.1	5.4 ± 3.1	5.1 ± 2.9	0.13 ± 0.06
BDI-II	17.1 ± 3.3	9.6 ± 1.6	8.5 ± 2.4	2.9 ± 0.82
QOL	24.8 ± 1.3	39.8 ± 1.7	40.1 ± 2.5	− 0.9 ± 0.98

BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory-second edition; CBT, cognitive behavior therapy; HAM-A, Hamilton Anxiety Scale; LSAS, Liebowitz Social Anxiety Scale; PSWQ, Penn State Worry Questionnaire; QOL, quality of life; YBOCS, Yale-Brown Obsessive Compulsive Scale.

follow-up; HAM-A (0.37), BAI (0.23), PSWQ (0.24), LSAS (0.38), and YBOCS (0.27) (Table 3).

BDI-II score had improved significantly between pretreatment and posttreatment ($P \leq 001$), that is, the mean score was reduced posttreatment. The improvement remained SS after 6 months follow-up. ANOVA tests showed SS improvement between pretreatment and follow-up ($P \leq 0.001$), but NS was shown between posttreatment and follow-up ($P = 0.17$) (Tables 2 and 3).

There was a large ES for all participants in the study. An ES of Cohen's test value ($d = 1.3$) was calculated at posttreatment and ($d = 1.5$) at follow-up of participants. The within-group ES was large for all tools at posttreat-

ment, with the highest value found for the BDI-II score (Cohen's $d = 2.9$) and the lowest value found for YBOCS scores (Cohen's $d = 0.13$) (Table 4).

Table 5 explores outcome differences achieved by subtypes of anxiety disorders individually as measured by ANOVA and Student's t-tests. Differential analysis for outcome changes revealed that all subtypes of anxiety disorders improved significantly from pretreatment to posttreatment in all tools of the study. These changes were found to be constant on follow-up assessment.

Analysis of patients in the study was categorized according to reliable change index into CS, SS, and NS as shown in Table 6.

Outcome of cognitive behavior therapy on quality of life
There was SS improvement in the QOL questionnaire posttreatment (P value = 0.006), such that participants had higher scores posttherapy. The improvement remained SS in the follow-up phase 6 months after treatment. ANOVA tests showed SS improvement between pretreatment and follow-up ($P = 0.005$), but NS was shown between posttreatment and follow-up ($P = 0.19$) (Tables 2 and 3, Fig. 2).

Table 7 explores QOL outcome differences achieved by subtypes of anxiety disorders individually as measured by ANOVA and Student's t-tests. Differential analysis for outcome changes revealed that all subtypes of anxiety disorders improved significantly from pretreatment to

Table 5 Showed precognitive behavior therapy, postcognitive behavior therapy and at 6-month follow-up changes in mean ± standard deviation of used tools broken down by subtypes of anxiety disorders

Disorder	BDI-II	HAM-A	BAI	PSWQ	LSAS	YBOCS
Obsessive–compulsive disorder						
Pretreatment	14.7 ± 0.5	27 ± 1.7	24 ± 4	46.4 ± 1.5	37 ± 2.6	14.2 ± 1.5
Posttreatment	11 ± 1	19.6 ± 0.5	23.6 ± 2.3	46 ± 2.6	37 ± 2.6	11.4 ± 2.5
Follow-up	10.2 ± 2.1	18.3 ± 1.6	21.9 ± 3.4	45.5 ± 2.9	36.8 ± 2.9	10.7 ± 3.1
P value	**0.007**	**<0.001**	–	–	–	**<0.001**
Panic disorder						
Pretreatment	19.5 ± 4.7	39.2 ± 4.5	38.2 ± 2.1	56.7 ± 2.2	46.5 ± 4.5	4 ± 2.1
Posttreatment	8.3 ± 1.7	13.5 ± 1.2	8.8 ± 1	43 ± 2.9	4.3 ± 2.1	4 ± 2.1
Follow-up	7.4 ± 2.6	11.9 ± 2.1	7.2 ± 2.7	4.6 ± 3.1	41.8 ± 3.3	3.9 ± 2.9
P value	**<0.001**	**<0.001**	**<0.001**	–	–	–
Phobia						
Pretreatment	13.7 ± 1.5	25.7 ± 2.1	25.7 ± 3.2	52 ± 3.4	43.4 ± 2.5	4 ± 2
Posttreatment	9 ± 1.7	15.6 ± 1.1	9 ± 1	38.4 ± 1.5	42.3 ± 2.5	4.4 ± 2.5
Follow-up	8.1 ± 2.2	14.3 ± 2.4	8.3 ± 2	37.2 ± 2.7	42 ± 2.2	4.1 ± 2.1
P value	**<0.001**	**<0.001**	**<0.001**	–	–	–
Social anxiety disorder						
Pretreatment	18.7 ± 1.5	8.4 ± 2.3	24 ± 2	58.4 ± 0.5	62.7 ± 2.3	4 ± 1
Posttreatment	9 ± 1	18.3 ± 1.5	10.6 ± 1.1	44.4 ± 3.2	41.7 ± 1.2	4.4 ± 1.1
Follow-up	7.9 ± 2.1	17.3 ± 2.2	9.8 ± 2.7	43.4 ± 4.1	39.9 ± 2.8	4 ± 0.3
P value	**<0.001**	**<0.001**	–	–	**<0.001**	–
Generalized anxiety disorder						
Pretreatment	18.7 ± 7.2	34.4 ± 1.1	28.4 ± 1.5	65 ± 3.6	53 ± 1	3.4 ± 1.1
Posttreatment	11 ± 1	20 ± 1	25.6 ± 0.5	55.6 ± 2.5	42.3 ± 0.6	3.7 ± 1.5
Follow-up	10.2 ± 1.9	18.9 ± 2.1	24.3 ± 1.5	45.3 ± 3.1	41.8 ± 1.5	3.6 ± 1.7
P value	**<0.001**	**<0.001**	–	–	**<0.001**	–
Posttraumatic stress disorder						
Pretreatment	16.7 ± 0.5	25.7 ± 1.5	25 ± 1	52.4 ± 1.5	42.4 ± 3.7	5 ± 1
Posttreatment	9.3 ± 1.5	19.6 ± 0.5	23.6 ± 1.5	39.4 ± 2.3	41.7 ± 1.2	5 ± 1
Follow-up	8.1 ± 2.1	18.5 ± 1.2	22.2 ± 2.1	38.5 ± 3.1	40.8 ± 2	4.9 ± 1.8
P value	**<0.001**	**<0.001**	0.13	**<0.001**	–	–

Statistical significance level was set at <0.05; highly significant level at <0.01; and very highly significant at <0.001.
BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory-second edition; HAM-A, Hamilton Anxiety Scale; LSAS, Liebowitz Social Anxiety Scale; PSWQ, Penn State Worry Questionnaire; YBOCS, Yale-Brown Obsessive Compulsive Scale.

Table 6 Showed clinical improvement in our sample according to reliable change index

Tool	CS		SS		NS		χ^2
	n	Percentage	*n*	Percentage	*n*	Percentage	
HAM-A	22	83.4	11	16.7	5	13.2	0.47 (*P*=0.79)
BAI	7	87.5	1	12.5	0	0	1.14 (*P*=0.28)
PSWQ	1	20	2	40	2	40	1.33 (*P*=0.51)
LSAS	3	50	2	33.4	1	16.7	1.33 (*P*=0.51)
YBOCS	1	14.2	5	71.4	1	14.2	0.88 (*P*=0.65)
BDI-II	19	50	12	31.6	7	18.4	0.95 (*P*=0.62)
QOL	23	60.5	11	28.9	4	10.5	1.48 (*P*=0.48)

Statistical significance level was set at <0.05; highly significant level at <0.01; and very highly significant at <0.001. χ^2 observed time two (posttest) score.
BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory-second edition; CS, clinically significant; HAM-A, Hamilton Anxiety Scale; LSAS, Liebowitz Social Anxiety Scale; NS, not improved; PSWQ, Penn State Worry Questionnaire; QOL, quality of life; SS, statistically significant; YBOCS, Yale-Brown Obsessive Compulsive Scale.

posttreatment in QOL. This gain was found to be constant on follow-up assessment.

Does the duration of anxiety symptoms at baseline predict changes in quality of life?

In the whole sample of participants, a SS correlation was found between the duration of symptoms and posttreatment improvement in HAM-A ($r = 0.67$, $P = 0.02$) and QOL ($r = -0.68$, $P = 0.02$).

Analysis of posttreatment outcome of the HAM-A among participants in the study revealed a negative correlation with the duration of symptoms, that is, the longer the duration of the symptoms the higher the posttreatment outcome of HAM-A; in other terms, poorer improvement in anxiety symptoms.

Analysis of posttreatment outcome of the QOL among participants in the study revealed a negative correlation with the duration of symptoms, that is, the longer the duration of the symptoms the poorer the posttreatment outcome of the QOL; in other terms, poorer improvement in the QOL (Fig. 3).

Does severity of comorbid depression in anxiety disorders predict changes in quality of life?

In the whole sample of participants, a SS correlation was found between pretreatment BDI-II scores and post-

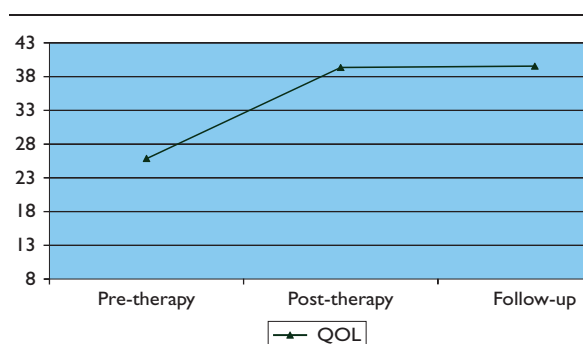**Figure 2**

Figure shows precognitive to postcognitive behavior therapy (CBT) and at 6 months follow-up changes in quality of life.

treatment improvement in HAM-A ($r = 0.57$, $P = 0.04$) and QOL ($r = -0.62$, $P = 0.03$).

Analysis of pretreatment outcome of the BDI-II among participants in the study revealed a negative correlation with the posttreatment outcome of HAM-A, that is, the higher the pretreatment score of the BDI-II the higher the posttreatment outcome of HAM-A; in other terms, poorer improvement in anxiety symptoms.

Analysis of pretreatment outcome of the BDI-II among participants in the study revealed a negative correlation with the posttreatment outcome of QOL, that is, the higher the pretreatment score of the BDI-II the lower the posttreatment outcome of QOL; in other terms, poorer improvement in the QOL (Fig. 4).

Discussion

In general, most CBT research studies of anxiety disorders tend to focus on symptom measurement at the expense of measurement of functional impairment as QOL. This study examined the effect of CBT on QOL in anxiety disorder patients, and indicates that CBT is effective for the management of anxiety disorders with a short-term (8 weeks) and long-term (35 weeks) positive impact on QOL.

In this study, the positive impact of CBT on QOL was confirmed by the quite uniform indication that an outcome of CBT in our anxiety patients was good. This was detected through several domains; (i) pretreatment to posttreatment overall SS improvement in the scores of all tools, (ii) approximately half of the participants achieved CS changes, sustained by the large ES detected among outcome of tools, and (iii) reduction in the number of participants using psychotropic medications. Some studies lacked this wide range of evidence confirming the effectiveness of CBT in anxiety patients just as Watanabe *et al.* [48] who did not collect information about changes in medication dosing after CBT course. In contrast, our patients' decreased their benzodiazepines daily intake to a mean of 0.17 ± 0.47; antidepressants daily intake to a mean of 6.2 ± 8.37; and antipsychotics daily intake was reduced to a mean of 12.2 ± 37.2 with a SS difference from the pretreatment level.

Table 7 Precognitive behavior therapy, postcognitive behavior therapy and follow-up quality of life in different diagnostic categories of anxiety disorders

Disorder	Pre-CBT	Post-CBT	At follow-up	P value
Obsessive–compulsive disorder	26.4 ± 1.5	39.3 ± 2.1	41 ± 3.2	<0.001
Panic disorder	23.2 ± 0.5	41.5 ± 1.2	42.8 ± 2.2	<0.001
Phobia	23.4 ± 0.5	39.6 ± 0.5	41.2 ± 2.1	<0.001
Generalized anxiety disorder	25.7 ± 0.5	38.3 ± 1.5	39.5 ± 2.2	<0.001
Social anxiety disorder	25.7 ± 0.5	41 ± 1	42.5 ± 2.5	<0.001
Posttraumatic stress disorder	25 ± 1	38.6 ± 2.1	39.2 ± 3	<0.001

CBT, cognitive behavior therapy.

This significant reduction of outcome of tools for anxiety disorders treated with a course of CBT was in concordance with results attained by several studies. For example, a controlled clinical trial was conducted by Linden et al. [49] to evaluate the efficacy of CBT treatment in outpatients with pure GAD; the reduction in the score on the HAM-A was 6.4% (1.5 points). In addition, results of study by Praško et al. [50] study indicated that all patients who completed at least 5 weeks of intensive CBT program showed significant improvement on YBOCS and BDI scales. Moreover, at the end of the treatment, 40.4% of the patients achieved clinical remission. This was agreed with our 55% posttreatment remission rate.

In addition, the long-term effect of CBT on anxiety disorders found in our study was congruent with Prasko et al. [51] who aimed to assess the 6-month treatment efficacy and 24-month follow-up of CBT in patients with a generalized form of social phobia. CBT was found to be the best choice for long-term reduction of avoidant behavior with a significant reduction identified on the subjective general anxiety as indicated by LSAS. In addition, this long-term effect increased our confidence that the observed improvements were a result of CBT and not extraneous factors such as the passage of time [52].

Pretreatment assessment of patients concluded that 35 patients (87.5%) from a total of 40 patients were receiving medications; this goes with the recent guidelines for treatment of anxiety disorders provided by the National Guideline Clearinghouse, which necessitates combination of pharmacotherapy and CBT in all subtypes of anxiety disorder [23].

Few researches were regarding the effectiveness of different therapeutic interventions on QOL in anxiety disorders especially CBT. However, a recent study conducted by May et al. [53] compared the effect of a CBT on QOL over a 1-year period as measured before and immediately after the intervention and at 3 and 9 months postintervention. QOL and physical activity were significantly and clinically relevantly improved immediately after the intervention and also at 3 and 9 months postintervention compared with preintervention.

Consistent with other reports, our findings suggest that subtypes of anxiety disorder patients show QOL improvement after CBT. Rapaport et al. [18] reported two or more standard deviations below the community norm in QOL in 20% of patients diagnosed as PD, 26% in OCD, 21% in social phobia, and 59% in PTSD. This is accord with Lochner et al. [12] who stated that the infrequency and transient nature of panic attacks lead to less impairment than the more chronic and pervasive symptoms of anxiety and/or agoraphobic avoidance. Our results stated a SS improvement in the QOL in OCD from 26.4 ± 1.5 to 39.3 ± 2.1, PD from 23.2 ± 0.5 to 41.5 ± 1.2, phobic disorder from 23.4 ± 0.5 to 39.6 ± 0.5, GAD from 25.7 ± 0.5 to 38.3 ± 1.5, SAD from 25.7 ± 0.5 to 41 ± 1, and PTSD from 25 ± 1 to 38.6 ± 2.1. However, these means showed different order of anxiety subtypes in which PD had the maximum change in QOL followed by phobic disorder and SAD with the same value of change and lastly by OCD, GAD, and PTSD with the same value of change. This was in agreement with Simon et al. [54] who found that patients with SAD who do not have significant comorbid depression or anxiety are substantially impaired in QOL, but to a lesser extent than patients with PD, who suffer from both mental and physical impairments in QOL.

Figure 3
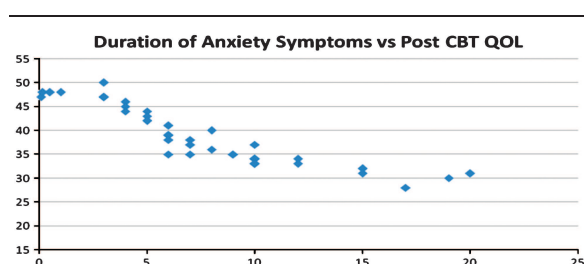
Correlation between duration of anxiety symptoms and postcognitive behavior therapy (CBT) outcome of quality of life (QOL).

Figure 4
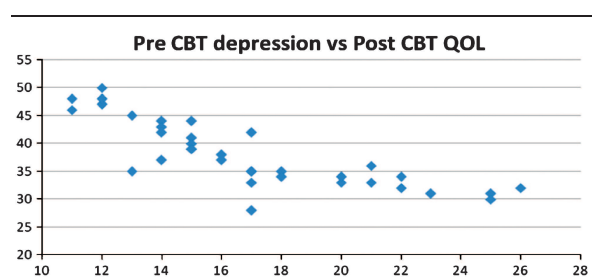
Correlation between pretreatment depression as measured by beck depression inventory second edition and postcognitive behavior therapy (CBT) outcome of quality of life (QOL).

Assessment instruments used for assessing QOL in both clinical and research settings are numerous; however, no agreement as to which ones are the 'gold standards' remains elusive [55]. In this study, we used Bigelow *et al.* [44] QOL scale, which considered the personal importance and satisfaction with several life domains and had been validated on clinical samples and being sensitive enough to discriminate between residents of mental health hospitals and residents of community [45]. The use of such a standardized scale allows for QOL comparisons across different samples and different populations. Subjective QOL scales are more sensitive to the individual's perception of QOL, which is an additional factor that should be part of a complete assessment of significant QOL impairment [18].

Change in QOL observed for our CBT-treated anxiety patients were not only SS, but were also clinically meaningful. The clinical significance of treatment gains was examined by the reliable change index, which found that 60.5% of our patients had clinical significant improvement, 28.9% had statistical significant improvement, and 18.4% were insignificantly changed after CBT. This was true in relation to all scales used in this study, in which BAI showed the highest ratio of CS change (83.4%), followed in order by HAM-A, QOL, BDI-II, LSAS, PSWQ, and YBOCS. This confirmed that CBT improves clinically both symptom impairment (as measured by scales) and functional impairment of (QOL) anxiety disorders [14].

To examine the extent to which treated anxiety patients' QOL scores move into the range of normal populations' scores, the posttreatment and 6-month follow-up overall QOL index for our treated patients [$M = 39.8$, standard deviation (SD) = 1.3 and 40.1, SD = 2.9, respectively] could not be compared with that reported by Weissman *et al.* [56] for a community sample of control participants ($M = 1.6$, SD = 0.3), because the latter used a different scale for assessing QOL 'Social Adjustment Scale–Self-Report'. However, normative comparisons based on meta-analytic procedures can be expressed as ESs [57]. The comparisons between our sample and the community control participants at posttreatment and follow-up are described by relatively small ESs (i.e. 0.9 at posttreatment and 0.98 at follow-up in our sample and 0.30 at posttreatment and 0.31 at follow-up, respectively).

The pretreatment duration of anxiety symptoms was a potent predictor of QOL at posttreatment and follow-up. In the whole sample of participants, a SS correlation was found between the duration of symptoms and posttreatment improvement in HAM-A ($r = 0.67$, $P = 0.02$) and QOL ($r = -0.68$, $P = 0.02$). The longer the duration of the anxiety symptoms, the poorer the improvement in anxiety symptoms and the poorer the improvement in the QOL was found. To our knowledge, this correlation was not reported before especially in anxiety disorders as a whole diagnosis. However, Telch *et al.* [58] found baseline severity of panic-related symptoms; anxiety and agoraphobic avoidance was related to pretreatment QOL but not to QOL at posttreatment or follow-up. This supported our

results that, duration of anxiety symptoms are more powerful predictors of QOL than the severity of symptoms.

Moreover, pretreatment outcome of BDI-II was a potent predictor of QOL at posttreatment and follow-up. In the whole sample of participants, a SS correlation was found between pretreatment BDI-II scores and posttreatment improvement in HAM-A ($r = 0.57$, $P = 0.04$) and QOL ($r = -0.62$, $P = 0.03$). The higher the pretreatment score of the BDI-II, the poorer the improvement in anxiety symptoms and QOL. This is accord with Yemi and Jeffery [24] who stated that comorbidity is the rule with anxiety and depressive disorders and found that HAM-A was correlated significantly with BDI ($r = 0.39$).

Our patients were on combined pharmacological and psychological treatments; this is accord with Osborn *et al.* [14] and Telch *et al.* [58] who supported the encouraging evidence that CBT alone could not lead to CS improvement in patients' QOL; it would be premature to conclude that CBT is uniquely effective in this regard. He also suggested that alternative treatments should lead to enhanced QOL to the extent that they produce meaningful improvements in patients' anxiety. In addition, Eng *et al.* [59] questioned the limited effects of CBT on social functioning domain of QOL.

This study has methodological strengths especially when comparing with other studies; (i) the used outcome measures were similar to those used in pharmacotherapy in contrary to other research studies that tended to use a broader range and/or less sophisticated measures than did pharmacotherapy researchers [58], (ii) all used tools and interview instrument SCID are highly validated and reliable measures for screening and assessing anxiety disorders [17], (iii) the number of tools used to assess outcome changes pretreatment to posttreatment and at follow-up, we used six tools in addition to the QOL one, (iv) we tried to be clear about the integrity of CBT and how it was delivered as reported. In addition, the 95% compliance of participants to CBT program might be regarded as an indicator of patient's approval and satisfaction with the study, (v) we followed the empirical evidence that suggests that assessment of the complete impact of various treatment approaches should involve long-term follow-up. The follow-up duration in our study was 6 months; other studies had follow-up durations ranging from 60 days, 12 weeks, 3 months, 1 month, 10 weeks, and 16 weeks, (vi) some of our assessing instruments are designed for use by (clinical) assessors and others by patients. Patient assessments may result in different results than clinician assessments, as patients may assign more weight to certain domains being measured than clinicians [60], (vii) CBT protocol used in this study followed Lazarus [61] broad-spectrum multimodal CBT who expanded the scope of CBT to include physical sensations, visual images, interpersonal relationships, and biological factors.

However, this study had some limitations: (i) the used QOL battery did not assess other relevant QOL domains such as health-care use, alcohol and substance abuse, or suicide attempts, (ii) our results did not reveal the

association between the characteristic symptoms of each anxiety disorder and differential impairment of various domains of function that guided specifically tailored interventions [12], (iii) no control group was used to avoid the threat of maturation that involves spontaneous recovery over time. However, it should be noticed that anxiety disorders are considered to be chronic disorders and spontaneous recovery is rare, (iv) the high level of education in our sample (80% with a college degree and 20% had a diploma certificate) may lead to selection bias, (v) our sample was a heterogeneous sample of anxiety disorder patients, both in terms of diagnosis and stage of disease. Despite those limitations, the study design is appropriate for its purpose of measuring the change found in QOL after CBT in a typical clinical setting.

Although the limited number of studies in this area necessitated this approach, it is recommendable to set studies designed to evaluate diverse range of QOL indicators across different interventions in anxiety disorders patients.

There is no conflict of interest to declare.

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الملخص العربي

تغير نوعية الحياة بعد العلاج المعرفى السلوكى لاضطرابات القلق: دراسة مصرية من منظور مستقبلي

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هدف البحث: على الرغم من الانتشار الزائد و المسار المزمن و المعدل العالى للتأثير المرضى فى اضطرابات القلق , الا أنه لم يعرف إلا القليل عن تأثير الطرق المختلفة لعلاج القلق على نوعية حياة المرضي. و يهدف هذا البحث إلى دراسة كم التأثير الناتج عن العلاج المعرفي السلوكى لمرضي القلق على نوعية حياتهم' وكذلك التعريف بالتأثير طويل المدى لهذا العلاج. **طريقة البحث:** تناول البحث دراسة أربعين مريضا باضطرابات القلق (تبعا للمناظرة المقننة للتشخيص الأمريكي الرابع)' استكملوا المقابلة الإكلينيكية شبه المقننة للقسم الخاص بالقلق والاكتئاب. و قد خضعوا لاستيفاء تاريخ الجوانب الاجتماعية الديموجرافية' والتاريخ الطبى, ومقياس بك للاكتئاب. كذلك تم تطبيق بروتوكول مقنن للعلاج العقلى السلوكى على كل الأفراد المشاركين فى البحث. و قد تم تقويم نوعية الحياة , و كذلك الأبعاد المختلفة للقلق قبل العلاج (الأسبوع صفر), و أعيد التقويم بعد العلاج (الأسبوع 9)'و كذلك الشهر السادس من المتابعة (الأسبوع 35) لمتابعة مآل العلاج' وتأثيره على نوعية الحياة' وكذلك مدى بقاء تحسنها. **نتائج البحث:** و قد أظهر البحث التأثير الإيجابى للعلاج العقلى السلوكى' والذى إنعكس على التغير في التشخيص, وجرعات الدواء , و نتائج مقاييس تقويم المآل. كذلك أظهرت الدراسة تحسن نتائج مقاييس جودة الحياة' سواء على مستوى القلق العام أو التقسيمات الأصغر للقلق' وذلك في تقييمات ما بعد العلاج أو المتابعة بعد 6 شهور و اللتان لم تسجلا إختلافا إحصائيا. و كذلك ظهر إرتباط سلبى بين نوعية الحياة وطول مدة اضطراب القلق قبل العلاج.
الاستنتاج: و قد خلص البحث إلي أن العلاج السلوكى المعرفي يعالج اضطرابات القلق على المستويين القريب والبعيد' كما أن له تأثيراً علي تحسين جودة الحياة. و مع ندرة الأبحاث في هدا المجال' فإنه ينصح بعمل دراسات تصمم لتقييم المدى المتسع لدلالات جودة الحياة فى الطرق المختلفة لعلاج اضطرابات القلق.