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REVIEW

A review of studies concerning treatment adherence of patients with anxiety disorders

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Objective: This paper aimed at describing the most consistent correlates and/or predictors of nonadherence to treatment of patients with different anxiety disorders.

Method: The authors retrieved studies indexed in PubMed/MedLine, PsycINFO, and ISI Web of Knowledge using the following search terms: attrition OR dropout OR attrition rates OR patient dropouts OR treatment adherence AND anxiety disorders. Research was limited to articles published before January 2010.

Results: Sixteen studies were selected that investigated the impact of sociodemographic, clinical, or cognitive variables on adherence to treatment for anxiety disorders. While no consistent pattern of sociodemographic or clinical features associated with nonadherence emerged, all studies that investigated cognitive variables in panic disorder, social anxiety disorder, and obsessive-compulsive disorder found that expectations and opinions about treatment were related to adherence.

Conclusion: The findings of this study suggest that it is essential to consider anxiety disorder patients' beliefs about illness and treatment strategies to increase their compliance with the therapeutic plan.

Keywords: attrition, dropout, OCD, obsessive-compulsive disorder, social anxiety disorder

Introduction

Pathological anxiety and fear, ie, functioning impairing mood states associated with preparation for possible or imminent negative events, are the core features of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) anxiety disorders. Current conditions subsumed under its epithet include, among others, generalized anxiety disorder, obsessive-compulsive disorder (OCD), panic disorder, agoraphobia, specific phobias, social anxiety disorder (SAD) or "social phobia," posttraumatic stress disorder, and acute stress disorder. Epidemiological studies show that anxiety disorders are the most common class of mental disorders, affecting up to 28.8% of the general population at some point during their lives.[1] People with anxiety disorders present significant functional and occupational impairments. In addition, they use public health services more often, thus leading to greater financial expenditures.[1,2] These findings illustrate the importance of access to treatment and adherence to therapeutic strategies for patients with these conditions.

Although the dropout rate of patients with various psychiatric disorders for treatments in progress is approximately 50%,[3–5] the situation for anxiety disorders may be particularly problematic. For instance, it has been suggested that up to 85% of patients with social phobia who were initially interviewed do not attend follow-up

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treatment sessions.[2] Although no clear information on the clinical, functional, and economic impact of treatment dropout anxiety disorders is available, the high level of attrition compromises the effectiveness of treatment. Identifying the risk factors for dropout in patients with anxiety disorders would allow clinicians to develop strategies that promote higher adherence to an established therapeutic plan (either pharmacological or psychosocial).

The objective of this review is to identify the sociodemographic, clinical, and cognitive variables that predict attrition/dropout from different DSM-IV anxiety disorder treatments. Of note, studies including treatment adherence of patients with major depressive disorder with concomitant anxiety symptoms were excluded for not describing individuals with a primary anxiety disorder. The authors of this present review hypothesize that patients with lower socioeconomic levels, less education, more comorbidities, and negative beliefs or expectations regarding treatment will be more likely to drop out before completion compared with those without these characteristics.

Methods

The authors of this review identified studies that investigated predictors of attrition/dropout for anxiety disorder treatments through searches on PubMed/MedLine, PsycInfo, and ISI Web of Knowledge. The following search terms were used: attrition OR dropout OR attrition rates OR patient dropouts OR treatment adherence AND anxiety disorders. Research was restricted to articles published before January 2010. Additionally, the references of the selected studies were examined to find others related to the subject matter of interest.

Studies that investigated adherence to pharmacological, psychological, or both types of treatment in adults with a primary diagnosis of anxiety disorder were included. The studies that were included evaluated both the absence of treatment adherence after the initial interview but before the treatment had begun (ie, attrition) and the absence of treatment adherence after the treatment had begun (ie, "dropout"). Studies addressing attrition or dropout in randomized controlled trials, open studies, naturalistic follow-ups, and retrospective assessments were included. Excluded studies were those that (1) focused on appraising the attrition or dropout of treatment in patients with primary major depression associated with secondary anxiety, (2) described the index of attrition or dropout but did not evaluate its predictors, (3) investigated predictors of attrition or dropout in children or adolescents with anxiety disorders, and (4) included qualitative methods.

Results

A MedLine search resulted in 287 studies, of which 10 met the inclusion criteria. A PsycInfo search found 304 studies, of which two satisfied the inclusion criteria; however, these studies had already been selected in the MedLine search. Finally, an ISI Web of Knowledge search resulted in 318 articles, of which five met inclusion criteria, four of which had already been identified in the MedLine search. Another five relevant articles were found in the references of these studies that had not appeared in the database searches. Thus, a total of 16 articles were selected. A psychologist and a psychiatrist evaluated all of these articles jointly.

The data were organized into two subsections. The first part (Studies' designs) addressed the informative value of the reviewed studies, while the second one (Studies' results) described the results that can be inferred from these studies. The first subsection included tables listing studies that investigated treatment adherence in anxiety disorders in general (Table 1), in panic disorder (Table 2), in SAD (Table 3), and in OCD (Table 4), their sample sizes, the type of treatments they offered and/or were applied, the instruments that were employed, the attrition and dropout treatment indices, and the cognitive, clinical, and sociodemographic variables that predicted these features. The second subsection included one table (Table 5) describing the results associated with each potential predictor. This latter table describes the potential predictor, the number of studies investigating it, and the number of studies reporting a positive or negative association with adherence.

Studies' designs

A total of 16,766 patients with anxiety disorders were assessed with regard to treatment adherence, including 13,085 patients from a single retrospective study using a large managed care database. The impact of sociodemographic, clinical, and cognitive variables on adherence to treatment was evaluated in 14, 15, and seven studies, respectively. Seven papers assessed adherence to treatment in randomized controlled trials, six in naturalistic studies, three in open studies, and one in a retrospective study. One study combined data from an open and a controlled trial in a single analysis.

Most (12) studies assessed adherence to cognitive behavioral therapies, eight studies evaluated adherence to pharmacotherapy, and three investigated adherence to the combined treatment. Three papers included assessment of the three forms of treatment (pharmacotherapy, cognitive behavioral, or combined treatments). Treatment included serotonin reuptake inhibitors in four and individual cognitive behavioral treatment in five studies. Statistical analysis

Table 1 Studies that investigate adherence to treatment for anxiety disorders in general

Study	Design	N	Type of treatment	Instrument	Attrition/ dropout rate	Clinical predictors of adherence	Sociodemographic predictors of adherence	Cognitive predictors of adherence
Hunt and Andrews[8]	Naturalistic study	432	CBT	SCL-90 and EPI	17.0% dropout	Absent	Absent	Not evaluated
Wingerson et al[7]	Controlled clinical trial	112	Benzodiazepines; 5HT reuptake blockers and $5HT_{1A}$ agonists	CGI and TPQ	40.0% dropout	Personality traits involving search for novelty reduced adherence.	Absent	Not evaluated
Issakidis and Andrews[4]	Naturalistic study	731	CBT, mostly in group	DASS, FQ, ACQ, BSQ, SPS, SPIS, PSWQ, and MOSSF-12	30.4% attrition and 10.3% dropout	A primary diagnosis different from panic disorder, the presence of depressive symptoms, and an offer of group treatment reduced adherence in the pre-treatment phase. Patients who had reported less severe psychiatric symptoms but with greater effects on physical health and more severe depressive symptoms adhered to treatment less than patients without these traits.	The presence of at least one child and an indication of treatment from a general clinic reduced adherence in the pre-treatment phase. Women adhered to treatment less than men.	Not evaluated
Stein et al[9]	Retrospective study	13,085	Serotonin reuptake inhibitors; serotonin-norepinephrine reuptake inhibitors	Charlson index	57.0% dropout	Patients without comorbid depression or a history of specialized treatment adhered less than those with these qualities.	Absent	Not evaluated

Abbreviations: 5HT, 5-hydroxytryptamine; ACQ, Agoraphobic Cognitions Questionnaire; BSQ, Body Sensations Questionnaire; CBT, cognitive-behavior therapy; FQ, Fear Questionnaire; CGI, Clinical Global Impression; SCL-90, Symptom Checklist-90; EPI, Eysenck Personality Inventory; TPQ, Tridimensional Personality Questionnaire; DASS, Depression, Anxiety and Stress Scale; SPS, Social Phobia Scale; SPIS, Social Phobia Interaction Scale; PSWQ, Penn State Worry Questionnaire; MOSSF-12, Medical Outcome Study Short Form 12.

Table 2 Studies that investigate treatment adherence for panic disorder

Study	Design	N	Type of treatment	Instrument	Attrition/ dropout rate	Clinical predictors of adherence	Sociodemographic predictors of adherence	Cognitive predictors of adherence
Carter et al[11]	Open study	31	CBT in group accompanied by partner	ADIS-R, MI, STAI, BAI, BDI, ACQ, BSQ, DAS, MCIC, TNQ, and ATT	26.0% dropout	Absent	Absent	Patients who reported problems at the beginning of the sessions, whose partner did not wish to continue accompanying the patient to treatment, and who did not like CBT adhered less than those without these conditions.
Grilo et al[6]	Controlled clinical trial	162	CBT (ie, panic control therapy), imipramine, placebo, or combined treatments	ADIS-R, ASI, HMA, HMD, PAEQ, EMQ, and WCCL	24.7% dropout	Patients with more sensitivity to anxiety and low agoraphobic avoidance adhered less than those without these traits.	Patients with low family incomes, less education and who had undergone a prior treatment adhered less than those without these traits.	Patients who attributed their illness to stress or age, whose attitudes were less favorable to their specific treatment, and who presented a coping style for anxious situations based on the search for social support in accordance with responses to the WCCL adhered less than those without these conditions.
Hofmann et al[18]	Controlled clinical trial	628	CBT (ie, panic control therapy), imipramine, combined treatments, or placebo.	ADIS-R and SCID	48.6% attrition	Not evaluated	Not evaluated	Patients who did not want to take or interrupt their current medication adhered less than those who were willing to do so.
Keijsers et al[17]	Open study	161	CBT (panic control therapy)	NML-2, PDQ-R, ACQ, and MI	19.9% dropout	Absent	Patients with less education adhered less than those with more education.	Patients who were less motivated adhered less than those who were more motivated.
Toni et al[5]	Naturalistic study	326	Imipramine, clomipramine, or paroxetine	SCID, PDAI, and LIFE-UP	54.9% dropout	Less severe illness reduced treatment adherence.	Absent	Not evaluated

Abbreviations: CBT, cognitive-behavior therapy; ADIS-R: Anxiety Disorders Interview Schedule-Revised; MI, Mobility Inventory; STAI, State-Trait Anxiety Inventory; BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; ACQ, Agoraphobic Cognitions Questionnaire; BSQ, Body Sensations Questionnaire; DAS, Dyadic Adjustment Scale; MCIC, Modified Couples Interaction Checklist; TNQ, Treatment Non-completer Questionnaire; ATT, Attitudes Toward Treatment; ASI, The Anxiety Sensitive Index; HMA, Hamilton Anxiety Rating Scale; HMD, Hamilton Rating Scale for Depression; PAEQ, Patients' Attitudes and Expectations Questionnaire; EMQ, Etiological Model Questionnaire; WCCL, The Ways of Coping Checklist; SCID, Structured Clinical Interview for DSM-III-R; PDAI, Panic Disorder-Agoraphobic Interview; LIFE-UP, Longitudinal Interview Follow-up Examination; NML-2, Nijmegen Motivation Questionnaire-2; PDQ-R, Personality Diagnostic Questionnaire-Revised.

Table 3 Studies that investigate treatment adherence in patients with SAD

Study	Design	N	Type of treatment	Instrument	Attrition/ dropout rate	Clinical predictors of adherence	Sociodemographic predictors of adherence	Cognitive predictors of adherence
Turner et al[15]	Controlled clinical trial	84	Behavioral therapy (ie, inundation), atenolol, or placebo pill	ADIS-R, SCID-II, SPAI, SADS, FNE, FQ, STAI; HMA, CGI, SUDS, and SIST	15.5% attrition and 12.7% dropout	Patients with lower clinical severity scale scores and functional levels on the ADIS-R adhered less in the pre-treatment phase compared with those without these qualities. During treatment, patients who had lower disease severity scores on the STAI adhered less than patients with higher scores.	Absent	Not evaluated
Coles et al[2]	Controlled clinical trial and open study	395	CBT in group, phenelzine or placebo and CBT in group	ADIS-IV-L, GAF, BFNE, SIAS, SPS, BDI, LSRDS, and QOLI	85.0% attrition	Absent	Absent	Not evaluated
Hofmann and Suvak[16]	Controlled clinical trial	133	Behavioral therapy in group (ie, live exposure, video feedback, and instructive training; CBT in group (ie, cognitive restructuring and exposure).	ADIS-IV, SPAI, BDI, and PDQ-IV	25.6% dropout	Absent	Absent	Patients who considered the treatment to be less logical adhered less than those who did not share this thought.

Abbreviations: CBT, cognitive-behavior therapy; SAD, social anxiety disorder; ADIS-R, Anxiety Disorders Interview Schedule-Revised; MI, Mobility Inventory; STAI, State-Trait Anxiety Inventory; BDI, Beck Depression Inventory; HMA, Hamilton Anxiety Rating Scale; SCID, Structured Clinical Interview for DSM-III-R; PDQ-R, Personality Diagnostic Questionnaire-Revised; SADS, Social Avoidance and Distress Scale; FNE, Fear of Negative Evaluation Scale; FQ, Fear Questionnaire; CGI, Clinical Global Impression; SUDS, Subjective Units of Distress Scale; SIST, Social Interaction Self-Statement Test; ADIS-IV-L, Anxiety Disorders Interview Schedule for DSM-IV-Lifetime Version; GAF, The Global Assessment of Functioning; BFNE, The Brief Fear of Negative Evaluation Scale; SIAS, The Social Interaction Anxiety Scale; SPS, Social Phobia Scale; LSRDS, The Liebowitz Self-Rated Disability Scale; QOLI, Quality of Life Inventory; SPAI, Social Phobia and Anxiety Inventory.

Table 4 Studies that investigate treatment adherence in patients with OCD

Study	Design	N	Type of treatment	Instrument	Attrition/ dropout rate	Clinical predictors of adherence	Sociodemographic predictors of adherence	Cognitive predictors of adherence
Hansen et al[12]	Naturalistic study	30	Behavioral therapy (exposure and response prevention)	CTRT, LOI, and PDQ-R	Not evaluated	Patients with less severe disease adhered less than those with more severe diseases.	Absent	Patients whose expectations were not met by the therapy, who had a critical relationship with their therapist, who had less anxiety regarding household tasks, and who felt less pressure from those close to them to continue treatment adhered less than those without these conditions.
Mataix-Cols et al[10]	Controlled clinical trial	153	Behavioral therapy (exposure and response prevention) guided by computer and a manual; behavioral therapy (exposure and response prevention) guided by a therapist or relaxation guided by an audiotape.	Y-BOCS and HRSD	17% dropout	Patients with obsessions, hoarding compulsions, or both adhered less than those without these traits.	Not evaluated	Not evaluated
Mancebo et al[14]	Naturalistic study	80	CBT (unspecified); or medications (unspecified in the study)	SCID-P, Y-BOCS, MHRSD, ADQ, and TAS-P	57% of patients did not adhere to medication (as evaluated by the interruption of medication or the reduction of the dose prescribed but who did not dropout per se) and 28% of patients dropped out from CBT	Patients who described side effects, who were anxious or fearful toward their medication, and who had depressive symptoms adhered to medication less than those who did not have these qualities. Patients with more severe obsessive-compulsive or depressive symptoms and who felt anxious or fearful about participating in therapy adhered less to CBT compared with those without these traits.	Absent	Patients who reported that they did not see the usefulness of their medication adhered less to medication than those who did see its usefulness. Patients who perceived environmental barriers such as lack of time, money to pay for therapy or the availability of therapy at any moment adhered to CBT less than patients without these qualities.
Santana et al[13]	Naturalistic study	223	Different classes of antidepressants (primarily selective serotonin reuptake inhibitors), atypical antipsychotics and/or benzodiazepines	SCID, Y-BOCS and CGI	Not evaluated	Patients who did not have comorbid major depression adhered less than those who had depression.	Patients with more education, who were economically active, and resided in areas distant from the clinic adhered less than patients who did not share these qualities.	Not evaluated

Abbreviations: CBT, cognitive-behavior therapy; OCD, obsessive-compulsive disorder; PDQ-R, Personality Diagnostic Questionnaire-Revised; CGI, Clinical Global Impression; CTRT, Criticism of Treatment and/or Reason for Termination; LOI, Leyton Obsessional Card Inventory; SCID-P, Structured Clinical Interview for DSM-IV – Patient Version; Y-BOCS, Yale-Brown Obsessive-Compulsive Scale; MHRSD, Modified Hamilton Rating Scale for Depression; ADQ, Adherence Determinants Questionnaire; TAS-P, Treatment Adherence Survey – Patient Version; HRSD: Hamilton Rating Scale for Depression.

Table 5 Sociodemographic, clinical, and cognitive predictors of treatment adherence in anxiety disorders and the number of studies assessing them

	Potential predictor	Number of studies	Positive correlation with dropout/attrition	Negative correlation with dropout/attrition
Sociodemographic aspects				
Anxiety disorders in general	Age	14	1	–
	Female sex	14	1	–
	Education level	9	1	3
	Lower socioeconomic level	6	1	1
Clinical aspects				
Anxiety disorders in general	Severity of anxiety symptoms	3	–	1
	Comorbidities	3	1	1
	Personality factors	2	1	–
Panic disorder	Severity of panic symptoms	4	1	1
	Comorbidities	2	–	–
	Personality factors	3	–	–
SAD	Severity of SAD symptoms	3	–	1
	Comorbidities	3	–	–
	Personality factors	2	–	–
OCD	Severity of OCD symptoms	4	2	1
	Comorbidities	2	1	1
	Personality factors	1	–	–
Cognitive aspects				
Panic disorder		4	4	–
SAD		1	1	–
OCD		2	2	–

Abbreviations: OCD, obsessive-compulsive disorder; SAD, social anxiety disorder.

also varied greatly, but most studies used chi-square tests, regression analysis, and correlations to find the predictors (or correlates) of adherence.

Studies' results

A summary of findings, describing different classes of sociodemographic, clinical, and cognitive predictors of treatment adherence, is depicted in Table 5, along with the number of studies assessing each dimension and the number of studies showing a positive and negative association between each predictor and treatment adherence. Of note, for the sake of clarity, the data on sociodemographic aspects of different anxiety disorders and the severity of key anxiety symptoms, comorbidities, and personality factors have been collapsed into single variables for each anxiety disorder.

Sociodemographic variables

Age

Fourteen studies attempted to evaluate the impact of participants' age on treatment adherence.[2,4–16] Coles et al[2] investigated the pre-treatment phase of a trial of group cognitive-behavior therapy (CBT), phenelzine, and placebo for SAD. They found that these patients displayed a high pre-treatment attrition rate (85%) and that older patients turned down treatment more often than younger ones.

Sex

The same studies assessed the impact of participants' sex on treatment adherence.[2,4–16]

Among these studies, Issakidis and Andrews[4] studied patients with various anxiety disorders and found that women dropped out of CBT more frequently than men.

Education level

Nine studies investigated the influence of education level on treatment adherence in patients with anxiety disorders.[2,4,6,11,13–17] Of these studies, four found significant results.[2,6,13,17] In a univariate analysis, Grilo et al[6] found that patients with panic disorder who dropped out of a treatment trial comparing CBT, imipramine, and placebo had less education than those who completed treatment. However, a multivariate regression that controlled for other variables (eg, sociodemographic characteristics, severity of panic disorder, psychiatric comorbidity, attitude toward treatment, coping style, and personality style) found that educational level did not significantly contribute to dropouts, unlike family income and participant age.

In the Coles et al[2] SAD study, treatment-seeking people with less education, who were non-Caucasian and either unemployed or employed fulltime, were significantly more likely to schedule, but not attend, an initial interview.

Furthermore, Coles et al[2] conducted a logistic regression to determine the extent to which demographic variables determined interview attendance. A model that included race, age, and level of education explained 70.7% of the variance of treatment adherence.

Keijsers et al[17] studied 161 patients with panic disorder and also found that educational level predicted treatment adherence to CBT (panic control therapy). They found that less education was associated with dropping out of treatment. Although educational level did not emerge as a predictor in a univariate analysis, a regression model that included motivation found that educational level was significantly associated with dropping out of treatment.

Unlike the studies above, Santana et al[13] conducted a naturalistic follow-up study on 223 patients with OCD at a university clinic for anxiety disorders that offered free pharmacological treatment. In that study, the follow-up time of the patients (up to 10 years) was considered to be a measure of treatment adherence. Through a logistic regression, the authors of that study found that patients with less education remained in treatment longer.

Socioeconomic level

Seven studies investigated socioeconomic level, including family income and employment status.[2,4,6,7,13,16] Two studies found significant differences between adherent and nonadherent patients in terms of socioeconomic levels.[6,13] As previously described, Grilo et al[6] found that panic disorder patients who dropped out of a treatment trial comparing CBT, imipramine, and placebo presented a significantly lower income than patients who continued treatment. These findings were detected with regression models. On the other hand, Santana et al[13] used a linear regression model to find that unemployed OCD patients remained in treatment longer at a public service compared with those with jobs.

Other sociodemographic variables

Santana et al[13] examined 223 patients with OCD and found a relationship between the patients' places of residence and treatment adherence. Patients who lived in the city where the clinic was located remained in treatment longer than those who lived in a different city. Issakidis and Andrews[4] used regression models to observe that patients with different anxiety disorders who had at least one child and who were treated at a general clinic rather than by a specialist in a mental health clinic were more likely to turn down the pre-treatment phase of CBT.

Similarly, in a study on adherence to pharmacological treatments in 13,085 patients with anxiety disorders, Stein et al[9] observed that patients who were treated by a mental health specialist adhered to treatment more than those who were not seen by a specialist. Finally, Grilo et al[6] found that panic disorder patients with a history of previous and brief treatments, defined by a Likert scale varying from 1 (no previous treatment) to 4 (more than a year of treatment), were more susceptible to dropping out from a controlled treatment trial with CBT, imipramine, and placebo compared with patients without this history.

Clinical variables

Anxiety disorders in general

Hunt and Andrews[8] investigated 1045 patients who sought CBT for anxiety disorders from 1986 to 1988. Of these patients, 546 met the diagnostic criteria of panic disorder, agoraphobia, SAD, and generalized anxiety disorder. Of these patients, 432 patients accepted treatment. The clinical variables investigated were diagnosis, the severity of psychiatric symptom scale score (Symptoms Checklist-90 or SCL-90), the locus of behavioral control scale score and the Eysenck Personality Inventory (EPI) neuroticism subscale score. There were no significant differences found between the group who completed treatment (n = 357) and those who dropped out of treatment (n = 75).

Wingerson et al[7] hypothesized that personality factors might contribute to dropping out of treatment. They investigated 112 patients with anxiety disorders treated with pharmacotherapy (including 5-hydroxytryptamine (5HT) reuptake blockers, benzodiazepines, and $5HT_{1A}$ agonists). For panic disorder and generalized anxiety disorder patients combined, early dropouts scored higher on total novelty seeking of the Tridimensional Personality Questionnaire, as well as on the novelty-seeking traits of both disorderliness/dislike of regimentation and impulsiveness. Patients who dropped out of treatment (40%) did not differ from those who remained with regard to history of depression, alcohol or drug abuse, psychiatric hospitalization, attempted suicide, or symptom severity.

Issakidis and Andrews[4] investigated 731 patients who sought and received treatment in a clinic specialized in anxiety disorders. To analyze the data, they defined two dependent variables: attrition in pre-treatment (either refusal of treatment or nonappearance) and dropping out of treatment once it has started. They analyzed primary psychiatric diagnosis, severity of symptoms, psychiatric comorbidities, and degree of incapacity. Attrition at pre-treatment (30.4%)

was associated with primary diagnosis because patients with depression or another psychiatric disorder were more likely to turn down treatment compared with those with panic disorder. In addition, the presence of more severe depressive symptoms at the initial interview and selection for group (rather than individual) treatment also significantly predicted attrition. In total, 10.3% of patients dropped out of treatment, and as in the pre-treatment phase, patients with comorbid depression or depressive symptoms dropped out of treatment more often than those without these symptoms. Dropouts also reported less severe symptoms before treatment but a greater impairment of physical health.

Stein et al[9] examined patients with various anxiety disorders who were offered pharmacological treatments and found divergent results from those of Issakidis and Andrews.[4] According to Stein et al,[9] patients with comorbid depression adhered to antidepressants (5HT and serotonin-noradrenaline reuptake blockers) more than those without such a comorbidity. They argued that a possible reason for the lower rates of adherence in the nondepressed group was the lower likelihood of mental health specialty care within this population. In their analysis,[9] significantly fewer patients with anxiety alone, compared with patients with comorbid depression, received mental health specialty care during the year after treatment initiation.

In summary, studies that investigated anxiety disorders in general differed from each other with regard to their methodologies and results. The prevalence of dropouts varied from 10.3% to 57.0%. Only one study investigated attrition during pre-treatment.[4] All of the studies investigated the impact of comorbidities and the severity of symptoms[4,7–9] in adherence. However, only two studies[4,9] found significant differences between adherent and nonadherent patients, with divergent results. Specifically, one study found that patients with comorbid depression were more likely to turn down pre-treatment and drop out from treatment[4] compared with patients without comorbidities, whereas another study found that patients with comorbid depression were more likely to adhere to treatment.[9]

Panic disorder

Carter et al[11] investigated 31 patients with panic disorder and agoraphobia who were offered group CBT. The patients' partners accompanied them to each session. The clinical variables investigated were the number of situations avoided and the severity of their panic disorder; however, no significant differences were found through a multivariate analysis.

Grilo et al[6] investigated 162 patients diagnosed with panic disorder, with or without agoraphobia, who were offered CBT, medication, or both. They investigated six domains of variables: sociodemographic characteristics, severity of panic disorder, psychiatric comorbidities, attitude toward treatment, coping style, and personality style. After conducting multivariate regressions, the authors of that study verified that patients with higher Anxiety Sensitivity Index (ASI) scores and low agoraphobic avoidance were more likely to discontinue treatment.

As in the study above, Keijsers et al[17] investigated 161 patients with panic disorder who were offered CBT. The clinical variables investigated were the severity of symptoms and dysfunctional personality traits. The severity of symptoms was evaluated through three characteristics: catastrophic agoraphobic cognition, agoraphobic avoidance behavior, and the frequency of panic attacks via the Agoraphobic Cognitions Questionnaire and the Mobility Inventory. Furthermore, these authors of that study evaluated psychopathic personality traits using the Personality Diagnostic Questionnaire-Revised to investigate whether patients with personality disorders or with higher scores on this scale were more likely to discontinue treatment. They found no significant differences between dropouts (19.9%) and those who completed treatment.

Toni et al[5] investigated 326 patients diagnosed with panic disorder who were treated with antidepressants and followed up for 3 years. During this period, 179 (54.9%) patients dropped out of treatment. The only statistically significant difference between dropouts and those who completed treatment was a lower severity of panic disorder among the first group.

To summarize, five studies investigated treatment adherence in patients with panic disorder.[5,6,11,17,18] Among this sample, four studies[5,6,11,17] investigated clinical variables related to dropouts in patients with panic disorder and three studies included CBT.[6,11,17] All of the studies evaluated the severity of panic disorder, but only two studies found significant findings, and these had divergent results. In one study,[6] patients with a more severe disorder withdrew from treatment more often than patients with a less severe disorder, whereas the reverse was true in the other study.[5] None of these four studies[5,6,11,17] evaluated attrition in pre-treatment.

SAD

Turner et al[15] investigated 84 patients with SAD who met the criteria for generalized or circumscribed forms. These patients were randomly divided into three groups: (1) exposure, (2) atenolol, and (3) placebo pill. Thirteen (15.5%) patients selected for this study declined to participate

in the treatment protocol. These patients presented lower severity scores on the Anxiety Diagnostic Interview Schedule (ADIS)-Reviewed scale. Among those who participated in this study, nine (12.7%) patients dropped out of treatment over the course of the 12-week program and differed from those who completed treatment in terms of a lower disorder severity as measured by the Fear Questionnaire Symptom Severity Scale and the Spielberger State-Trait Anxiety Inventory self-reports.

Coles et al[2] analyzed the treatment course for patients with SAD from the initial telephone contact to the beginning of treatment. A total of 395 people made an initial telephone call; of these people, only 60 began treatment. Thus, 85% of the patients who made initial contact with the clinic did not begin treatment. Of the 395 patients who contacted the clinic, 131 completed an initial interview. Of these patients, 126 people were diagnosed with SAD, and 60 patients accepted and began treatment. No significant differences were found between the group who began treatment (n = 60) and those who did not (n = 66) with regard to the following clinical variables: severity of symptoms, depressive symptoms, quality of life (as measured by the Quality of Life Inventory), and functional impairment (as measured by the Liebowitz Self-Rated Disability Scale).

Hofmann and Suvak[16] also investigated 133 patients with SAD who sought group behavioral therapy or group CBT in a center for anxiety at Boston University. Of the 133 patients, 34 (25.6%) dropped out of treatment. The authors of that study investigated the following clinical variables: DSM-IV Axis-I diagnoses, anxiety and depression scores (ie, the Social Phobia and Anxiety Inventory and the Beck Depression Inventory, respectively), personality disorders, and the index of disease severity stemming from social phobia (as measured by the ADIS for DSM-IV [ADIS-IV]). They compared the clinical and sociodemographic variables of the group that completed treatment with those of the group who dropped out and did not find significant differences.

In summary, all of the studies reviewed here investigated the influence of clinical variables on the adherence to treatment for SAD.[2,15,16] Two studies[2,15] analyzed attrition from treatment and obtained different results. Turner et al[15] found that 15% of patients withdrew from study participation. Coles et al[2] found that 85% of people who sought clinical help withdrew before treatment. This between-study heterogeneity may be partially explained by the disparate approaches that the studies used to conduct their investigations. Coles et al[2] began their investigation with the first phone call for treatment, whereas Turner et al[15] investigated attrition in patients who already had a confirmed diagnosis and passed through the initial stages of treatment but who ultimately declined to participate. Two studies[15,16] investigated the patients who began treatment and dropped out; however, only one found that patients with less severe disease symptoms were more likely to discontinue treatment.[15]

OCD

Hansen et al[12] investigated nonadherence to therapy in patients with OCD who had undergone CBT. They compared groups of 15 dropouts and 15 patients who successfully completed a treatment that consisted of 10 sessions of exposure and response prevention. Patients who abandoned treatment without informing their therapist during the study period were considered to be nonadherent. The researchers analyzed the severity of OCD as measured by the Leyton Obsessional Inventory (LOI) and personality disorders determined using the Personality Diagnostic Questionnaire-Revised. Patients who discontinued treatment had lower LOI disease-severity scores.

Mataix-Cols et al[10] investigated whether different symptom dimensions in patients with OCD were associated with treatment adherence and behavioral therapy response. They investigated patients who participated in a controlled clinical trial of behavioral therapy either by computer or guided by a clinician. They randomly selected 218 patients with OCD to receive 10 sessions of treatment for (1) exposure and response prevention guided by computer and a manual, (2) exposure and response prevention guided by a behavioral therapist, and (3) relaxation guided by audiotape. After a 3-month follow-up, the patients in the first two groups (exposure by computer or therapist) similarly improved, and both groups improved more than the relaxation control group. Of the patients who received at least one visit for post-evaluation, 153 completed the Yale-Brown Obsessive-Compulsive Scale Checklist (Y-BOCS). The severity of obsessive-compulsive symptoms at the beginning of treatment predicted response to therapy, and serious symptoms at the outset of therapy continued to be more critical at the conclusion of treatment. Patients with high scores on the sexual/religious dimension of the Y-BOCS had poorer responses to exposure and response prevention treatment. Regression analyses revealed that high scores on the hoarding dimension predicted dropouts.

Mancebo et al[14] validated an instrument (ie, the Treatment Adherence Survey – patient version) that investigates adherence to pharmacological and psychological treatments in patients with OCD. This instrument is composed of two parts. The first section investigates adherence to CBT, and the second section investigates adherence to pharmacotherapy.

Mancebo et al[14] selected 80 patients who participated in the Brown Longitudinal OCD Study. Of these patients, 28% did not adhere to CBT and 57% did not adhere to medication. Those who did not adhere to CBT replied that they felt too anxious or fearful to participate in therapy (55%). These same patients also had more severe obsessive-compulsive and depressive symptoms as evaluated by the Y-BOCS and the Modified Hamilton Rating Scale for Depression, respectively. Patients who did not adhere to medication more frequently reported dissatisfaction with side effects (77%) and anxiety or fear with respect to taking medication (41%). These patients also had more severe depressive symptoms than those who adhered to treatment.

Santana et al[13] also investigated patients with OCD and, similarly to Hansen et al,[12] found results that diverged from those of Mancebo et al.[14] In this naturalistic study, the only clinical variable that predicted adherence was comorbid major depression. However, patients who presented with this comorbidity were more likely to adhere to treatment.

In summary, all the studies that investigated adherence to OCD treatment evaluated the impact of the disease's severity.[10,12–14] The results were divergent: Hansen et al[12] found that patients with less severe obsessive-compulsive symptoms more frequently discontinued treatment, whereas Mancebo et al[14] found that patients with more severe symptoms more frequently dropped out of treatment. Mataix-Cols et al[10] found that the severity of OCD predicted response to treatment but not adherence. One study[14] observed that patients with comorbid depression and more severe depressive symptoms adhered to treatment less often than those without these symptoms, while another one[13] described that comorbid depression increased adherence.

Cognitive variables

Panic disorder

Carter et al[11] asked patients with panic disorder who dropped out CBT in group to complete a self-report questionnaire. These patients claimed not to have been satisfied with their treatment. In addition, they stated that their partner, who functioned as their co-therapist and accompanied them to all the sessions, did not want them to continue treatment. Finally, they declared having "difficulties with the therapy sessions." This last response appeared on a self-report questionnaire (Treatment Non-completer Questionnaire) that lists 18 common reasons that influence interruptions of treatment; however, the authors of the study did not provide explanations of these "difficulties."

Grilo et al[6] found significant differences in the attitudes of dropout panic disorder patients regarding their treatment and the reasons they provided with respect to the etiology of their panic attacks. Patients who (1) attributed their panic attacks to life stressors, (2) had less favorable attitudes toward their treatment (group versus individual treatment), and (3) used a coping style based on social support were more likely to discontinue treatment.

Hofmann and Suvak[16] investigated attrition in patients with panic disorder who sought, or were referred to, two clinics during the pre-treatment phase. One of the clinics offered a pharmacological treatment, whereas the other offered a psychological treatment. After an initial interview, during which patients were assessed for a formal DSM-IV diagnosis of panic disorder, they participated in a study that offered five randomly distributed treatment modalities: (1) imipramine, (2) panic control (ie, psychological treatment), (3) placebo, (4) imipramine and panic control, and (5) placebo and panic control. The patients were informed that they had a 92% chance of receiving an active treatment. Of 628 pre-selected patients, 115 were ultimately excluded from the study due to diagnosis changes, medical problems, or other reasons. Of those eligible for treatment, 305 patients (48.6%) refused to participate. The principal reasons given by the patients who turned down treatment were that they were not willing to take medication (33.8%) or that they were not willing to interrupt their usual medication schedule (24.9%). The latter reason occurred due to a study regulation in which participants were required to interrupt the use of all current psychotropic medications.

Keijsers et al[17] also found that patients with panic disorder who were less motivated for treatment were significantly more likely to discontinue treatment. This result appeared in both a univariate analysis and a regression model. In addition, the authors of that study contacted 25 of the 32 dropouts; the most common reasons these former patients provided for dropping out included dissatisfaction with CBT and its protocol and their improvement to that point, as well as a lack of motivation.

SAD

Hofmann and Suvak[16] found that SAD patients who discontinued behavioral or group CBT treatment found therapy to be less logical than those who completed treatment. A self-report questionnaire administered after the first session also investigated the attitude of the patients toward their treatment. Hofmann and Suvak[16] tried to contact patients who discontinued treatment, but only 50% responded. Despite a positive

correlation between "lack of logic" and the dropout rate, the patients reported that they discontinued treatment because of conflicts with work, feelings that the group environment was overwhelming or that the treatment was ineffective, moving to a different city, and personal reasons.

OCD

Hansen et al[12] studied patients with OCD after a psychological treatment and found similar reasons for dropout using a structured questionnaire. Dropouts stated that the therapy did not correspond to their expectations and had criticisms concerning their therapist. Furthermore, these former patients felt less "pressure" from someone close to them to continue therapy compared with those who completed treatment. These results highlight the importance of knowing and agreeing to the proposed treatment, patients' relationships with their therapist, and their attitudes toward treatment.

Mancebo et al[14] found that 80 patients with OCD reported perceived environmental barriers between CBT and their ability to complete treatment. Although there were no explanations of these "environmental barriers," the fact that the patients perceived them as a reason for not adhering to treatment indicates the presence of beliefs with regard to treatment access which must be better investigated. With regard to medication adherence, these patients also questioned the usefulness of their medication.

Discussion

A total of 16 studies were selected that investigated the impact of sociodemographic or clinical variables on adherence to treatment for anxiety disorders. The greatest majority of the available studies were unable to find sociodemographic differences between adherent and nonadherent patients with anxiety disorders. Only one naturalistic study reported that women with anxiety disorders discontinued treatment more frequently than men.[4] Further, in just one study, older, non-Caucasian and unemployed anxiety disorder patients displayed treatment attrition more frequently than those who did not share these features.[2] However, in a naturalistic study, unemployed OCD patients were more likely to adhere to treatment.[13] Therefore, it seems that no consistent conclusion regarding the effect of gender, age, race, and employment on adherence of patients with anxiety disorders to treatment can be reached at this moment.

Nine studies[2,4,6,11,13–17] investigated the influence of education level on treatment adherence of patients with anxiety disorders, but only four[2,4,13,17] reported significant findings. Specifically, three studies found that patients with less education were more likely to turn down treatment,[2,4,17] whereas one study found the opposite result.[13] The authors of this present review believe that the interpretation of these contradictory findings should take into account the peculiarities of each mental health service in question. For instance, while greater levels of education could foster adherence to a private and/or wealthy clinic, it could also lead to greater dropout rates in a public service dedicated to lower income individuals.

Further, six studies[2,4,6,13,16] investigated the impact of socioeconomic levels on treatment adherence in anxiety disorders. Of note, only one study on patients with panic disorder found an association between lower socioeconomic level and higher likelihoods of dropout,[6] while a naturalistic study of OCD found a paradoxical association between higher socioeconomic levels and greater adherence to treatment.[13] In the latter study, Santana et al[13] tracked patients for 10 years via a free university service. Thus, patients with more education and higher socioeconomic levels might have sought treatment in private services to avoid some of the inconveniences of public services such as lines and hours spent waiting for the appointment.

In summary, although there is some evidence that both lower educational levels and socioeconomic status can adversely affect adherence in anxiety disorders, studies showing no relationship outnumber those that do. Also, the relationship between adherence to treatment and educational levels and socioeconomic status need to be examined in the light of the characteristics of the service being provided.

Fifteen studies evaluated the impact of clinical variables on dropping out of treatment.[2,4–7,8–17] Despite the fact that many studies of depression show that comorbidity predicts adherence to treatment, the present review revealed that only four studies found a relationship between comorbidity and treatment adherence. Furthermore, the results were divergent. Stein et al[9] and Santana et al[13] found that patients with comorbid depression adhere to treatment more often than those without this comorbidity. In contrast, Issakidis et al[4] and Mancebo et al[14] found that patients with comorbid depression adhere less to treatment. Thus, our hypothesis that comorbidity would predict adherence was not confirmed based on studies with depressed patients.

The five studies that investigated cognitive variables found similar results and emphasized the importance of treatment choice and favorable attitudes toward treatment.[6,11,14,16,18] Cognitive variables may be an important intervention factor because they are more modifiable than clinical and sociodemographic variables. The results of this review suggest

that treatment programs need to consider these expectations and include structured interventions to motivate patients to participate in treatment even before it begins.

Conclusion

Few studies have researched correlates or predictors of attrition and/or dropout in patients with anxiety disorders. The heterogeneity of the findings described in this review partially reflects the different methodologies used to identify the factors involved in the treatment adherence of patients with anxiety disorders. For example, many studies analyzed the effects of pharmacological and psychological treatments separately, whereas other studies investigated combined treatments. Also, given that researchers conceptualize "adherence" in different ways, a consensus definition is necessary. For example, although some researchers consider dropping out to be the cessation of treatment before its official conclusion, others consider dropouts to be people who continue to attend treatment but do not appear at all of the sessions or who take medication less frequently or in smaller doses than those prescribed.

Despite this review's negative findings regarding the impact of sociodemographic and clinical features of patients with anxiety disorders in treatment adherence, the studies are rather consistent in describing a high rate of nonadherence among patients with anxiety disorders.[9] Thus, the authors of this present review emphasize the importance of more research on this topic in order to develop strategies that help patients conclude their treatments. Furthermore, they emphasize this review's consistent results on cognitive variables, which indicate that expectations and beliefs about the disease and its treatment are important features to be considered in the management of patients with anxiety disorders.

Disclosure

The authors report no conflicts of interest in this work.

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