Variables associated with the success of group cognitive behavioral therapy for insomnia: preliminary results

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ABSTRACT

Introduction. Insomnia Disorder (ID) is defined as the predominant dissatisfaction with the quantity or quality of sleep associated with difficulty in initiating or maintaining sleep or early-morning awakenings with the inability to go back to sleep. Cognitive Behavioral Therapy (CBT) has proven its effectiveness for ID, being established as a frontline treatment.

Objective. To identify the variables associated with the success of CBT for insomnia.

Method. The sample consisted of 28 patients who attended the HCUV Sleep Unit and met ID diagnostic criteria. All patients underwent a CBT program in group format. Several sociodemographic and clinical characteristics (general psychopathology, anxiety, depression, anger, emotional regulation, and personality) were evaluated in order to determine which discriminated between patients who improve and those who do not improve after CBT, using the Index Insomnia Severity (ISI) as a criterion variable. Results: After the program, almost 60% of the sample improved. Significant differences were found in the level of severity of insomnia after CBT according to sex ($p = 0.027$), with women improving more. Likewise, lower levels of psychopathology were related to a better response to the intervention ($p = 0.007$). Moreover, two personality dimensions were significant: low Harm avoidance ($p = 0.006$) and high Self-directedness ($p = 0.026$), appearing associated with improvement.

Conclusions. The CBT-I group program was globally effective in improving insomnia, detecting that certain clinical and personality profiles benefit the most. More research is needed to determine if they could be patients with different subtypes of insomnia. The temperament dimensions seem to play a relevant role in determining subtypes of insomnia and perhaps we could offer more personalized treatments.

Keywords. Insomnia, cognitive-behavioral therapy, associations to improvement

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VARIABLES ASOCIADAS AL ÉXITO DE LA TERAPIA COGNITIVO CONDUCTUAL GRUPAL PARA EL INSOMNIO: RESULTADOS PRELIMINARES

RESUMEN

Introducción. El trastorno de insomnio (TI) se define como la predominante insatisfacción con la cantidad o la calidad del sueño asociada a dificultad para iniciar el sueño, mantenerlo o despertares precoces con incapacidad para volver a dormir. La terapia cognitivo conductual (TCC) ha demostrado su eficacia para el TI, consolidándose como tratamiento de elección.

Objetivo. Identificar las variables asociadas al éxito de la TCC para el insomnio.

Método. La muestra estuvo formada por 28 pacientes que acudieron a la Unidad del Sueño del HCUV y cumplían criterios diagnósticos de TI. Todos los pacientes realizaron un programa de TCC en formato grupal. Se evaluaron diversas características sociodemográficas y clínicas (psicopatología general, ansiedad, depresión, ira, regulación emocional, y personalidad) con el objetivo de determinar cuáles

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discriminaban entre los pacientes que mejoran y los que no mejoran tras la TCC, empleando como variable criterio el Índice de Gravedad del Insomnio (ISI).

Resultados. Tras el programa mejoró casi el 60% de la muestra. Se hallaron diferencias significativas en el nivel de gravedad del insomnio tras la TCC en función del sexo (p=0,027), mejorando más las mujeres. Así mismo, menores niveles de psicopatología se relacionaron con una mejor respuesta a la intervención (p=0,007). Igualmente fueron significativas dos dimensiones de personalidad: baja Evitación del riesgo (p=0,006) y alta Autodirección (p=0,026) apareciendo asociadas a la mejoría.

Conclusiones. El programa de TCC-I grupal resultó eficaz globalmente para mejorar el insomnio, detectando ciertos perfiles clínicos y de personalidad que se benefician más. Es necesaria más investigación para determinar si podría tratarse de pacientes con subtipos de insomnio distintos. Las dimensiones de temperamento parecen tener un papel relevante a la hora de determinar subtipos de insomnio y quizás poder ofrecer tratamientos más personalizados.

Palabras clave. Insomnio, terapia cognitivo-conductual, asociaciones mejoría

INTRODUCTION

Chronic Insomnia Disorder (ID), formerly called primary insomnia, is defined in DSM-5[1] as dissatisfaction with the quantity or quality of sleep caused by difficulty initiating or maintaining it or by an early-morning awakening. It occurs at least three nights per week for a minimum of three months despite favorable sleeping conditions, causing deterioration in daytime functioning and clinically significant discomfort. It must not be explained by the coexistence of mental disorders or medical conditions, and cannot be attributed to the effects of a substance. The prevalence of insomnia according to these criteria is 6-10%[1], although more recent studies raise it to 12-15%[2,3], constituting the most frequent sleep disorder.

ID is a heterogeneous and complex entity. At present, an integrated diagnosis has been chosen until it can be reliably characterized in different phenotypes. For example, five subtypes of insomnia have been proposed based on different combinations between distress, sensitivity to reward, and reactivity to environment or life events. There are differences between these subtypes in the trajectory of personal development, the response to treatment, the risk of depression and the response of the P300 cognitive auditory-evoked potentials[4]. Furthermore, two recent genome-wide association studies[5,6] have linked insomnia with the neural circuits that regulate stress and emotions, depression and anxiety, as well as with the duration of sleep, diabetes, and coronary heart disease. Then, insomnia with a short objective duration of nighttime sleep, less than 6 hours, is considered a serious phenotype associated with an increased cardiovascular, metabolic and neurocognitive risk, and could express a genetic predisposition to chronic insomnia[7].

Current clinical practice guidelines, supported by meta-analyses and systematic reviews on effective treatments for the management of ID, conclude that cognitive behavioral therapy for insomnia (CBT-I) is the frontline treatment for ID in adults[8,9]. Among the well-established components of CBT-I we find psychoeducation on sleep, sleep hygiene, stimulus control, sleep restriction, relaxation training, and cognitive therapy[10]. The application format can be individual or group, with no significant differences between the two in terms of improvement in sleep efficiency, total waking time, awakenings after sleep onset, and sleep quality[11]. The group format allows, however, a greater diffusion and accessibility[11] and a lower cost.

Likewise, in order to improve its administration, it is important to know those factors and characteristics of the patients that predict a more successful therapy outcome. In this sense, multiple variables have been studied. Regarding demographic factors (age, gender, marital status, educational level, occupational status) it is concluded that they are not significantly related to the CBT-I outcomes[12-14]. It has also been found that a greater severity of insomnia prior to treatment is related to a perception of lower quality of sleep[13] and poorer results of sleep efficiency measured objectively[14]. However, it seems that the existence of a greater disturbance of sleep does not imply a bad result, obtaining large reductions in symptoms also in this case, although these patients are less likely to achieve normative scores since they start from higher initial values[12,13]. On the other hand, the use of hypnotic drugs has been studied simultaneously with CBT-I, finding no relationship with the therapy success[13]. Regarding the psychopathological history, some studies conclude that it cannot be established as a predictor of success for CBT-I[13,14]. When anxiety and depression symptoms have been studied, it has been concluded that higher scores on these variables in pretreatment are related to greater improvements in sleep after CBT-I[12,13]. Also, the presence of symptoms pre-existing depression does not reduce the efficacy of CBT-I in patients with insomnia[15,16]. Finally, with regard to cognitive mediators, among which we include dysfunctional beliefs and attitudes about sleep and thinking errors, several studies show the correlation between the presence of these mediators and better results of CBT-I[12,13,17,18], although a recent study finds no relationship[19].

Therefore, although the literature on the subject is scarce, we could conclude that both demographic factors such as

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the use of hypnotic drugs, the history or psychopathological background, and the severity of insomnia have not been shown to be directly related to a better response to CBT. However, the presence of anxiety-depressive symptoms as well as the presence of cognitive mediators does seem to be related to a better response to psychological treatment. The objective of this study is to detect possible variables associated with the therapeutic response of CBT-I that allow discriminating between those patients who improve and those who do not improve, paying special attention to emotional factors and personality variables, aspects that have been less studied so far.

METHODOLOGY

Patients

The sample consisted of 28 adults who came with complaints of insomnia to the Sleep Unit of the Clinical Neurophysiology Service of the Hospital Clínico Universitario de Valencia (HCUV) between January 2016 and January 2018. The selection criteria used were: a) meet criteria for the diagnosis of ID, both inclusion and exclusion (absence of mental or medical disorder and substance use), b) absence of mental retardation and c) acceptance to participate in group therapy aimed at treating the insomnia problem (CBT -I).

Response to TCC-I

The criterion variable to determine the improvement in insomnia after CBT-I was the Insomnia Severity Index (ISI)[20], which consists of seven items that assess insomnia severity, sleep satisfaction, interference in daytime functioning, perception of sleep problem by others and level of concern of the patient. The improvement criterion was a decrease of 6 or more points in the ISI one month after treatment[21].

Sociodemographic and clinical data

Among the sociodemographic data, sex, age, marital status, educational level and occupation were studied. The clinical data included the psychiatric history and the need for subsequent psychotherapeutic consultations. A series of clinical variables were also collected by administering the following self-reports in their validated Spanish versions, all with good psychometric properties[23,25,26,27,29,31,33]:

- Symptom Checklist-90-R (SCL-90-R)[22]: This index provides a direct measure of the level of severity of psychopathological symptoms.

- Beck Anxiety Inventory (BAI)[24]: This questionnaire consists of 21 items that mainly assess cognitive and physiological symptoms of anxiety.

- Beck Depression Inventory-II (BDI-II). This questionnaire consists of 21 items that detect and evaluate the severity of depression.

As variables related to emotional aspects were included:

- State-Trait Anger Expression Inventory (STAXI-2)[28]: This inventory measures different dimensions of anger (state, trait, external expression, internal expression, external control and internal control). The Expression Index of the Anger (IEI) offers a general measure of anger expression and control.

- Emotional Regulation Questionnaire (ERQ)[30]: It consists of 10 items which evaluate two response tendencies to regulate emotions, cognitive reappraisal and emotional suppression.

As a measure of personality, the following was used:

- Cloninger Temperament and Character Inventory-revised version (TCI-R)[32]: It is a self-report composed of 235 items plus another 5 validity items. This test measures four dimensions of temperament (Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence), and three character dimensions (Self-Directedness, Cooperativeness, and Self-Transcendence).

Description of the intervention program

The group CBT-I program was the result of a collaboration between the Sleep Unit (Clinical Neurophysiology Section) and the Clinical Psychology Unit (Psychiatry Service). Eight sessions were held, with a weekly frequency, lasting an hour and a half, dividing their content into various components. In the first place, a first psychoeducational part was carried out, where information was provided to the participants on the pathophysiology of sleep as well as sleep hygiene measures and stimulus control. Within the physiological component, participants were trained in physical deactivation techniques, such as slow breathing, Jacobson's progressive muscle relaxation[34] and mindfulness, among others. A cognitive component was included where work was carried out on the identification and restructuring of cognitive distortions in relation to sleep, as well as an emotional component where the identification, understanding and management of emotions was addressed. Finally, sleep restriction, problem-solving training, and assertive interpersonal conflict management were introduced within the behavioral component.

After the post-treatment evaluation, a two-session supportive individual psychotherapeutic intervention was provided to work on comorbid factors of emotional regulation and conflict management in the maintenance of insomnia.

Procedure

ID diagnosis was made in the Sleep Unit, where patients were offered to enter the group CBT-I program. Those who agreed to participate were evaluated by a clinical psychology resident, supervised by a clinical psychologist. They administrated all the measures described, except BAI and BDI, which were answered in the diagnostic evaluation. The post-treatment evaluation was carried out in the Sleep Unit through different outcome measures, which are described in another study[35]. The ISI score is used in this work as the primary outcome. Sociodemographic and clinical data were obtained through semi-structured interview and self-administered questionnaires.

Data analysis

First, a descriptive analysis was performed on the total sample for all the dependent variables analyzed in the study.

A repeated measures t-test for the insomnia measurement (ISI) was performed comparing the baseline evaluation with that obtained in the post-treatment.

As mentioned above, a group of patients that improved after the intervention and another that did not improve was established taking as a criterion a decrease of 6 or more points in the ISI one month after the treatment. To check if there were differences in the variables studied between these two groups, the Chi-square test was used in nominal variables. For the rest of the continuous quantitative variables, a multivariate analysis of variance was performed, controlling in this case for the effects of age, since although there were no significant differences between groups in age, there was great heterogeneity in this regard (range 31 to 70 years).

The data were analyzed using the Statistical Package for the Social Sciences (SPSS version 22).

RESULTS

Sample description

The total sample of this study consists of 28 subjects, 12 men (42.9%) and 16 women (57.1%). They were aged between 31 and 70 years (mean = 51.64 years, SD = 9.43). Regarding the psychiatric history, the majority had not required previous attention (n = 18; 64.3%). On the other hand, 4 participants required individual psychotherapeutic support after completing the intervention (14.3%) (Table 1).

Table 1 Descriptive analysis on sociodemographic, clinical and personality data

	N (%) / Mean (SD)
GENDER	
Man	12 (42,9)
Woman	16 (57,1)
AGE	51,64 (9,43)
MARITAL STATUS	
Without partner	5 (17,9)
With partner	23 (82,1)
EDUCATION LEVEL	
Basic	7 (25)
Medium	14 (50)
Superior	7 (25)
OCUPATION	
Active	21 (75)
Not active	7 (25)
PSYCHIATRIC BACKGROUND	
Yes	10 (35,7)
No	18 (64,3)
PSYCHOTERAPY POST	
Yes	4 (14,3)
No	18 (64,3)
IGS SCL-90	65 (26,22)
BDI	12,68 (5,68)
BAI	12,94 (9,87)
STAXI	
Anger Expression Index (IEI)	29,22 (10,34)
ERQ	
Cognitive reappraisal	27,33 (6,58)
Emotional Suppression	15,96 (6,37)
TCI	
Novelty seeking	41,96 (29,14)
Harm avoidance	68,32 (29,01)
Reward dependence	41 (22,36)
Persistence	52,84 (22,24)
Self-directedness	36,52 (28,89)
Cooperativeness	36,32 (28,12)
Self-transcendence	45,95 (31,43)

Response to TCC-I

CBT-I reduced the ISI score in the whole sample (pre-treatment mean: 18.78 (SD = 3.36) vs. post-treatment mean: 11.11 (SD = 5.80); t = 7.64, p <0.001, effect size d Cohen = 0,16). Sixteen patients (57.14%) improved according to the ISI drop criterion ≥ 6 points.

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Variables associated with improvement in ISI

Table 2 shows the chi-square test results, comparing patients who improve and do not improve in the different nominal variables. First of all, with regard to demographic variables, we found significant differences in the level of severity of insomnia with respect to gender (p = 0.03), finding that women improved more. On the other hand, no significant differences were found in this variable after treatment according to marital status (p = 0.39), educational level (p = 0.65) and occupation (p = 0.38). Regarding clinical variables, psychiatric history (p = 0.82) and the need to receive individual psychotherapeutic support after group treatment (p = 0.09) were not significant either.

Table 3 presents the results of the MANCOVA for the remaining quantitative variables. Although no significant differences were found in the variable age between the two groups (p = 0.39), it was controlled for its effect, due to its high variability. As can be seen in the table, significant differences were found in insomnia improvement after treatment on the level of general psychopathology measured through the SCL-90-R (p = 0.006). Patients who obtained lower scores on this scale improved the most. However, no differences were found in the level of anxiety (p = 0.75) or depression (p = 0.74). Nor were significant differences observed with respect to the Anger Expression Index (IEI) (p = 0.57) or the emotional regulation style, both in cognitive reappraisal (p = 0.27) and emotional suppression strategies

Table 2 Chi-cuadrado (X2) test comparing patients that improve (ISI ≥ 6) and do not improve (ISI < 6) in the categorial dependent variables (sociodemographic and clinical)

	Improve ISI ≥ 6 N	No improve ISI < 6 N	X^2	p
GENDER				
Man	4	8	4,86	**0,03**
Woman	12	4		
MARITAL STATUS				
Without partner	2	3	0,73	0,39
With partner	14	9		
EDUCATION LEVEL				
Basic	4	3		
Medium	9	5	0,87	0,65
Superior	3	4		
OCUPATION				
Active	11	10	0,78	0,38
Not active	5	2		
PSYCHIATRIC BACKGROUND				
Yes	6	4	0,05	0,82
No	10	8		
PSYCHOTERAPY POST				
Yes	4	0	2,79	0,09
No	10	8		

Table 3 MANCOVA comparing patients that improve (ISI ≥ 6) and do not improve (ISI < 6) in the different quantitative variables (clinical and personality), controlling for the age effect

	Improve ISI ≥ 6 Mean (D.T.)	No improve ISI < 6 Mean (D.T.)	F	p
IGS SCL-90	54,22 (26,23)	80,68 (17,32)	9,22	**0,006**
BDI	12 (5,67)	13,58 (5,82)	0,11	0,74
BAI	13,06 (12)	10,67 (6,27)	0,10	0,75
STAXI				
Anger Expression Index (IEI)	29,63 (9,99)	28,64 (11,31)	0,34	0,57
ERQ				
Cognitive reappraisal	26,44 (7,92)	28,64 (3,93)	1,27	0,27
Emotional Suppression	15,69 (6,88)	16,36 (5,85)	0,14	0,71
TCI				
Novelty seeking	46,93 (31,24)	35,64 (26,30)	1,44	0,24
Harm avoidance	55,50 (30,70)	84,64 (16,49)	7,35	**0,01**
Reward dependence	48 (19,48)	32,09 (23,47)	3,43	**0,08**
Persistence	58,42 (24,66)	45,73 (17,25)	2,33	0,14
Self-directedness	47,14 (32,10)	23 (17,48)	4,81	**0,04**
Cooperativeness	43,07 (29,89)	27,73 (24,31)	1,56	0,23
Self-transcendence	47,29 (34,90)	43,36 (26,20)	0,14	0,71

(p = 0.71). Regarding the personality variables measured through the TCI-R, it was found that those subjects with lower scores on the Harm Avoidance scale (p = 0.01) and those with higher scores on the Self-direction dimension (p = 0.04) improved more after CBT-I. We also found a trend towards significance in the Reward Dependence dimension (p = 0.08), where patients with higher scores in this dimension improved more. No differences were found between those who improved after CBT-I and those who did not improve in any of the other dimensions evaluated by the TCI.

CONCLUSIONS

This study analyses the influence of a number of sociodemographic, clinical, emotional and personality variables on the response to CBT-I in a sample of ID patients in a context of standard clinical practice. One month after the end of treatment, CBT-I was effective in improving the severity of insomnia (ISI) for the sample globally, and nearly 60% did so according to the established criteria. Women, patients with less general psychopathology and those with temperament traits characterized by low Harm avoidance and character traits consisting of high Self-directedness improved significantly.

Regarding the socio-demographic variables, in agreement with our results, none of the reviewed studies has shown that these are predictors of the response to CBT. Only the age has presented contradictory results[12-14]. The only conflicting data would be with respect to gender, which in our case does appear associated with the therapeutic response. However, given the small sample size, these results must be taken with caution.

Among the clinical variables, the psychiatric history, the need to receive individual psychotherapeutic support after the group treatment, the level of general psychopathology, the level of anxiety and depression were analyzed. In our study, as in the previous literature[13,14] , we did not find that psychiatric history could be established as a variable associated with response to treatment. On the other hand, neither anxiety nor depression levels appeared associated with the results. In this case, our data are different to the previous literature, which finds that higher levels of anxiety-depressive psychopathology are associated with a better response to CBT[12] or at least that patients with high levels of depression still benefit from the psychological treatment[15, 16]. This is the case despite the fact that the contents of the treatment program and the assessment measures were similar. However, with regard to general psychopathological symptoms, we found that in this case patients´s response is worse. In our sample the anxiety and depression scores are low and show little variability, therefore, they are not susceptible to discriminate between patient profiles. However, the general psychopathology scores are higher and heterogeneous, and in this case relationships, if any, could be established. It would seem that a CBT program focused on the specific elements for insomnia could be useful in patients with insomnia and especially those with an anxiety-depressive symptom profile, but if the patients present more symptoms and more nonspecific symptoms, they probably need a different psychological or pharmacological approach.

With regard to the variables related to emotions, contrary to expectations, neither the measure of control and expression of anger nor the emotional regulation style, turned out to be differentiating between those who improved and those who did not. Difficulties in emotion regulation have been described in people with insomnia[36]. We hypothesize that those patients with specific difficulties in controlling or expressing anger, or general difficulties in emotional regulation, especially with a tendency to use emotional suppression as a regulation style, would generate and / or maintain a greater physiological activation, being a subgroup of patients that would especially benefit from therapy. As we have mentioned, none of these variables discriminated with respect to the treatment outcome. However, if we look at the descriptive data, we can see that our sample did not present these characteristics (low scores both in the anger expression index, as well as in the use of both cognitive reappraisal and emotional suppression strategies). Perhaps a larger sample, in which patients with these types of difficulties were represented, would yield different results.

Finally, the analysis of personality variables was carried out, finding that high scores in the dimension of temperament Harm Avoidance predict a worse outcome. Thus, subjects who respond intensely to aversive stimuli, characterized by being shy, cautious or socially inhibited individuals, with high fatigue and pessimistic in anticipation of problems would not benefit as much from therapy as patients with low scores in this dimension. Regarding the character dimensions, the Self-directedness scale appeared to be positively related to the therapy success. This means that those people with strong self-esteem, a solid personal identity, an adequate level of maturity, who have personal resources, are proactive and are committed to their goals or purposes, would improve more after CBT-I.

To the best of our knowledge, there is no study that addresses aspects of personality in relation to the psychological treatment of patients with insomnia. Some papers study aspects of personality in insomniac patients, being the results in line with ours. They find that patients with chronic insomnia, compared to controls, have higher

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scores in Harm Avoidance, and lower scores in Self-directedness[37-39]. The authors suggested that serotonergic mechanisms, implicated both in insomnia and in the Harm Avoidance temperament dimension, could explain the high incidence of Harm Avoidance as a personality trait in the psychophysiology of patients with insomnia[6,37]. Current approaches point out the existence of insomnia subtypes with different pathophysiological mechanisms which would have specific characteristics and differentiated treatment rather than a unique ID with an underlying general mechanism[4, 40]. It remains open the possibility that this group would be a subtype of patient with insomnia, who would respond worse to a CBT program with the described characteristics. In fact, in our work, a last result obtained with the TCL-R scale was a trend to significance in another dimension of temperament, Reward Dependence. In this case, patients with higher scores in this dimension improved more. Interestingly, a recent study determines subtypes of insomnia, among other factors, from this dimension of temperament[4]. This reinforces the need for further research studying temperament in as large and heterogeneous samples as possible, in order to determine subtypes of patients with insomnia and being able to offer more personalized treatments.

In conclusion, our study shows that CBT-I administered in a group format is effective in improving the severity of insomnia in general, and that in particular, women and patients who present lower levels of general psychopathology obtain a better result. On the other hand, patients with temperamental traits such as harm avoidance or, maybe also reward dependence, present a differential response to this type of psychological treatment. Future research will have to determine whether these could be a different insomnia type patient with different therapeutic needs.

Among the strengths of this study, we would like to highlight the wide range of variables explored, as well as the novel aspects of including emotional regulation strategies, control of the emotion anger and especially personality dimensions. Regarding the limitations, we would point out the sample size and the heterogeneity regarding the demographic and clinical characteristics of the patients. The results refer to short-term improvement, not being medium-term results currently available. Furthermore, it was an evaluation carried out within the usual clinical practice, not a clinical trial.

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