

## Presence of negative emotions in bronchial asthma

*Presencia de emociones negativas en el asma bronquial*

*Presença de emoções negativas na asma brônquica*

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### Abstract

This paper investigates the presence of anxiety, anger and depression in a sample of patients with asthma from a hospital environment and a sample of people free of this respiratory disease. For this research, the Anxiety Situations and Responses Inventory (ASRA), the Spanish adaptation of the State-Trait Anger Expression Inventory (STAXI) and the Tri-dimensional Personality Questionnaire for Depression (TPQD) were used. Patients with respiratory disease scored significantly higher on negative emotions than people without asthma. The results will be discussed to consider the importance of taking emotions into account in order to handle the disease in a comprehensive manner.

**Keywords:** anger, anxiety, asthma, depression.

## Resumen

El presente artículo investiga las diferencias entre una muestra de pacientes de asma en un entorno hospitalario y un grupo de individuos libres de asma, en la presencia de tres emociones negativas: la ansiedad, la ira y la depresión. Para evaluar las respuestas de ansiedad se utilizó el Inventario de de Situaciones y Respuestas de Ansiedad (ASRA), para evaluar la ira se utilizó la adaptación española del Inventario de Expresión de Ira (STAXI) y para evaluar la depresión se utilizó el Cuestionario de Personalidad Tri-dimensional para la Depresión (PQD). Los resultados muestran que los pacientes de asma mostraron puntuaciones significativamente más altas que los sujetos del grupo de control para todas las variables evaluadas. Lo anterior pone de manifiesto la importancia de tener en cuenta las emociones de los pacientes con el fin de manejar la enfermedad desde una perspectiva integral.

**Palabras clave:** ira, ansiedad, asma, depresión.

## Resumo

O presente artigo investiga as diferenças entre uma amostra de pacientes com asma em um ambiente hospitalar e um grupo de indivíduos livres de asma, na presença de três emoções negativas: ansiedade, raiva e depressão. Utilizou-se o Inventário de Situações e Respostas à Ansiedade (ASRA) para avaliar as respostas de ansiedade, e a adaptação espanhola do Inventário de Expressão de Raiva (STAXI) para avaliar a raiva e o Questionário de Personalidade para avaliar a depressão. Tridimensional para Depressão (PQD). Os resultados mostram que os pacientes com asma apresentaram escores significativamente mais elevados do que os indivíduos do grupo controle para todas as variáveis avaliadas. O precedente destaca a importância de levar em consideração as emoções dos pacientes para administrar a doença de uma perspectiva integral.

**Palavras-chave:** raiva, ansiedade, asma, depressão.

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## Introduction

Bronchial asthma is a real health problem for all age groups in any country, regardless of the development level achieved. According to World Health Organization data, there are at least 235 million patients with asthma, from which 255 thousand died because of this disease in 2005 (WHO, 2015). The prevalence figures range between 2.1-4.4 % in countries such as Albania, China, Greece, Georgia, Indonesia, Romania and Russia, and 29.1-32.2 % in Australia, New Zealand, Ireland and the United Kingdom (ISAAC, 2015). The prevalence increase may be due to a better diagnosis and classification of asthma patients (Urrutia *et al.*, 2007; Urrutia *et al.*, 2012), although it is also important to know the social context in which the disease develops (Olazagasti, Shrout, Yoshikawa, Bird & Canino, 2012). Asthma prevalence figures are about 5 % amongst the general population and about 8-10 % amongst children (Carlsson *et al.*, 2013).

Cisneros, López, Ramírez & Almonacid (2009) define asthma as a disease originated by the presence of a chronic inflammation of the respiratory tract, associated to bronchial hyper-responsiveness, and its course typically includes reversible bronchial obstruction episodes, with or without treatment.

Nowadays there is a vast amount of data explaining or detailing the relationship that psychological factors have with asthma (Cano-Vindel, & Fernández-Rodríguez, 1999; Cano-Vindel, Fernández-Rodríguez & Spielberger, 2012; Fernández-Rodríguez, 1997, 2012, 2014, 2017; Fernández-Rodríguez & García, 2013; Fernández-Rodríguez & Miralles, 2015; Booster, Oland & Bender, 2016). There is enough evidence to state that psychological factors may play a major role in the physical disease variability, evolution, morbidity and treatment (Castilblanco, 2007; Moes-Wójtowicz, Wójtowicz, Postek, & Domagała-Kulawik, 2012), even in relation to other diseases (Fernández-Rodríguez, 2013).

The psychosocial-type factors may influence asthma pathogenics and physiopathology, either directly at an autonomous, endocrine, immunological level and through some central nervous system mechanisms, or indirectly through factors related to health habits, lifestyle, thoughts about the disease and handling of the disorder.

Without foregoing medical treatment in any case, the psychological intervention clearly fits within a biopsychosocial approach, being particularly relevant the importance of psychological treatment looking forward to handle the disease in an integral way (Pateraki & Morris, 2018; Ritz, Meuret, Trueba, Fritzsche & Von Leupoldt, 2013). Within this psychological intervention, it is worth highlighting the asthma self-care, understood as a reduction of the doctor's participation in the treatment, as a systemic way to educate patients to control the disease, preventing it whenever possible and reducing it when necessary (Sicouri *et al.*, 2017).

As part of the psychological factors, emotions are some particularly relevant agents. They are psychophysiological reactions that appear when somebody faces situations that are relevant from an adaptive perspective, such as those that imply a threat, damage or danger, success, novelty or loss. They have a biological substrate: they are pleasant or unpleasant, activate the individual, are part of the communication and, at the same time, can act as important conduct reasons. Their nature is universal and these reactions cause affective, physiological and expressive modifications (Cano-Vindel & Tobal, 2001). The most commonly studied emotions in bronchial asthma, out of the so called “negative emotions”, are anxiety and depression, and anger, with less frequency in terms of number of studies.

The action mechanisms for anxiety and anger can be very similar. Both emotions may influence bronchial asthma by two mechanisms (Fernández-Rodríguez, 2012; Kotses, & Creer, 2010). The first one is hyperventilation and it is closely related to those behaviors that normally appear together with any intense emotional states, e.g. crying, laughing, etc. The second route, responsible for the bronchoconstrictor response, happens due to changes in the autonomous nervous system that occur in every emotional response. In addition, due to the disease intermittence and the numerous stimuli that may cause a crisis, asthma patients benefit from a great cognitive activity and they stay alert to their environment, generating many believes and expectations with regards to the appearance of a crisis. This generates a chronic anxiety in the subject and the subsequent physiological activation (Creer, 2008).

The action mechanisms for depression are different. Both depression and asthma are related to a cholinergic system alteration (Martín, 2008). A depressive estate can be characterized by a predominance of the parasympathetic nervous system, in a way that any circumstance implying a cholinergic dominance (parasympathetic activation receivers, existing in great numbers in the bronchial tree) places the patients in a very high risk situation, as they tend to show a higher parasympathetic reactivity in the respiratory tract (Suárez, Huerta, & Del Olmo, 2010). McFadenn, Luparello, Lyons & Bleecker (1969) highlighted the cholinergic intervention when blocking the bronchoconstriction response in a suggestion experiment with prior atropine (anticholinergic) administration. In this type of experiment, the suggestions induced refer to the bronchoconstrictor effect caused by the substance being administered to the subjects, thus increasing the asthma symptoms. In the McFadenn *et al.* (1969) experiment, the atropine prevented the suggestion effect. Rosenkranz (2007) pointed out that the P substance (involved in pain perception) could be linked to the inflammatory disease physiopathology, as well as to the anxiety and depression physiopathology.

More recently, it was found that administering long-term corticoid treatments reduces the serotonin levels in the blood and this could explain the onset of depressive symptoms (Vidal & Matamala, 2013). This matter is coherent with the psychological anguish observed in patients with severe asthma and prednisone dependants compared to those who did not show such dependence to prednisone (Amelink *et al.*, 2014).

Depression in asthma patients can cause a worsening of respiratory symptoms (Kaugars, Klinnert & Bender, 2004) and an increase of the disease exacerbations (Ahmedani, Peterson, Wells & Williams, 2013; Han, Forno, Marsland, Miller & Celedón, 2016). At the same time, asthma can facilitate a depressive reaction (Fasciglione & Castañeiras, 2007). Indeed, a depressive state may trigger a minimization of the asthma symptoms in the patient's perception, so there would be a poor self-care regarding the disease (Raymond, Fiese, Winter, Knestel & Everhart, 2012), resulting in a poorer control and a low index of adherence to medication (Sastre, Crespo, Fernández-Sánchez, Rial & Plaza, 2018; Krauskopf *et al.*, 2013).

During the research analysis, two questions stood out: firstly, the presence of a response specificity in the reactivity, both at a stimuli level and at a response level (asthma patients reacting with degrees of pulmonary changes different to those in healthy individuals), particularly if the stimuli are relevant to the disease. Secondly, it was highlighted that there is a sub-group of asthma patients who respond to stress with a bronchoconstriction; this-sub group represents about 50 % of total asthma patients. The characteristics of the sub-group with this reaction are still to be determined.

The current investigation aims at testing and studying differences in anxiety, anger and depression amongst subjects suffering from bronchial asthma and healthy individuals. The measurement may be very useful to classify different patients and may enable carrying out specific interventions.

## **Method**

### **Participant**

A total of 135 subjects participated in the current research, 65 of them were included in the asthma patients group and the remaining 70 went into the control group of healthy individuals. All participants took part voluntarily and without remuneration. In all cases, confidentiality and anonymity were assured and completed informed consent procedures, which included the main information about the study.

Asthma patients were recruited amongst the outpatients of the Pneumology Service at the Central Hospital in Asturias, Spain. Subjects in the control group were recruited in different environments (neighborhood associations, care homes, etc.) and both the control and the asthma patients groups were created simultaneously. Special care was taken to ensure both groups were balanced in terms of age and gender.

The distribution was as it follows:

1. Asthma patients group: 76 individuals aged 18-68; the average age of the group is 38. Thirty-six of them were men (47.3 %) with an average age of 40 years old and 40 were women (52.7 %) with an average age of 36 years old. Within the group, 16 patients suffer from severe asthma, 50 patients suffer from moderate asthma and 10 patients suffer from mild asthma. Diagnose was issued in all cases by a specialist.

2. Control group: 82 individuals aged 18-74; the average age of the group is 38. The group includes 38 men (46.3 %) and 4 women (53.7%), with an average age of 40 and 36 years old respectively.

To be included in the bronchial asthma group, individuals had to meet the following criteria:

1. Suffer from bronchial asthma as diagnosed by a specialist.
2. To be free from any other psychophysiological and psychological disorders.

With regards to the control group, the requirements were not to suffer from bronchial asthma or any other psychophysiological or psychological disorders, currently or in the past.

## **Measures**

In order to study anxiety, the abridged version of the Anxiety Situations and Responses Inventory (ISRA) was chosen (Miguel-Tobal & Cano-Vindel, 1994). This is an inventory designed to assess how frequently a series of cognitive, physiological and motor responses appear when facing different evaluation, interpersonal, phobic and everyday life scenarios. In addition to indices for the three response systems and indices for the four scenarios, the ISRA provides an anxiety trait measurement as well.

The STAXI used is the experimental Spanish version adapted by Miguel-Tobal, Casado, Cano-Vindel and Spielberger (Miguel-Tobal, Cano-Vindel, Casado & Spielberger, 2001). This version respects the format of the original one and tries to preserve each item original meaning, adapting it to Spanish expressions.

The Tri-dimensional Personality Questionnaire for Depression (TPQD) (Jiménez García, 2004) was used to measure depression. This questionnaire was created in Spain, with Spanish samples. It also measures the depressive manifestations in all three response systems (cognitive, physiological and motor) as well as the general depression level.

The scores according to each scale were analyzed after the evaluation stage. Means and standard deviations were calculated for each group and Student “t” tests were carried out (mean differences for equal or different variances) in order to analyze the differences in means for each group, as well as to assess the significance degree for each sample evaluated. A variance analysis was also carried out to check for differences within the asthma patients group based on the patients' gender. Data analysis was performed using the SPSS statistics package for a Windows environment.

## **Procedure**

The study followed the directions in the area of Research Hospital. The study procedure and consent procedure had the approval of the Ethics Committee for Clinical Research, this committee is known as “*Comité de Ética para la Atención Sanitaria del Área Sanitaria IV de Asturias*”. The director of the Department of Pneumology II (University Hospital of Asturias) supervised the ethical statement throughout study. The contact with patients in the asthma group was established when they visited their doctor, who explained them the objective and procedure. All participants provided their verbal informed consent, which was orally and not written for several reasons: first, participants provided it directly to their doctor; second, the evaluation was performed after the consultation; third, participants carried out an oral interview; fourth, their voluntarily participation was understood as a tacit consent. Although informed consent was oral, all participants answered a written psychological test being aware of their voluntary participation. All participants in the research took part voluntarily and without remuneration. In all cases, confidentiality and anonymity were assured. For all cases the assessment was done individually, voluntarily and personally. Inventories were completed following an interview to ensure that the inclusion criteria for each group were met. Additionally, the individuals were also informed about the nature of the research during the interview.



## Results

With regards to anxiety (table 1), the results show greatly significant differences in all scales ( $p < .001$ ), except for interpersonal anxiety, a variable where the significance was ( $p = .005$ ). For all variables, asthma patients obtained higher scores.

**Table 1.** Means, Standar Deviations, “T”-Test and Significance Levels Between Asthmatics and Normal Group In A.S.R.A. (I.S.R.A. Spanish version)

Variables	Asthma		Control		t-test	Significance
	Mean	SD	Mean	SD		
Cognitive Anxiety	15.00	5.07	9.61	6.12	3.91	<.001
Physiological Anxiety	15.43	6.44	6.31	4.87	6.56	<.001
Motor Anxiety	11.12	4.16	7.28	3.65	4.01	<.001
Trait Anxiety	41.55	13.10	23.18	11.98	5.98	<.001
Tests Anxiety	14.87	4.74	9.48	3.88	5.11	<.001
Interpersonal Anxiety	4.06	2.36	2.54	1.91	2.90	.005
Phobic Anxiety	6.70	3.04	4.07	2.81	3.66	<.001
Day Life Anxiety	3.96	2.30	1.30	1.34	5.70	<.001

Source: Our own data

In the anger study (table 2), significant differences were found in the anger trait scales ( $p=.002$ ), irritable temperament or anger ( $p=.001$ ) external anger ( $p=.007$ ) and anger expression ( $p=.007$ ). Asthma patients also had higher scores in relation to anger.

**Table 2.** Means, Standar Deviations, “T”-Test and Significance Levels Between Asthmatics and Normal Group In S.T.A.X.I.

Variables	Asthma		Control		t-test	Significance
	Mean	SD	Mean	SD		
State Anger	10.92	1.90	11.93	4.35	-0.59	.559
Trait Anger	20.35	6.28	6.28	3.30	3.36	.002
Angry Temperament	7.25	2.70	5.42	1.48	3.46	.001
Angry Reaction	9.46	3.27	8.30	2.37	1.65	.103
Anger In	16.59	3.80	15.05	3.40	1.76	.086
Anger Out	16.59	4.95	13.69	3.57	2.79	.007
Anger Control	20.75	4.75	22.28	5.80	-1.18	.244
Anger Expression	28.43	9.01	22.60	8.25	2.77	.007

Source: Our own data

As for depression (table 3), significant differences were found in all the scales ( $p<.001$ ). Asthma patients obtained higher scores than individuals in the control group in all cases.

**Table 3.** Means, Standar Deviations, “T”-Test and Significance Levels Between Asthmatics and Normal Group In T.P.Q.D. (C.T.D. Spanish version)

Variables	Asthma		Control		t-test	Significance
	Mean	SD	Mean	SD		
Cognitive System	39.93	23.05	17.40	16.98	4.58	<.001
Physiological System	31.19	15.54	10.37	7.66	6.83	<.001
Motor System	31.00	13.02	15.05	11.26	5.37	<.001
General Level Depression	102.03	47.37	42.82	32.86	5.99	<.001

Source: Our own data

On performing the variance analysis to study anxiety differences between asthma patients based on their gender, significant differences were only observed in F-IV or daily life anxiety  $F(1, 63) = 4.245, p=.043$  with a greater anxiety level in men (table 4).

**Table 4.** F and P-Values of A.S.R.A. Anova (I.S.R.A. Spanish version).

<b>Variables</b>	<b>F</b>	<b>P</b>
<b>Cognitive Anxiety</b>	2.743	.103
<b>Physiological Anxiety</b>	0.512	.477
<b>Motor Anxiety</b>	0.993	.322
<b>Trait Anxiety</b>	1.699	.197
<b>Tests Anxiety</b>	0.093	.761
<b>Interpersonal Anxiety</b>	1.051	.309
<b>Phobic Anxiety</b>	1.924	.170
<b>Day Life Anxiety</b>	4.245	.043

Source: Our own data

For anger, the variance analysis showed significant differences in the anger states  $F(1, 63) = 4.983, p=.029$ ; anger trait  $F(1, 63) = 16.092, p < 0.001$ ; anger temperament  $F(1, 63) = 9.277, p = .003$ ; anger reaction  $F(1, 63) = 9.338, p = .003$ ; external anger  $F(1, 63) = 8.785, p = .004$  and finally, anger expression  $F(1, 63) = 5.095, p = .027$  (table 5). In all the cases men obtained higher average scores than women.

For depression there were no significant differences based on gender in any of the assessed variables.

**Table 5.** *F and P-Values of STAXI Anova.*

<b>Variables</b>	<b>F</b>	<b>P</b>
<b>State Anger</b>	4.983	.029
<b>Trait Anger</b>	16.092	<.001
<b>Angry Temperament</b>	9.277	.003
<b>Angry Reaction</b>	9.338	.003
<b>Anger In</b>	1.427	.237
<b>Anger Out</b>	8.785	.004
<b>Anger Control</b>	0.076	.784
<b>Anger Expression</b>	5.095	.027

Source: Our own data

## **Discussion and Conclusions**

Based on the results obtained, we can state that the assessed emotions have an impact on the asthma patient profile. It is possible to notice that there is a specific profile with regards to the presence of these three emotions in asthma patients when compared against a group of individuals free from the disease. Basically, this profile is defined by the existence of higher and more significant levels of emotion.

In terms of anxiety, the difference between the asthma patient and a healthy individual is not only a greater anxiety trait, but also the presence of a higher number of insecurity thoughts, more activation of the somatic and autonomous nervous system, greater number of motor behaviors, as well as higher anxiety levels in the four situational factors assessed. In addition, men in the asthma patients group also display

higher levels than women in those situations that may occur in the patients' everyday lives, such as work, study, when sleeping or for no reason at all.

In terms of anger, the asthma sufferer differs from healthy individuals, particularly in the general tendency to experience and express anger without a specific provocation or anger temperament, in the external anger or the degree in which the individual expresses anger towards people or objects. The anger trait and the frequency to express those feelings are also different. Within the asthma patients group, men experience higher levels of anger states, trait, temperament and reaction, expressing it more often and directing it towards other people or things (external anger).

Asthma patients experience a higher number of depressive thoughts, the most frequent being "I worry easily", "I find it very hard to make decisions" and "I'm very hard on myself". These individuals also show more activation indices and physical symptoms associated to depression, the symptoms with the highest average scores being "I lack energy and I get tired very quickly", "I feel tired and I wake up easily at night". Moreover, asthma patients display motor behaviors that can be easily related to depressive states, the behavior with the highest average scores being: "I call my friends less often than before", "I do less things than before and my leisure and pleasurable activities have decreased".

In consequence, asthma patients display a much higher general depression level than subjects in the control group. That is to say, they show a higher rate of depressive symptoms than subjects in the control group.

Traditionally, only general or trait referent data were facilitated with regards to anxiety and depression. In psychology it is very uncommon to offer methods that produce results in all three response systems, whereas it is really advisable to obtain these multiple measurements. The current research represents a leap forward in obtaining broader indices in terms of information from the three response systems, both for anxiety and depression.

These data support even more the potential influence of emotions on psychophysiological disorders. In fact, this is one of the factors that explain those disorders.

When considering a correct and comprehensive treatment for the disease, it is essential to consider the presence of an emotional factor in bronchial asthma. These emotional variables drive the necessity of attaching psychological intervention strategies to the physical disease.

Although the methodology used in this research prevents reaching conclusions about a potential etiologic cause of psychological nature, the results support the statement that there is a greater weight and empiric evidence supporting the idea that asthma sufferers display higher indices of negative emotions than individuals without this pulmonary disease. All this is consistent with the so called Psychological Psycho-maintenance Theory. This theory states that the psychological, social and behavioral variables can maintain and worsen the physical illness, having a decisive influence on its course.

## References

- Ahmedani, B.K., Peterson, E.L., Wells, K.E. & Williams, L.K. (2013). Examining the relationship between depression and asthma exacerbations in a prospective follow-up study. *Psychosomatic Medicine*, 75(3), 305-310. doi: 10.1097/PSY.0b013e3182864ee3
- Amelink, M., Hashimoto, S., Spinhoven, P., Pasma, H.R., Sterk, P.J., Bel, E.H., *et al.* (2014). Anxiety, depression and personality traits in severe, prednisone-dependent asthma. *Respiratory Medicine*, 108(3), 438-444. doi: 10.1016/j.rmed.2013.12.012.
- Booster, G.D., Oland, A.A. & Bender, B.G. (2016). Psychosocial factors in severe Pediatric asthma. *Immunology and Allergy Clinics of North America*, 36(3), 449-460. doi: 10.1016/j.iac.2016.03.012.
- Cano-Vindel, A., & Fernández-Rodríguez, J. C. (1999). Perfiles de ira y ansiedad en el asma bronquial. *Ansiedad y Estrés*, 5(1), 25-35.
- Cano-Vindel, A., & Miguel-Tobal, J. J. (2001). Emociones y salud. *Ansiedad y Estrés*, 7(2), 111-121.
- Cano-Vindel, A., Fernández-Rodríguez, J. C., & Spielberger, C. D. (2012). The experience and expression of anger and anxiety in bronchial asthma patients. *Ansiedad y Estrés*, 18(2-3), 221-230.
- Carlsson, A. C., Wändell, P., Ösby, U., Zarrinkoub, R., Wettermark, B., & Ljunggren, G. (2013). High prevalence of diagnosis of diabetes, depression, anxiety, hypertension, asthma and COPD in the total population of Stockholm, Sweden—a challenge for public health. *BMC Public Health*, 13(1), 670. doi: 10.1186/1471-2458-13-670.
- Castilblanco, E. (2007). *Introducción a la Psiconeuroinmunología. Una aproximación holística de la salud* (Diploma Course Dissertation). Universidad de la Sabana, Chía, Colombia. Retrieved from <https://intellectum.unisabana.edu.co/bitstream/handle/10818/1672/131333.pdf?seq>
- Cisneros, C., López, A., Ramírez, M.T., & Almonacid, C. (2009). Asma. In J. De Miguel & R. Álvarez-Sala (Eds.), *Manual de Neumología Clínica* (pp. 117-132). Madrid, Spain: Ergón.



- Creer, T. L. (2008). Behavioral and cognitive processes in the self-management of asthma. *Journal of Asthma*, 45(2), 81-94. doi: 10.1080/02770900701247236.
- Fasciglione, P., & Castañeiras, C. (2007). Asma bronquial hoy: una perspectiva psicosocial. *Archivos de alergia e inmunología clínica*, 38(1), 12-18.
- Fernández-Rodríguez, J. C. (1997). Perfiles de ansiedad en asmáticos a través del ISRA. *Boletín de la Sociedad Española para el Estudio de la Ansiedad y el Estrés*, 7, 12-22.
- Fernández-Rodríguez, J. C. (2012). The experience and expression of anger and anxiety in bronchial asthma patients. *Anuario de Psicología*, 42(2), 213-225.
- Fernández-Rodríguez, J. C. (2013). Rinitis y factores psicológicos. Estado de su relación. *Escritos de Psicología*, 6(1), 14-19. doi: 10.5231/psy.writ.2012.2709
- Fernández-Rodríguez, J. C. (2014). Estudio de la depresión en el asma bronquial a través del triple sistema de respuesta. *Anuario de Psicología*, 44(1), 21-29.
- Fernández-Rodríguez, J. C. (2017). State of the Relationship between Bronchial Asthma and Psychological Factors. *Annals of Clinical and Laboratory Research*, 5(4), 204. doi: 10.21767/2386-5180.1000204
- Fernández-Rodríguez, J. C. & García, C. G. (2013). Presencia de factores psicológicos en pacientes con asma bronquial. *Revista Iberoamericana para la Investigación y el Desarrollo Educativo*, 10, 1-20.
- Fernández-Rodríguez, J.C. & Miralles, F. (2015). Presence of depression in patients with asthma and its influence on their families. *Anuario de Psicología*, 45(3), 361-374.
- Han, Y. Y., Forno, E., Marsland, A. L., Miller, G. E., & Celedón, J. C. (2016). Depression, asthma, and bronchodilator response in a nationwide study of US Adults. *The Journal of Allergy and Clinical Immunology: In Practice*, 4(1), 68-73. doi http://dx.doi.org/10.1016/j.jaip.2015.10.004
- ISAAC (2015). *International Study of Asthma and Allergies in Childhood*. Retrieved from <http://isaac.auckland.ac.nz/>
- Jiménez García, G. I. (2004). *La depresión desde una perspectiva tridimensional: elaboración de un instrumento de medida*. Tesis Doctoral. Madrid, España: Universidad Complutense de Madrid.
- Kaugars, A. S., Klinnert, M. D., & Bender, B. G. (2004). Family influences on pediatric asthma. *Journal of Pediatric Psychology*, 29(7), 475-491.

- Kotses, H. & Creer, T.L. (2010). Asthma, self management. In Harver A, Kotses H, editors. *Asthma, Health & Society. A Public Health Perspective* (p. 117-140.). New York, USA: Springer
- Krauskopf, K. A., Sofianou, A., Goel, M. S., Wolf, M. S., Wilson, E. A., Martynenko, M. E., ... & Wisnivesky, J. P. (2013). Depressive symptoms, low adherence, and poor asthma outcomes in the elderly. *Journal of Asthma*, 50(3), 260-266.
- Martín, R. (2008). *Estudio de las variables psicológicas, calidad de vida e intervención psicoeducativa en el asma bronquial infantil* (Doctoral Dissertation). Universidad de Salamanca, Salamanca, Spain. Retrieved from [http://gredos.usal.es/jspui/bitstream/10366/22516/1/DOGP\\_Estudio%20variables%20psicologicas%2c%20calidad%20de%20vida.pdf](http://gredos.usal.es/jspui/bitstream/10366/22516/1/DOGP_Estudio%20variables%20psicologicas%2c%20calidad%20de%20vida.pdf)
- McFadden Jr., E. R., Luparello, T., Lyons, H. A., & Bleecker, E. (1969). The mechanism of action of suggestion in the induction of acute asthma attacks. *Psychosomatic Medicine*, 31(2), 134-143.
- Miguel-Tobal, J. J., & Cano-Vindel, A. (1994). *Manual del Inventario de Situaciones y Respuestas. ISRA. Tercera edición revisada con la inclusión de estudios psicométricos y nuevos baremos*. Madrid, Spain: TEA.
- Miguel-Tobal, J. J., Cano-Vindel, A., Casado, M. I., & Spielberger, C. D. (2001). *Inventario de Expresión de la Ira Estado-Rasgo, STAXI-2./State-Trait Anger Expression Inventory. STAXI-2*. Madrid, Spain: TEA.
- Moes-Wójtowicz, A., Wójtowicz, P., Postek, M., & Domagała-Kulawik, J. (2012). Asthma as a psychosomatic disorder: the causes, scale of the problem, and the association with alexithymia and disease control. *Polish Pneumology and Allergology*, 80(1), 13-19.
- Olazagasti, M. A. R., Shrout, P. E., Yoshikawa, H., Bird, H. R., & Canino, G. J. (2012). The longitudinal relationship between parental reports of asthma and anxiety and depression symptoms among two groups of Puerto Rican youth. *Journal of Psychosomatic Research*, 73(4), 283-288. doi: 10.1016/j.jpsychores.2012.07.006.
- Pateraki, E., & Morris, P. G. (2018). Effectiveness of cognitive behavioural therapy in reducing anxiety in adults and children with asthma: A systematic review. *Journal of Asthma*, 55(5), 532-554. doi: <https://doi.org/10.1080/02770903.2017.1350967>

- Raymond, K. P., Fiese, B. H., Winter, M. A., Knestel, A., & Everhart, R. S. (2012). Helpful hints: caregiver-generated asthma management strategies and their relation to pediatric asthma symptoms and quality of life. *Journal of Pediatric Psychology, 37*(4), 414-423. doi: 10.1093/jpepsy/jss001
- Ritz, T., Meuret, A.E., Trueba, A.F., Fritzsche, A. & Von Leupoldt, A. (2013) Psychosocial factors and behavioral medicine interventions in asthma. *Journal of Consulting and Clinical Psychology, 81*(2), 231-250. doi: 10.1037/a0030187.
- Rosenkranz, M. A. (2007). Substance P at the nexus of mind and body in chronic inflammation and affective disorders. *Psychological Bulletin, 133*(6), 1007.
- Sastre, J., Crespo, A., Fernandez-Sanchez, A., Rial, M., Plaza, V. (2018). Anxiety, Depression, and Asthma Control: Changes After Standardized Treatment. *The Journal of Allergy and Clinical Immunology: In Practice*. In press. doi: <https://doi.org/10.1016/j.jaip.2018.02.002>
- Sicouri, G., Sharpe, L, Hudson, J.L., Dudeney, J., Jaffe, A., Selvadurai, H., Lorimer, S. & Hunt, C. (2017). Threat interpretation and parental influences for children with asthma and anxiety. *Behaviour Research and Therapy, 89*(1), 14-23. doi <http://dx.doi.org/10.1016/j.brat.2016.11.004>
- Suárez, L., Huerta, J. G. & Del Olmo, H. (2010). Aspectos psicológicos del asma. *Alergia, Asma e Inmunología Pediátricas, 19*(1), 18-22.
- Urrutia, I., Aguirre, U., Pascual, S., Esteban, C., Ballaz, A., Arrizubieta, I., & Larrea, I. (2012). Impact of Anxiety and Depression on Disease Control and Quality Of Life in Asthma Patients. *Journal of Asthma, 49*(2), 201-208. doi: 10.3109/02770903.2011.654022.
- Urrutia, I., Aguirre, U., Sunyer, J., Plana, E., Muniozguren, N., Martínez-Moratalla, J.,... Maldonado, J.M.. (2007). Cambios en la prevalencia de asma en la población española del Estudio de Salud Respiratoria de la Comunidad Europea (ECRHS-II). *Archivos de Bronconeumología, 43*(8), 425-430.
- Vidal, A., & Matamala, M. (2013). Asma infanto-juvenil y trastornos psiquiátricos. *Revista chilena de enfermedades respiratorias, 29*(1), 14-23. doi: <http://dx.doi.org/10.4067/S0717-73482013000100003>
- World Health Organization (2015). *Enfermedades respiratorias crónicas. Programas y proyectos*. Retrieved from <http://www.who.int/respiratory/asthma/es/>

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