

# Therapeutic compliance among asthma patients in an allergy clinic: third evaluation (SEGARIA Project)

A. Campos, J. Reyes and M. Torres

Hospital Universitario La Fe. Valencia. Spain.

---

## ABSTRACT

*Objectives:* To perform a third evaluation of therapeutic compliance in asthma patients managed in our department by using identical methodology to that employed in two prior evaluations (1995 and 1993). To study the possible association between correct inhalation technique and the patient's degree of knowledge about asthma.

*Material and methods:* A random sample with a fixed rate was obtained, comprising 54 adult patients with asthma (aged more than 18 years old) managed in our department in an outpatient regime.

Patients who reported that they habitually failed to comply with the treatment duration, the number of dosage times per day, or the dose at each specific dosage time were classified as noncompliers with the medication in question. The study was performed during October and November, 2003. First visits were excluded. The same categories of medications and procedures as those employed in the 1993 and 1995 studies were used.

*Results:* Of the 54 patients studied, 19 % revealed some type of pharmacological noncompliance. The overall percentage of incorrectly used medication was 8 %. Among noncompliers, clinical course was poor in 44 % and additional visits to specialists or the

emergency room were required in 45 %. Incorrect use was most frequent with the turbuhaler (32.1 %), and faulty technique was also most common with this device (67.9 %).

*Conclusions:* In this evaluation, overall therapeutic compliance was clearly better than that in 1995 (81 % compared with 54 %), indicating a positive tendency over time. These results were more positive than those reported in the scientific literature on therapeutic compliance. Nevertheless, correct inhalation technique was markedly less frequent than in our previous studies.

The most incorrectly used pharmacological groups continue to be the controller medications. A non-significant tendency among noncompliers to require more additional visits and to have worse clinical course and less knowledge about their disease than compliers was maintained.

This type of evaluation continues to be useful in the clinical monitoring of therapeutic compliance in daily clinical practice.

**Key words:** Therapeutic compliance. Inhalation technique. Asthma. Allergy. Disease.

---

## Correspondence:

A. Campos  
Hospital Universitario La Fe  
Avda. Campanar, 21  
46019 Valencia. Spain  
E-mail: campos\_ang@gva.es

## INTRODUCTION

The suitable compliance with the treatment orders (TC) prescribed for patients continues to be a crucial question in the handling of patients with chronic diseases such as what occurs in the case of bronchial asthma. It has been postulated as an influential factor in the clinical evolution in the form of an increase in morbimortality<sup>1</sup>.

**Table I**

**Questionnaire about the knowledge of the asthma disease**

- 
1. Asthma can be present even when one does not feel breathlessness or fatigue:  
I agree                      I disagree                      I don't know
  2. Some medications for asthma must be maintained for months although there are no crisis of fatigue or breathlessness  
I agree                      I disagree                      I don't know
  3. The primary objective in an asthma treatment is to prevent the causes or allergens if this is possible  
I agree                      I disagree                      I don't know
  4. Tobacco has absolutely no influence in the evolution of asthma  
I agree                      I disagree                      I don't know
  5. What have you been recommended to take if you have a crisis of fatigue or breathlessness? Please write it here
- 

The underlined answers in each question correspond to the answers considered to be correct.

---

**Table II**

**Structured Oral Questionnaire variation of the Morkinsky Green Levine test**

- 
- Some patients forget their medications: Does something similar happen to you?
  - Some patients stop taking their medications when they feel better: Does something similar happen to you?
  - Have you felt bad due to a prescribed medication? Did you abandon the medication?
  - Has your doctor changed any medication for you?
- 

The patient's own clinical evolution can occur with long asymptomatic periods and on the other hand, the characteristics of some "maintenance" medications, such as anti-inflammatory drugs without immediate perception in their effects, which induces a certain relaxation in the TC maintenance<sup>2</sup>.

Excluding the specific case of clinical tests, it assumes that the TC in clinical practice, understood as the suitability of the unit doses, daily rate, and their duration in time, can be situated for approx. 50 % of the patients, according to the published series<sup>3,4</sup>.

In 1993 and 1995, we carried out the aforementioned studies<sup>5,6</sup> designed to analyze the pharmacological compliance of asthma patients controlled in the outpatient visits to our department, where it was observed that 70 % and 51 % of the patients in the sample failed to comply with the prescribed treatment.

Another relevant factor in the clinical evolution is the correct performance of the technique for the different inhalatory therapy devices<sup>7,8</sup>. Although it must be said in relation to the degree of the patient's own awareness of his disease, so that he/she assumes a greater knowledge about the suffered process consequently resulting in a better therapeutic compliance.

Thus we propose it as a primary objective to evaluate the TC of our patients in the daily clinical practice and its breakdown by pharmacological groups in asthma patients controlled in our department. As a secondary objective, we plan to correlate the TC with the asthma patient's degree of knowledge about his illness as well as with the inhalatory technique.

**MATERIAL AND METHODS**

This involves a descriptive cross-section study. An identical methodology was followed for the studies performed in 1993 and 1995<sup>5,6,8</sup>. The procedure basically consisted in a random sample with a fixed rate (first and third patient of each day) comprised by 54 adult asthma patients (above the age of 18) controlled in our department in an outpatient regime in order to detect and quantify the degree of compliance with the different pharmacological groups prescribed in relation to their bronchial asthma and occasionally their accompanying rhinitis. It also evaluated the inhalatory technique and the asthma patient's degree of knowledge about his illness (table I).

The study was carried out from October to November 2003 and the selected sample included the asthma patients reviewed in outpatient clinics in at least two occasions, corresponding to all the doctors of the department. First visits were excluded from the study due to the difficulty to objectify the treatment prescribed by doctors from other hospitals.

Patients were invited during the habitual medical interview to declare their pharmacological compliance by means of a structured oral test inspired by the Morinsky Green Levine<sup>9</sup> test for the control of arterial hypertension, which appears in table II, used in prior evaluations.

A non-complying patient for the medication in question was considered in the cases in which the patient admitted that he/she habitually failed to comply with the duration of the treatment, the number of dosage times per day, or the dose at each specific dosage time in relation to the treatment recorded in his/her medical history.

The same medication categories were used as those employed in the 1993 and 1995 studies. Additional parameters were collected, such as the clinical evolution (good or not good) according to the criteria

**Table III**  
**Description of the steps of the inhalatory technique**

Steps	Pressurized Inhaler	Turbuhaler	Accuhaler
1	Remove mouthpiece and shake container	Remove the white cap	Open the Inhaler
2	Apply the inhaler to the lips or at 5 cm with mouth open	Verify that it is not empty	Verify that it is not empty
3	Exhale slowly	Load dose in two counterclockwise turns	Slow exhalation
4	Simultaneously inhale and press	Fit the device to the lips	Apply the nozzle to the lips
5	Hold breath and inhale (minimum 4 seconds)	Energetic Inhalation	Inhale deeply
6		Hold breath	Maintain breathing approx. 5 seconds
7		Exhale outside of the device	Exhale slowly

of the responsible doctor, additional visits to emergency rooms, specialists from other hospitals and admissions due to problems related to their bronchial asthma, and the patient's degree of knowledge about bronchial asthma based on a questionnaire with four questions (table I), in a way which considered that the patient knew about his/her own disease if he/she responded in a correct way to all of them.

With regards to the inhalatory technique, it considered that the patient carried it out in a correct way when he did not fail in any of the steps which are shown in table III, in accordance with the manufacturer recommendations of the device. It collected the total number of erroneous steps and the ones which were incorrectly performed by the patient.

The statistics package, SPSS® v11.0 for Windows® was used in the analysis.

The description of the variables was performed by means of percentages with a confidence interval of 95 %. A chi-square was used for the comparison of the proportions, previously verifying the normality of the variables and the homogeneity of the variances by means of the Levene test.

## RESULTS

The mean age of the patients was 45.1 (Standard Deviation [SD] of 16.7). The mean evolution of the asthma disease was 17.6 years (SD 11.6), where 64.8 % were female and 35.2 % were male.

Of the 54 patients studied, 19 % revealed some type of pharmacological non-compliance. The percentage of incorrectly-used medication in this study was 8 %.

Table IV describes the percentage of non-compliance broken down in pharmacological groups in 1993, 1995, and 2003.

**Table IV**  
**Percentage of non-compliance according to pharmacological groups. Statistical comparison by years**

	1993	p	2003	p	1995
Beta-agonists, inhaled	2	n.s.	4	n.s.	2
Chromones, inhaled	67	< 0.05	0	< 0.05	38
Steroids, inhaled	40	< 0.05	12	< 0.05	44
Beta-agonists, dry power	12		–		10
Steroids, orally	8	< 0.05	0	< 0.05	12
Specific immunotherapy	2	n.s.	0	< 0.05	10
Theophylline, orally	16		–		17
Steroids, nasal way	62	< 0,05	17	< 0,05	42
Chromons, nasal way	72		–		–
Antihistaminics	22	< 0.05	5	< 0.05	25
Beta-agonists, long lasting	–		10	< 0.05	33

–: non available dates; n.s: non significative.

44 % of the non-complying patients had a bad clinical evolution according to the doctor criteria, compared with 13.3 % who had good TC. 45 % of the non-complying patients required additional visits to specialists or to the emergency rooms compared with 22.2 % of patients who correctly complied with the treatment. Of the total of additional visits, 11.1 % were admitted to hospital; 22.2 % made visits to the emergency room, and 66.7 % clinical visits to specialists.

Table V describes the percentages of patients that presented a bad clinical evolution of their disease and additional visits to emergency rooms, specialists from other hospitals, and admissions due to problems related to their bronchial asthma; as well as the percentage of patients that knew about their disease and those that incorrectly performed the inhalatory technique based on their good or bad TC.

**Table V**

**Clinical evolution and inhalatory technique in complying and non-complying patients**

	Bad evolution (%)	Additional visits (%)	Know the disease (%)	Wrong technique (%)
Bad TC	44	45	14,8	14,8
Good TC	13,3	22	50	48,2

**Table VI**

**Percentage of non-compliances and bad technique according the prescribed device**

Device	Prescription	Non-compliance	Bad technique
Pressurised inhaler (MDI)	55,2	10,3	50
Turbuhaler	26,7	32,1	67,9
Accuhaler	18,1	21	42,1

**Table VII**

**Percentage of failures in the steps of inhalatory technique**

Step	Failure (%)
1	7,4
2	3,6
3	16
4	1,8
5	30,4
6	26,8
7	14,3

The percentage of failures in the inhalatory technique and non-compliances by the prescribed device are described in table VI.

31.5 % of the patients failed in only one step, 25.9 % failed in two, and the remainder failed in three or more steps. Table VII shows the percentage of failures in different steps of the inhalatory technique. The greatest percentage of failures in the inhalatory technique are registered in both the post-inhalation apnea and in the energetic inhalation after fitting the device to the lips.

**DISCUSSION**

This study shows a decrease in the historical tendency of the degree of non-compliance by the pa-

tient and the number of incorrectly-used medications in relation to the years 1993 and 1995. We have changed from 70 % in 1993 and 51 % in 1995 to the current 19 %. If we compare the percentage of current incorrectly-used medications with those of 1993 and 1995, we find the current 8 % as opposed to 35 % and 20 % respectively, where the differences for both the non-compliance by the patient as well as the incorrectly-used medications are statistically significant ( $p < 0.05$ ).

Given that therapeutic non-compliance is situated between 40 % and 92 % (10.4) for bronchial asthma, we can consider that we have good pharmacological compliance.

In relation to the incorrectly-used pharmacological groups, it detected a major statistical decrease for the steroids inhaled in dry powder form, the nasal steroids, and the long-lasting beta adrenergics.

It seems to observe, although without statistical meaning, a greater proportion of additional visits both to emergency rooms as well as to specialists in the patients that fail to comply with the pharmacological treatment. This fact can possess an interesting "tracer" relevance for individual cases. In a way which supports the empirical idea, above all for patients with a bad clinical evolution, the TC must be guaranteed in the first place.

Paradoxically, there is a significant statistical dissociation between the good TC and the correct performance of the inhalatory technique, which in our case, seems to get worse with the passage of time. One possible explanation can consist in the attention that we dedicate to this topic with our patients. This could mean that in daily practice, we have interiorized the systematic revision of the TC and we probably devote less attention to the verification of the inhalatory technique.

If we compare the inhalatory technique of the current study with that of 1995, 62.9 % of the studied patients incorrectly performed the inhalatory technique, as opposed to 44 % of the patients in 1995, where there is a significant statistical difference,  $p < 0.05$ .

Flor et al<sup>11</sup> detected that 53.9 % of the patients performed an incorrect technique, where the manoeuvres with the greatest percentage of error, the exhalation prior to the inhalation, the maintenance of the post-inhalation apnea, and the slow exhalation after the inhalation.

Finally, as we concluded in previous studies, we consider that the evaluation of the TC and the inhalatory technique form a part of the habitual clinical follow-up protocol for asthma patients.

## REFERENCES

1. Horn CR, Clark TJ, Cochrane GT. Compliance of inhalatory therapy and asthma morbidity. *Respir Med.* 1990;1:67-70.
2. Kim C, Feldman HI, Joffe M, Tenhave T, Boston R, Apter AJ. Influences of earlier adherence and symptoms on current symptoms: A marginal structural models analysis. *J Allergy Clin Immunol.* 2005;115:810-4.
3. Coutts JA, Gibson NA, Paton JY. Measuring compliance with inhaled medication in asthma. *Arch Dis Child.* 1992;67:332-3.
4. Primer on Indicator development and application measuring quality in health care. Illinois Joint Commission on Accreditation of Healthcare Organizations, 1990.
5. Campos A, Giner A, Alamar R, Castelló JV, García I, Hernández D, Basomba A. Cumplimiento terapéutico de asmáticos en una consulta de alergia (Proyecto Segaria). *Rev Esp Alergol Immunol Clin.* 1996;11:101-5.
6. Campos A, García I, Giner A, Díaz MA, Peris A, Hernández D, Montoso J. Estudio de la adherencia al tratamiento en asmáticos: 2.ª evaluación (Proyecto Segaria 1993-1995). *Rev Clin Asistencial.* 1996;11:215-9.
7. Carrión Valero F, Maya Martínez M, Fontana Sanchis I, Díaz López J, Marín Pardo J. Técnica de inhalación en los pacientes con enfermedades respiratorias crónica. *Arch Bronconeumol.* 2000;36:236-40.
8. Campos A, Díaz MA, Muñoz MP, Liñana JJ, Martínez M, Lanuza MD. Assessment of the inhalatory technique in asthmatic patients: a comparative study of three aerosol devices. *Allergol et Immunopathol.* 1998;26:47-51.
9. Morinsky, et al. Concurrent and predictor validity of a self report measure of medication adherence. *Med Care.* 1986;1: 67-74.
10. Zora JA, Lutz CN, Tinkelman PG. Assessment of compliance in children using inhaled beta adrenergic. *Ann Allergy.* 1989;62: 406-9.
11. Flor Escriche X, Rodríguez Mas M, Gallego Álvarez L, et al. ¿Siguen utilizando incorrectamente los inhaladores nuestros pacientes asmáticos? *Aten Primaria.* 2003;32:269-75.