



Letter

Adherence to immunotherapy in times of financial crisis

Studies on adherence to allergen immunotherapy (IT) show that patients and clinicians blame high cost, inconvenience, and lack of efficacy for nonadherence to treatment.^{1–5} The Spanish National Health System covers part of the cost of medication (40%) if the patient is working or the total cost if the patient is retired. The covered portion of medication costs includes the cost of IT. The world recession has affected many countries (Spain more intensely than others) and has reduced purchasing power. We present the results of a retrospective study comparing 1-year adherence to IT before the start of the recession (pre-recession group) and after the start of the recession (post-recession group) in a public hospital in the center of Spain with a catchment population of 250,000 inhabitants.

According to the estimated date of start of the global economic crisis (2007–2008), the pre-recession group comprised patients ($n = 199$) who attended our consults for the first time from January 1 to December 31, 2006, and were prescribed IT at their first visit, or at the following visit once the appropriate diagnostic tests had been

performed. Adherers were defined as those who annually attended their appointments and took their treatment according to the regimen (usually perennial) recommended by the physician. The post-recession group comprised patients ($n = 206$) who were evaluated at their first visit from January 1 to December 31, 2010 (ie, 2 years after the start of the recession), following the same selection criteria as for the pre-recession group. Two different types of statistical analysis were performed: the first, a univariate analysis using the χ^2 test, which compared the 2006 with the 2010 group at the onset of IT and after 1 year of treatment. In a second step, a multivariate logistic regression analysis was carried out to identify the best combination of independent factors associated with each subgroup of patients. Table 1 shows the main characteristics of pre-recession vs post-recession patients among the whole group of patients and among the adherers after 1 year of follow-up. No significant differences ($P > .05$, using the χ^2 test) were observed either at the beginning of IT or at 1-year adherence between pre-recession vs post-recession patients regarding sex, age, social

Table 1
Patients' characteristics and adherence

	Onset			Adherence after 1 Year ^a		
	Pre-recession Group, 2006 ($n = 199$)	Post-recession Group, 2010 ($n = 206$)	<i>P</i>	Pre-recession Group, 2006 ($n = 156$)	Post-recession Group, 2010 ($n = 139$)	<i>P</i>
Sex			NS			NS
Male	120 (60)	124 (60)		98 (63)	85 (61)	
Female	79 (40)	82 (40)		58 (37)	54 (39)	
Age (median, range)	22.3 (5–63)	21.1 (4–69)	NS	21.6 (5–63)	19.7 (4–69)	NS
<12 years	53 (27)	66 (32)		50 (32)	52 (37)	
≥12 years	146 (73)	140 (68)		106 (68)	87 (63)	
Social security status			NS			NS
Normal	184 (92)	196 (95)		142 (91)	132 (95)	
Pensioner	15 (8)	10 (5)		14 (9)	7 (5)	
Diagnosis			NS			NS
Rhinitis	9 (5)	19 (9)		5 (3)	11 (8)	
Rhinitis & asthma	182 (91)	180 (87)		145 (93)	122 (88)	
Anaphylaxis (hymenoptera)	8 (4)	7 (4)		6 (4)	6 (4)	
Type of IT						
Subcutaneous	143 (72)	118 (57)	.002	105 (67)	78 (56)	.04
Sublingual	56 (28)	82 (40)	.013	51 (33)	57 (41)	NS
Oral	0 (0)	6 (3)	.03	0	4 (3)	.04
IT composition						
Pollen	182 (91)	167 (81)	.002	144 (92)	113 (81)	.005
Molds	5 (3)	18 (9)	.007	4 (3)	13 (10)	.013
Dust mites	2 (1)	3 (1.5)	NS	1 (<1)	2 (1)	NS
Epithelium	2 (1)	11 (5)	.013	1 (<1)	5 (4)	NS
Hymenoptera venom	8 (4)	7 (3.5)	NS	6 (4)	6 (4)	NS

Abbreviations: IT = immunotherapy; NS = not significant.

Results expressed as number of cases and percentage in brackets.

^aSignificant differences were found for adherence after 1 year, which was poorer in the post-recession group: 156/199 (78%) vs 139/206 (67%), $P = .01$.

Disclosures: Authors have nothing to disclose.

Table 2
Immunotherapy costs and income per person in Spain

	Year 2006	Year 2010	Increase (%)
Price of IT ^a (median €, range)			
Subcutaneous	216 (193–228)	288 (202–346)	25
Sublingual	537 (426–653)	653 (478–753)	17.8
Oral	NA	900 (530–1,275)	-
Annual income per person ^b (median €)	22,400	22,800	1.75

Abbreviations: NA = not commercially available.

^aPrice of 1-year treatment prior National Health System coverage. Results retrieved from the 5 top immunotherapy sellers in Spain.^bData obtained from the Spanish National Statistics Institute: <http://ine.es>.

security status, and allergic diagnosis. The route of IT most frequently prescribed to the whole group of patients was subcutaneous IT (64%), followed by sublingual IT (34%), the latter route being significantly more frequently used among patients younger than 12 years vs older than 12 years (81% vs 15%; $P < .001$). Pre-recession patients received subcutaneous IT more frequently vs post-recession patients (72% vs. 57%; $P = .002$), whereas both sublingual and oral IT were more frequently prescribed among the latter group (40% vs 28% and 3% vs 0%, respectively; $P < .03$). Regarding the specific vaccine composition, most patients (86%) received pollen IT, which was more frequently prescribed to pre-recession vs post-recession patients (91% vs 81%; $P = .002$); in turn, these latter patients received more frequently both molds and epithelium IT vs pre-recession cases (9% and 5% vs 3% and 1%, respectively; $P < .01$). Overall, 1-year adherence to IT was significantly greater among pre-recession vs post-recession patients (78% vs 67%; $P = .01$) and, more specifically, among those patients in whom sublingual IT was prescribed before vs after recession (91% vs 69%; $P = .003$). Nevertheless, among the adherers, a similar distribution of IT routes and compositions were observed in the pre-recession vs the post-recession group. Interestingly, a multivariate logistic regression analysis performed in the whole group of patients to identify potential factors associated with 1-year adherence to IT showed that not only the prescription of IT before the economic recession (odds ratio, 1.89; 95% confidence interval: 1.19–2.97; $P = .006$), but also patient age younger than 12 years (odds ratio, 3.06; 95% confidence interval: 1.72–5.45; $P < .001$), were independent factors associated with a better adherence to IT. The variables included in the model were the year in which IT was initiated (2006 vs 2010), age (<12 years vs >12 years), sex, social security status, together with route and composition of IT.

People try to save money in times of recession. In addition to the habitual reasons for nonadherence presented—high cost,

inconvenience, and lack of efficacy—the potential impact on adherence to IT related to dramatic changes in the economy in times of world crisis has not yet been addressed. In the present study, we show that patients who initiated IT before the development of the current global economic crisis have better adherence compared with those treated during the recession period. Spanish wages have not increased at the same rate as the cost of vaccines between 2006 and 2010 (Table 2). This imbalance, together with other causes such as the fear of losing one's job because of the loss of working hours, or the improved efficacy and availability of less expensive treatments (antihistamine and steroids),⁶ might explain, at least in part, the lower rate of adherence to IT among patients treated during the economic recession. Our results also show that children younger than 12 years have better adherence to IT compared with older patients. Because children more often receive sublingual IT vs other routes of IT (81% vs 19% in our series), the traditional association of better adherence to sublingual IT regarding other IT routes^{1,2} might most likely rely on the age of patients rather than the specific route employed for IT administration.

Given that the recession worsened in Spain in 2011 and 2012, greater nonadherence rates are expected in the coming years. Therefore, a careful selection of the patient and the type of IT, and new and alternative strategies—besides economic recovery—are mandatory if adherence is to improve.

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