Clinical Communications

Comparing allergic rhinitis treatments based on patient satisfaction: A MASK-air® study

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Clinical Implications

Medication satisfaction is higher in patients with allergic rhinitis using monotherapy than in those using comedication.

Patients' satisfaction with their treatment (medication satisfaction) is a patient-reported outcome measure.[1] Patients with allergic rhinitis (AR) use medications according to their symptoms and use comedication when feeling uncontrolled.[1] This may relate to medication satisfaction, because dissatisfied patients may increase their medication. Previous studies have compared satisfaction with AR medications[2,3]; however, none evaluated daily satisfaction or different individual medications. This can be achieved using mHealth tools retrieving direct patient data on a daily basis. For example, MASK-air includes a daily visual analogue scale (VAS) assessing AR medication satisfaction[4] and enabling a real-life assessment of patients' perceptions of their treatments.

Therefore, we aimed to assess the treatment satisfaction of patients with AR, by (1) comparing satisfaction with different medications when used in monotherapy *versus* in comedication, and (2) assessing the correlation between satisfaction with symptoms control, as assessed by symptoms VAS.

We performed an observational cross-sectional MASK-air study. MASK-air is a mobile app freely available on the Google Play and Apple App stores in 30 countries. It is a Good Practice of the Directorate-General for Health and Food Safety (European Commission) for digitally enabled, patient-centered care in rhinitis and asthma multimorbidity and a Best Practice of the Organisation for Economic Cooperation and Development for Public Health on integrated care for chronic diseases.[4] MASK-air includes a daily monitoring questionnaire in which users report (1) the impact of AR symptoms through 4 VASs (0-100 scale, with higher scores corresponding to a higher impact), (2) their daily medication use (from country-specific lists with prescribed and over-the-counter medications), and, when medication is reported, (3) their satisfaction with their AR treatment by means of a single VAS ("VAS satisfaction"; the question being, on 0-100 scale, "How satisfied are you with the rhinitis treatment that you took today?", with higher scores indicating higher satisfaction). This latter VAS was introduced in May 2023 and has been shown to have good validity and reliability.[5] We assessed MASK-air data from users older than 16 years with self-reported AR between May 2023 and June 2024. We analyzed all days on which patients reported having used intranasal antihistamines (INAHs), intranasal corticosteroids (INCSs), fixed combinations of INAHs + INCSs (considered as monotherapy), or oral antihistamines. Except for INAHs (due to small sample size for specific medications), we assessed common individual medications within each class. We compared medication classes and individual medications on VAS satisfaction levels, as well as on reported associated symptoms (VAS global allergy symptoms—"VAS global") under monotherapy or comedication. To better reflect patients' perspectives, monotherapy was defined as days

TABLE I. Characteristics of the assessed participants and of their reported days

Variable	Assessed sample
No. of days	44,034
No. of users (average days per user)	3,092 (14.2)
Sex: female, n (%)	1,794 (58.0)
Age (y), mean ± SD	36.1 ± 13.9
ARIA score, n (%)	
0	1,599 (73.5)
1	224 (10.2)
2	190 (8.6)
3	192 (8.7)
4	190 (8.6)
CSMS, median (IQR)	16.7 (20.6)
Immunotherapy, n (%)	251 (8.1%)
Medication classes used, no. of days (%)*	
INAHs	666 (1.5)
INCSs	18,870 (42.9)
INAHs + INCSs	9,345 (21.2)
OAHs	27,064 (61.5)
Medication use patterns, no. of days (%)	
Monotherapy	26,981 (61.3)
INAHs	177 (0.7)
INCSs	8,879 (32.9)
INAHs + INCSs	4,563 (16.9)
OAHs	12,118 (44.9)
Comedication	17,053 (38.7)
INAHs	489 (2.9)
INCSs	9,991 (58.)
INAHs + INCSs	4,781 (28.0)
OAHs	14,946 (87.6)

ARIA, Allergic Rhinitis and its Impact on Asthma; *CSMS*, combined symptom-medication score; *OAH*, oral antihistamine.

*The sum of the percentages is higher than 100%, because there were days on which comedication was used.

TABLE II. Levels of the VAS on treatment satisfaction and global allergy symptoms for each medication class in monotherapy *vs* comedication

	Treatment satisfaction			Median VAS global			Maximum VAS global		
Medication	Monotherapy	Comedication	Cohen's *d*	Monotherapy	Comedication	Cohen's *d*	Monotherapy	Comedication	Cohen's *d*
INAHs	52 (52)	75 (41)	0.68	31 (37)	32 (44)	0.04	47 (40)	57 (49)	0.33
INCSs	85 (29)	81 (31)	0.23	15 (24)	20 (31)	0.29	35 (45)	57 (44)	0.69
INAHs + INCSs	81 (28)	74 (53)	0.30	20 (24)	30 (52)	0.40	41 (40)	54 (43)	0.43
OAHs	82 (35)	79 (39)	0.14	20 (32)	33 (39)	0.14	50 (47)	58 (42)	0.25

OAH, Oral antihistamine.
Values are median (IQR) unless otherwise indicated.

when only 1 single drug formulation was reported, even if it contained multiple active compounds (eg, nasal azelastine-fluticasone, a fixed combination, was considered monotherapy). Comedication referred to days with 2 or more drug formulations for AR. Comparison between groups relied on effect sizes computed on the basis of standardized differences of medians (Cohen's *d*). We assumed that values between 0.2 and 0.5 correspond to small differences, values between 0.5 and 0.8 to moderate differences, and values more than 0.8 to large differences. For patients reporting more than 1 MASK-air monitoring questionnaire per day, we also computed the correlation between treatment satisfaction and symptom control assessed by changes in levels of VAS global, VAS nose, and VAS eye symptoms (ie, differences in postmedication and premedication VAS levels).

We studied 3092 users (44,034 days, 58.0% females; 36.1 ± 13.9 years) (Table I). Most days involved the use of monotherapy (N = 26,981; 61.3%).

In monotherapy, satisfaction was lower for INAHs (median, 52; interquartile range [IQR], 52) than for INCSs (median, 85; IQR, 29), INAHs + INCSs (median, 81; IQR, 28), and oral antihistamines (median, 82; IQR, 35) (Table II). For all classes except INAHs, comedication was associated with decreased satisfaction. For most individual medications (see Table E1 in this article's Online Repository at www.jaci-inpractice.org), comedication was associated with a decrease in treatment satisfaction. The largest differences in VAS satisfaction levels were between comedication and monotherapy for olopatadine-mometasone and fexofenadine (d = 1.16 and 0.90, respectively). Regarding symptoms, comedication was often associated with an increased median VAS global and always associated with an increased maximum VAS global (Table II).

VAS satisfaction levels were moderately correlated with a change in VAS global (−0.44; 95% CI, −0.66 to −0.14; P = .005), but weakly correlated with changes in VAS nose (−0.28; 95% CI, −0.55 to 0.04; P = .087) or VAS eye (−0.32; 95% CI, −0.58 to −0.01; P = .049) (see Table E2 in this article's Online Repository at www.jaci-inpractice.org).

Importantly, this is the first study to report daily medication satisfaction in AR. In summary, we found that there is a high level of satisfaction, particularly in patients reporting monotherapy. This accords with previous studies[2,3] and suggests that patients with AR who are unsatisfied with monotherapy may resort to the use of comedication. Previous MASK-air studies had found that comedication days were associated with poorer AR control when compared with days on monotherapy.[6,7] We also found a moderate correlation between satisfaction and change in global allergy symptoms, which further suggests that a reduction in satisfaction appears to partly explain that unsatisfied patients increase their medications. Finally, we found that although medication satisfaction and global symptoms are moderately associated, there is weak correlation between satisfaction and changes in VAS nose or VAS eye levels. This suggests that medication satisfaction is a patient-reported outcome measure different from symptom control.[1]

This study has some limitations. First, patterns of medication use are influenced by patients' symptoms, particularly when comparing single medication to comedication. Consequently, the lower satisfaction observed on days when comedication was used does not necessarily indicate that comedication is less effective than single medication for AR; rather, it may reflect more severe baseline symptoms or less well-controlled AR. In addition, because VAS satisfaction was implemented only recently, the sample size was smaller than in previous MASK-air studies, especially for days involving INAH use and for analyses of individual medications. Moreover, we assessed satisfaction on a daily basis, rather than over an extended period. This is important to consider, because certain treatments, such as INCSs, have a slower onset of action and may be associated with lower satisfaction during the initial days of use, despite demonstrating effectiveness when evaluated over time.[8] Future studies may explore longitudinal trends in satisfaction to complement the insights provided by daily evaluations.

However, this study also has important strengths. This is the first study to assess medication satisfaction in patients with AR, providing complementary information on an outcome that is relevant from a patient perspective. In addition, all symptom VASs in the daily monitoring questionnaire of MASK-air have been validated.[9] Although VAS satisfaction in MASK-air has not had its properties assessed, previous studies outside the allergy field have shown that VAS on satisfaction displays good validity and reliability.[5]

In conclusion, patients with AR report higher medication satisfaction when using monotherapy compared with comedication.

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The MASK-air Think Tank: The members of the MASK-air think tank are to be acknowledged for having enrolled patients in the study (ie, for suggesting that their patients install and use the MASK-air app). These members include Josep M. Anto, Wienczyslawa Czarlewski, Tari Haahtela, G. Walter Canonica, Elisio M. Costa, Piotr Kuna, Maciej Kupczyk, Marek Kulus, Désirée E. Larenas-Linnemann, Renaud Louis, Nikolaos G. Papadopoulos, Frederico S. Regateiro, Nicolas Roche, Joaquin Sastre, Nicola Scichilone, Luis Taborda-Barata, Arunas Valiulis, Arzu Yorgancioglu, Rute Almeida, Rita Amaral, Ignacio J. Ansotegui, Karl C. Bergmann, Sinthia Bosnic-Anticevich, Fulvio Braido, Victoria Cardona, Lorenzo Cecchi, Claudia Chaves Loureiro, Cemal Cingi, Alvaro A. Cruz, Wytske J. Fokkens, Govert de Vries, Bilun Gemicioglu, Tomohisa Iinuma, Juan Carlos Ivancevich, Cristina Jácome, Igor Kaidashev, Helga Kraxner, Daniel Laune, Gilles Louis, Olga Lourenço, Mika Makela, Michael Makris, Mario Morais-Almeida, Ralph Mösges, Joaquim Mullol, Rachel Nadif, Robyn O'Hehir, Yoshitaka Okamoto, Markus Ollert, Heidi Olze, Vincenzo Patella, Benoit Pétré, Francesca Puggioni, Jan Romantowski, Philip W. Rouadi, Sietze Reitsma, Daniela Rivero-Yeverino, Monica Rodriguez-Gonzalez, Ana Sá-Sousa, Marine Savouré, Faradiba S. Serpa, Mohamed H. Shamji, Aziz Sheikh, Charlotte Suppli Ulrik, Mikhail Sofiev, Milan Sova, Annette Sperl, Ana Todo-Bom, Sanna Toppila-Salmi, Ioanna Tsiligianni, Erkka Valovirta, Michiel van Eerd, Mihaela Zidarn, Hubert Blain, Louis-Philippe Boulet, Guy Brusselle, Roland Buhl, Denis Charpin, Thomas Casale, Tomas Chivato, Jaime Correia-de-Sousa, Christopher Corrigan, Frédéric de Blay, Stefano Del Giacco, Philippe Devillier, Mark Dykewicz, Alessandro Fiocchi, Mattia Giovannini, Ewa Jassem, Marek Jutel, Thomas Keil, Stefania La Grutta, Brian Lipworth, Alberto Papi, Jean-Louis Pépin, Santiago Quirce, Carlos Robalo Cordeiro, Maria J. Torres, Omar S. Usmani, Matteo Bonini, Brigita Gradauskiene, Christopher Brightling, Ivan Cherrez-Ojeda, Karla Robles-Velasco, Luigi Traetta, Apostolos Bossios, Liam Heaney, Michael Hyland, Celeste Porsbjerg, and Sabina Skrgat.

Conflicts of interest: J. Bousquet reports personal fees from Cipla, Menarini, Mylan, Novartis, Purina, Sanofi-Aventis, Teva, and Noucor, other fees from KYomed-Innov, and other fees from Mask-air-SAS, outside the submitted work. V. Kvedariene reports nonfinancial support from Norameda, Berlin CHemie Menarini, and Dimuna, outside the submitted work. T. Zuberbier reports personal fees from Amgen, AstraZeneca, AbbVie, ALK-Abelló, Almirall, Astellas, Bayer Health Care, Bencard, Berlin Chemie, FAES Farma, HAL Allergie GmbH, Henkel, Kryolan, Leti, L'Oreal, Meda, Menarini, Merck Sharp & Dohme, Novartis, Nuocor, Pfizer, Sanofi, Stallergenes, Takeda, Teva, UCB, Uriach, Abivax, Blueprint, Celldex, and Celltrion, outside the submitted work; and being Committee member, "Allergic Rhinitis and its Impact on Asthma," member of the Board, German Society for Allergy and Clinical Immunology (Deutschen Gesellschaft für Allergologie und Klinische Immunologie), Head, European Centre for Allergy Research Foundation, President, Global Allergy and Asthma Excellence Network, and member, Committee on Allergy Diagnosis and Molecular Allergology, World Allergy Organization. O. Pfaar reports grants and personal fees from ALK-Abelló, Allergopharma, Stallergenes Greer, HAL Allergy Holding B.V./HAL Allergie GmbH, Bencard Allergie GmbH/Allergy Therapeutics, Laboratorios LETI/LETI Pharma, Sanofi-Aventis and Sanofi-Genzyme, AstraZeneca, ASIT Biotech, LOFARMA, and GlaxoSmithKline (GSK); personal fees from ROXALL Medizin, Novartis, Med Update Europe GmbH, John Wiley and Sons, AS, Paul-Martini-Stiftung, Regeneron Pharmaceuticals, Inc, RG Aerztefortbildung, Institut für Disease Management, Springer GmbH, IQVIA Commercial, Ingress Health, Wort&Bild Verlag, Verlag ME, Procter&Gamble, ALTAMIRA, Meinhardt Congress GmbH, Deutsche Forschungsgemeinschaft, Thieme, AeDA, Alfried-Krupp Krankenhaus, Red Maple Trials, Inc, Königlich Dänisches Generalkonsulat, Medizinische Hochschule Hannover, ECM Expro&Conference Management, Technical University Dresden, Lilly, Japanese Society of Allergy, Forum für Medizinische Fortbildung, Dustri-Verlag, Pneumolive, Paul-Ehrlich-Institut, streamedup! GmbH, and Almirall, outside the submitted work; grants from Pohl-Boskamp, Inmunotek S.L., and Deutsche AllergieLiga e.V.; and being Vice President and member of the European Academy of Allergy & Clinical Immunology Excom, member of ext. Board of Directors Deutschen Gesellschaft für Allergologie und Klinische Immunologie; coordinator, main author, or coauthor of different position papers and guidelines in rhinology, allergology, and allergen immunotherapy; and associate editor of *Allergy and Clinical Translational Allergy*. B. Samoliński reports personal fees from Polpharma, TEVA, patient ombudsman, Polish Allergology Society, Viatris, and ADAMED, outside the submitted work; grants and personal fees from AstraZeneca, and grants from GSK. The rest of the authors declare that they have no relevant conflicts of interest, outside the submitted work.

Received for publication February 19, 2025; revised May 28, 2025; accepted for publication May 29, 2025.

Available online ■■

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2213-2198

https://doi.org/10.1016/j.jaip.2025.05.058

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ONLINE REPOSITORY

TABLE E1. Levels of the VAS on treatment satisfaction for each medication individually in monotherapy *vs* comedication

Medication	Monotherapy	Comedication	Cohen's *d*
Budesonide	85 (33) [512]	84 (28) [1094]	0.07
Fluticasone furoate	77 (32) [1679]	78 (29) [1922]	0.05
Fluticasone propionate	88 (22) [496]	85 (22) [890]	0.20
Mometasone furoate	87 (26) [5718]	81 (34) [5555]	0.35
Azelastine-fluticasone	81 (29) [4306]	74 (53) [4546]	0.30
Olopatadine-mometasone	87 (19) [257]	58 (45) [236]	1.16
Bilastine	81 (39) [2610]	81 (30) [2900]	0.00
Cetirizine	86 (39) [1496]	71 (42) [1599]	0.58
Desloratadine	80 (30) [2795]	78 (38) [3498]	0.09
Ebastine	76 (43) [1050]	84 (29) [1667]	0.36
Fexofenadine	95 (16) [542]	86 (22) [907]	0.90
Levocetirizine	84 (31) [1000]	87 (37) [1174]	0.20
Loratadine	76 (39) [528]	71 (40) [648]	0.16
Rupatadine	81 (30) [1659]	70 (70) [2430]	0.39

Values are median (IQR) [n] unless otherwise indicated.

TABLE E2. Repeated-measures correlation coefficient between the VAS on treatment satisfaction and the VAS on allergic symptoms

VAS	Correlation with VAS satisfaction, correlation coefficient (95% CI) [*P* value]
VAS global	−0.44 (−0.66 to −0.14) [.005]
VAS nose	−0.28 (−0.55 to 0.04) [.087]
VAS eye	−0.32 (−0.58 to −0.01) [.049]