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REVIEW

Self-Management in Allergic Rhinitis: Strategies, Outcomes and Integration into Clinical Care

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Abstract: Allergic rhinitis (AR) is a common disease, characterized by typical symptoms and type 2 inflammation. Standard treatment is usually effective and safe, and most medications are available as over-the-counter (OTC). Therefore, AR patients, mostly at the AR onset or if symptoms are mild, prefer to manage symptoms themselves. However, self-management could be associated with problems, including inadequate control or medication abuse. Therefore, this paper aimed at presenting and discussing this issue. Ideally, self-management should be conducted under medical supervision. In this regard, telemedicine could represent a valuable tool for implementing self-management. Visual analog scale (VAS) is a perfect parameter to measure symptom severity, medications use, and AR control. In addition, VAS is easily monitored over time. Presently, a mobile application allows to AR patients of self-managing themselves. Therefore, mobile healthcare may supply fundamental support in communication and decision-making. In this regard, VAS represents the best tool to monitor symptoms' severity and control over time. Finally, pharmacological and non-pharmacological remedies are numerous and effective but should be used wisely.

Keywords: allergic rhinitis, self-management, mobile healthcare, visual analog scale, symptoms

Introduction

Allergic rhinitis (AR) is a nasal disease driven by type 2 inflammation.[1] Type 2 inflammation accounts for symptoms, including itching, sneezing, watery rhinorrhea, and congestion.[2] In particular, nasal obstruction reflects the underlying type 2 inflammation and is the key symptom of hay fever.[3] However, AR symptoms typically and quickly accomplish the exposure to inhalant allergens.[4]

Allergic rhinitis is a relevant medical condition as it is prevalent, accounts for a significant burden, and affects the quality of life. Namely, some countries have an AR prevalence of up to 50%.[5] The socio-economic cost is substantial, as it may arrive at 50 billion/year in the European Union.[6] Moreover, even if AR is not a severe disease, the quality of life is profoundly impaired.[7]

The most relevant allergens causing AR include pollens (ie, grass, tree, and weed), indoor allergens (ie, house dust mites and pets), and molds; their presence and distribution depend on geography and climate.[8]

Two main classifications categorize AR: the old classification considers the seasonal and perennial AR (based on symptom duration), the recent classification, recommended by the Allergic Rhinitis and Impact on Asthma (ARIA) guidelines, includes intermittent and persistent also considering symptom severity, eg, mild or moderate/severe.[9]

There is extensive evidence that AR is commonly associated with other allergic diseases, mainly conjunctivitis and asthma.[10] Notably, this multimorbidity, associated with the common polysensitization, significantly affects the severity of allergic rhinitis.[11,12]

The diagnosis of AR is based on a detailed history, testing for allergen-specific IgE, and consistency.[13] In addition, the severity of type 2 inflammation could be detected and monitored by investigating eosinophils in the mucosa or blood.[14]

The treatments for AR include patient education and engagement, allergen avoidance, drugs, non-pharmacological remedies, allergen immunotherapy, and, in selected patients, surgery.[15] First, however, it has to be underlined that antiallergic

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medications are usually adequate. Still, the adherence rate is poor, meaning closer patient involvement is indispensable, as will be analyzed below.

Education is the first cornerstone of AR management and is fundamental to achieving optimal patient engagement that can assure perfect adherence to prescribed and shared strategies.[16]

Allergen avoidance could be ideal for allergic patients, as any symptom may arise without allergen exposure. Unfortunately, except in a few cases, it is almost always an impassable road because exposure is practically inevitable for most allergens.[17]

Concerning pharmacological options, oral and intranasal antihistamines, intranasal corticosteroids, and fixed combination intranasal antihistamines and corticosteroids represent the first-line treatments.[15–18] The outcomes on practical aspects of AR management were derived from the GRADE-based guidelines and real-world studies.[19] In particular, real-life studies reported that patients prefer oral medications, combined intranasal corticosteroids and antihistamines are potent treatments that act between 10 and 60 minutes, and patients prefer symptomatic (on-demand) treatment to a continuous schedule.[4]

Non-pharmacological remedies include nasal lavage with saline solutions (isotonic or hypertonic), nutraceuticals, probiotics, and natural compounds.[20]

Allergen immunotherapy (AIT) is presently the only treatment that targets the cause of AR as it is allergen-specific, modifies the natural course, has long-lasting effects, dampens type 2 inflammation, and restores a physiological T regulatory function.[13] However, AIT is expensive, requires long periods of administration (at least three years), adverse reactions (even if usually local, mild, and self-resolving) are frequent, mainly for sublingual routes, and adherence is poor.[21]

As a result, AR patients are sometimes disoriented and prefer to manage their illness independently from the doctor. This attitude should require particular attention and a rethinking of the approach to AR. Indeed, the treatment for patients with AR should be personalized considering the phenotype, including symptom duration and severity, endotype, comorbidities, concomitant therapies, and personal preference.[4] In this regard, mobile technology and telemedicine may significantly improve the quality of care. Moreover, the COVID-19 pandemic further underscored the need to implement the traditional vision of medicine with new approaches based on a patient-center point of view. Consistently, self-management could significantly affect outcomes and adherence to treatments.

Strategies in Self-Management

Self-management of allergic rhinitis represents an actual modality of approaching this disease, bypassing real doctor's visits. Of course, self-management may present relevant biases, including inadequate disease control and inappropriate prescriptions. However, self-management may be performed in different ways: directly by patients independently acting, asking advice from relatives/friends, or interacting with healthcare providers (physicians, pharmacists, nurses). Some researchers investigated this issue in different settings.

Self-Management of Allergic Rhinitis: The Evidence in Pharmacy

Evidence shows that self-care and self-management may significantly improve adherence and reduce the disease burden.[22,23] In this regard, the World Health Organization (WHO) defined self-care as "activities that individuals, families, and communities undertake intending to enhance health, prevent disease, limit illness, and restore health".[24]

Medication knowledge and adherence are important characteristics of self-management, particularly understanding when and how to utilize prescription and over-The-counter (OTC) medicines.[22] Moreover, the availability of many drugs as OTC or without the need for a prescription, the non-reimbursement of many medications, and non-pharmacological remedies have reduced the recourse to doctors, saving time and costs. On the other hand, there is a growing awareness among primary care doctors, pharmacists, healthcare workers, and patients (and their relatives) that appropriate, cost-effective, and safe treatment is crucial to control AR.[25] Alike, self-management, including self-monitoring, reduces the need for follow-up visits.[22] In this scenario, the role of pharmacists is relevant in supporting AR patients.[26] In this regard, several studies investigated the role of pharmacists in AR self-management.

Kuehl et al surveyed 146 US patients with AR.[22] The survey used an online questionnaire including 13 practical questions. The primary outcomes consisted of assessing the use of medications for AR, prescribed or not by doctors, and interactions with doctors or pharmacists about them. The results showed that 53% of AR patients used both prescribed

drugs and OTCs (self-managed). In addition, most of these subjects (53%) discussed with their doctors the use and indications of the prescribed medications for AR. Usually, these subjects are repeatedly discussed with doctors about the prescriptions. However, refill prescriptions frequently (75%) occurred without a doctor visit. In addition, two-thirds of patients discussed non-prescription drugs with pharmacists. As a result, the authors concluded that most interactions occurred with pharmacists instead of doctors.

Carr and Yawn reviewed the primary care management of patients with AR considering using OTC drugs.[27] Namely, as several medications for AR are available as OTC, most patients (about two-thirds) self-manage before consulting a doctor. It depends on the perception that AR is not a severe disease. However, this review underlined that most patients believe that AR significantly affects the quality of life more than perceived symptoms. As a result, AR requires patients to be treated.

Moreover, although self-management could be effective, many AR patients prefer an interview with a doctor. Indeed, as several pharmacological classes are available, including antihistamines, decongestants, and nasal corticosteroids, several patients are confused. In addition, this review underscored that most patients do not know the effectiveness of intranasal corticosteroids but believe that these medications are unsafe. Therefore, the authors concluded that communication with AR patients should improve, involving healthcare providers in addition to doctors, also concerning the use of delivery devices for intranasal administration.[27]

Tan et al investigated the AR burden in an Australian community pharmacy and the possible opportunities for specific interventions.[28] The study used a questionnaire administered to the customers purchasing nasal treatments. The study included 296 participants: 70% self-managed AR using OTCs, and only 44% had a doctor's diagnosis of AR. Interestingly, the most common symptom was nasal congestion, and the most used drug was antihistamines. This finding suggested a suboptimal AR treatment as nasal congestion responds better to nasal corticosteroids.[29]

Moreover, one-third of subjects had persistent moderate-severe symptoms with a relevant impact on daily activities. Lastly, the drug choice usually was based on the subjective perception of drug efficacy. Therefore, the authors concluded that many patients were undertreated and needed a doctor visit.

Another Australian study investigated the possible factors influencing AR patients' choices in self-management.[30] The study analyzed the data of 41 AR patients. Quality of life was perceived as significantly impaired. The most critical factors driving AR management were: the general practitioners, pharmacists, and personal experience. However, the study demonstrated that many factors could influence the patient's decisions, but the role of healthcare providers (ie, doctors and pharmacists) remained relevant.

The same Australian group conducted a cross-sectional study in some community pharmacies of Sydney.[31] The study compared patients self-selecting medications and patients consulting a pharmacist. The study recruited 202 AR patients; 65% had a doctor's AR diagnosis and 70% self-selected drugs. These last subjects had moderate-severe symptoms most frequently, such as four times higher odds, and perceived low impact on their quality of life. The authors concluded that pharmacists should engage self-managing patients to discuss AR management.

A retrospective study in Singapore evaluated a community pharmacist-led AR management service based on patient assessment, personalized recommendations, and follow-up.[32]

The study included 45 customers, and 32 received at least one follow-up. At baseline, pharmacists recommended primarily oral antihistamines (33%), topical corticosteroids (29%), and non-pharmacological remedies (28%). The study highlighted that customers appreciated the role of pharmacists, but there needed to be more protected time and interest from customers.

Self-Management of Allergic Rhinitis in Primary Care

South-East Asian researchers considered the impact of the COVID-19 pandemic on AR management in primary care.[33] Namely, the COVID-19 pandemic significantly affected the healthcare system. It provided the opportunity to implement self-care and self-management due to the lockdown and reduced availability of healthcare resources. In addition, COVID-19 represented the ideal opportunity to use digital technology in Medicine, such as telemedicine. It is well known that limited access to physical visits promoted self-care strategies, including self-diagnosis, OTCs use, and

complementary therapies.[33] However, telemedicine allows real-time synchronous interaction between patients and healthcare providers that have been recognized to be an essential part of clinical practice by many doctors.[34]

Moreover, telemedicine consistently receives high patient satisfaction from allergic subjects.[35,36] In this regard, the MASK (Mobile Airways Sentinel Network) app is highly ranked by European and Asian AR patients, as reported further. Indeed, the MASK app is easily accessible, user-friendly, and compatible with AR self-management.[34] Moreover, the MASK app may be considered a system engaging, highly intuitive, and appealing.[37] In this regard, the benefits of mobile technology include the possibility of self-monitoring using an electronic diary, personalized feedback, and individual education on ideal approaches.[33] These aspects can implement self-management and adherence to treatments.[38]

Therefore, AR management in the real world is based on self-management, including continuous follow-up on symptom monitoring, education, allergen avoidance, and treatment adherence.[33] The self-management desirably entails a dynamic interaction with GPs.[39]

Usually, patients refer to their GPs when symptoms are acute, affect the quality of life, and self-medication (mainly OTCs) is ineffective.[40] In this setting, the definition of the patient profile allows the identification of the appropriate treatment.[40] However, primary care doctors need to be made aware of the importance of AR guidelines.[41] However, guidelines do not always reflect patients' real needs and real-life experiences.[8] As a result, there is a need to implement primary care awareness of the relevance of AR and its management and ensure close contact with patients using telemedicine in primary care practice.

Self-Management of Allergic Rhinitis Using a Designated App

The mobile airways sentinel network (MASK) app represents an information and communication technology system based on the patient; this application is available in the majority of European countries.[42–44] The application contains a list of all medications that have been adapted to each country and a colored visual analog scale to measure the AR control and treatment response. In addition, MASK is scaled by the EU European Innovation Partnership on Active and Healthy Ageing strategy with support from EU grants and the World Health Organization.[44,45] The MASK app allows daily monitor symptoms, also concerning the individual variability if present comorbidity. Indeed, AR patients with comorbidities present more severe symptoms.[46–48] Notably, ocular symptoms were most common in polysensitized patients.

Moreover, it has to be underlined that the MASK app (available on the web as MASK-air®) constitutes a Good Practice of digitally-enabled Health and digitally-enabled, integrated, person-centered care for patients with allergic rhinitis.[49,50]

Outcomes for Self-Management

In the era of patient-reported outcomes measures (PROMs), the subjective assessment of symptoms represents a mainstay in the present concept of patient-centered management, as recently outlined.[51–54] As a consequence, PROMs are also very fruitful in self-management.

Different measures have been proposed as PROMs in allergic rhinitis, including total and single symptom scores, visual analog scale (VAS), quality of life, and several questionnaires. However, only VAS seems suitable for AR self-management as patients can easily use it. Indeed, the other measures need the support of healthcare providers or questionnaire forms, which are unavailable at home.

VAS is a psychometric test considering the subjective (patient) perception of symptom severity. Historically, VAS was initially used to measure pain intensity, mainly in the emergency room setting.[55,56] However, VAS has been extensively used successively in patients with allergic rhinitis.[57] More than 500 studies have been performed using VAS in allergic rhinitis. The reasons for this popularity depend on its ease of being understood and executed, simplicity, clarity, and rapid compilation. Moreover, it may be used everywhere and anytime.

In particular, VAS of nasal obstruction perception is well correlated with objective measurement by rhinomanometry.[58] Also, VAS may identify an AR patient candidate for spirometry,[59] suggest a response to decongestion test in adults and adolescents,[60,61] and measures the use and effectiveness of treatments.[10,62,63] However, the best use of VAS in allergic rhinitis has been developed by the MASK project.

MASK-Air® App

The MASK-air® was designed to implement AIRWAYS-ICPs.[51] Furthermore, MASK-air® consists of a patient-centered app; it presently is available in 27 countries and 19 languages with around 35,000 users.[64] This intensive use made it possible to acquire much information on AR patients. In particular, there is evidence that AR patients are poorly adherent to treatment;[65] most patients use self-medications,[66] on-demand treatments,[67] and switch therapies.[68] Interestingly, MASK-air® use showed us that most patients do not accomplish doctors' prescriptions,[65,69] and oral antihistamines are the most used medications and inappropriately dispensed in the pharmacy.[70] Moreover, AR control is well correlated with medication use, such as when AR was uncontrolled, an increased number of drugs was taken.[66]

Consequently, the MASK-air® studies provided relevant, helpful information to modify the actual approach in managing AR, mainly concerning the relationship between patient and healthcare provider. In this context, considering and monitoring AR control is the cornerstone of AR management. Consistently, VAS allows us to measure the AR control grade as values < 5 expressed poor control.[71] However, the cut-off values have been re-identified, so defining complete AR control (VAS = 0), good control (VAS = 1–20), partial control (VAS = 21–35), and poor control (VAS > 35) as recently reported.[72] Also, there is evidence that changes in VAS, recorded by this app, may have altered treatment and other outcomes.[73]

In conclusion, digital support in managing AR patients is clinically relevant and supports self-management under medical supervision.

Integration into Clinical Care

As previously discussed, AR self-management represents a whole way of care in the real world. However, different scenarios may occur. Usually, at the onset of allergic rhinitis, the patient self-manages using preferably non-pharmacological remedies or OTCs or medications suggested by relatives/friends. If symptoms are moderate/severe, patients commonly take advice from pharmacists or report to primary care doctors. Secondly, if AR is uncontrolled, primary care doctors or patients consult a specialist (an allergist or a rhinologist). However, most patients continue to autonomously self-manage themselves or, under medical supervision, self-manage.

Self-management is possible thanks to the availability of effective remedies and, preferably, also using mobile technology. In addition, there is awareness from physicians that education and communication are basilar requirements to manage AR.[74] However, adequate self-management requires adequate literacy by patients.[75,76] Namely, appropriate self-medication requires adequate knowledge of the indications for various treatments, which is rarely the case in reality.

On the other hand, the remedies for AR are extremely numerous, and it may be disorienting patient choice. Therefore, classically, remedies may be classified as pharmacological and non-pharmacological.

Non-pharmacological remedies include nasal saline lavage (using isotonic or hypertonic solutions), natural products, and avoidance measures.[77] In particular, nasal lavage is particularly fruitful as it removes allergens, inflammatory mediators, and excessive secretions using isotonic solutions.[78] Hypertonic saline solutions also medicate the nasal cavity as they exert anti-inflammatory and decongestant activities.[79] In addition, a list of natural products has been recently provided, mainly considering the evidence level of studies.[20]

Pharmacological treatments mainly include antihistamines (both oral and intranasal) and topical corticosteroids. Most antihistamines are available as OTC or may be dispensed without a medical prescription.[80] However, most belong to the first generation, such as sedative antihistamines. Thus, they should be highly discouraged. Intranasal corticosteroids are freely available for purchase only in certain countries (eg, the US), whereas, in the European Union, they need a medical prescription. However, the Italian Agency for Drugs permitted the use without a prescription for beclomethasone nasal spray.

It is, therefore, evident that use of mobile health apps to capture data may be helpful in management. However, whether use of mobile applications actually affect AR outcomes is not proven, and primary care physicians, and even busy pharmacists, may question the amount of time spend by them to review relatively small changes in VAS and respond to them real time.

Additional Techniques in Self-Management

Patients wishing to self-manage can obtain important information from several apps that provide useful guidance. Several apps provide pollen count data so that patients may avoid excessive pollen exposure, mainly concerning outdoor

activities. Of course, patients should find data concerning the precise geographic area and information should be reliable. In addition, meteo apps may give interesting information about the weather data, mainly concerning temperature, humidity, and overall wind (these variables significantly affect pollen scattering).

Also, apps providing air quality are useful for AR patients as they indicate the air concentration of pollutants that, if elevated, worsen AR symptoms.

Self-management can also benefit from the use of various tools that improve the condition of the home environment, such as HEPA filters, dehumidifiers, air conditioners and suitable window frames. These devices may be fruitful in reducing allergen exposure.

However, self-management can be remarkably effective when combined with telemedicine. In fact, the possibility to quickly seek medical advice and/or have medical supervision on self-management allows for an optimal strategy. In this regard, MASK-air® could represent a suitable example.

Conclusive Remarks

Self-management of allergic rhinitis represents a realistic approach to caring for this disease, as many patients actually manage their condition independently. Self-management may be a suitable option in the global healthcare scenario as it may save costs and time. However, there is evidence that optimal self-management requires adequate literacy and interaction with physicians and best specialists. Mobile healthcare may supply fundamental support in communication and decision-making. In this regard, VAS represents the best tool to monitor symptoms' severity and control over time. Also, pharmacological and non-pharmacological remedies are numerous and effective but should be used wisely. In conclusion, apps to manage AR symptoms may be very useful for patients, but since this appears to be a newer way to approach self-management they should be combined with clinical care.

Disclosure

The author reports no conflicts of interest in this work.

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