







ORIGINAL RESEARCH

Factors affecting adherence to intranasal treatment for allergic rhinitis: A qualitative study

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Abstract

Objective: To determine the facilitators of and barriers to adherence to use of intranasal pharmacotherapy (daily intranasal corticosteroids and/or antihistamine, and nasal saline irrigation [NSI]), for allergic rhinitis (AR).

Methods: Patients were recruited from an academic tertiary care rhinology and allergy clinic. Semi-structured interviews were conducted after the initial visit and/or 4–6 weeks following treatment. Transcribed interviews were analyzed using a grounded theory, inductive approach to elucidate themes regarding patient adherence to AR treatment.

Results: A total of 32 patients (12 male, 20 female; age 22–78) participated (seven at initial visit, seven at follow-up visit, and 18 at both). Memory triggers, such as linking nasal routine to existing daily activities or medications, were identified by patients as the most helpful strategy for adherence at initial and follow-up visits. Logistical obstacles related to NSI (messy, takes time, etc.) was the most common concept discussed at follow-up. Patients modified the regimen based on side effects experienced or perceived efficacy.

Conclusions: Memory triggers help patients adhere to nasal routines. Logistical obstacles related to NSI can deter from use. Health care providers should address both concepts during patient counseling. Nudge-based interventions that incorporate these concepts may help improve adherence to AR treatment.

Level of Evidence: 2

KEYWORDS

allergy/rhinology, endoscopy, irrigations, patient reported outcome measure, rhinitis

1 | INTRODUCTION

Allergic rhinitis (AR) affects 11% (physician diagnosed) to 33% (self-reported)¹ of patients in the United States with significant impacts on

Institution at which the work was performed: Department of Otolaryngology – Head & Neck Surgery, University of Kansas Medical Center.

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sleep, work productivity, and overall quality of life.² It can also lead to the development or exacerbation of asthma and chronic rhinosinusitis.¹ Effective, low-risk, and evidence-based pharmacologic treatment for AR includes intranasal corticosteroids (INCS) and intranasal antihistamines (INAH) along with nasal saline irrigations (NSIs).^{1,3} While this is an effective treatment routine, it requires daily commitment by the patient. INCS result in maximal benefit when used continuously rather than only when suffering from symptoms of AR.^{4,5} Adherence is defined as the extent to which a person's behavior (taking medication, following a diet, and/or executing lifestyle changes) corresponds to recommendations from a health care provider and involves patient decisions about their treatment plan.^{6,7} Adherence to AR treatment recommendations is variable and factors related to adherence to AR treatment are not well-characterized in the literature.

In prior survey-based studies, 28%⁸–77%⁹ of patients self-reported adherence to the recommended AR treatment regimen for all or most of the time. Twenty percent of patients reported adherence only for a short time or when they experienced symptoms.⁹ Previously reported reasons for non-adherence including forgetting to take medications,^{8,10} perceived lack of benefit,^{8,11} fear of side effects, and inconvenience.^{8,10} To our knowledge, no prior qualitative work has been done to understand the patient experience with AR treatment recommendations and gather in-depth feedback about facilitating and deterring factors.

The purpose of this study was to identify factors that affect patient adherence or non-adherence to the recommended AR treatment regimen, which included an INCS, INAH, and/or NSI. We hypothesized adherence to the AR treatment routine is related to factors such as severity of symptoms, convenience, cost, and patient understanding of the treatment.

2 | MATERIALS AND METHODS

The institutional review board at the University of Kansas Medical Center approved this study (Study number 00144433). English-speaking patients over the age of 18 with a diagnosis of AR who previously had not tried or had not consistently used INCS, INAH, or NSI were recruited face-to-face from a tertiary care rhinology and allergy clinic. Patient recruitment occurred by consecutive sampling such that those who meet the inclusion criteria are recruited. Incarcerated or pregnant patients, staff of the testing institution, or patients with contraindication to use of INCS, INAH, or NSI, were excluded from the study.

The study was designed using qualitative, grounded theory methodology, and reported using the COnsolidated criteria for REporting Qualitative research (COREQ) checklist¹² (Supplement 1). Quantitative data collection included demographic data (patient gender and age).

Written informed consent was obtained. At the outset of the study, patients were interviewed only at their follow-up visit, approximately 4–6 weeks after initiation of an AR treatment routine. After review of interview transcripts, the authors noticed that some

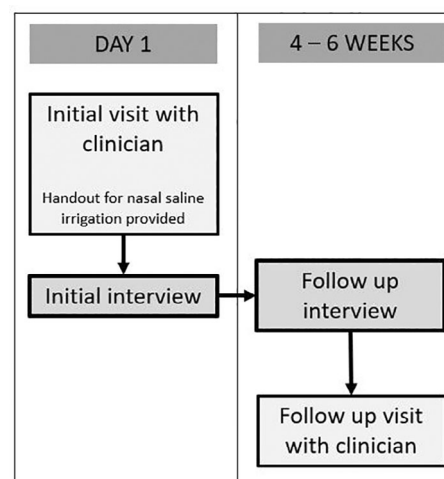


FIGURE 1 Study design

patients shared their immediate perceptions that influenced their approach to the treatment regimen. For example, one patient shared that they did not intend to attempt any of the suggested treatment; another patient thought it would be easy to follow the recommendations, but later struggled with incorporating the routine. Thus, a modification was made to add an interview after the first clinical visit (Figure 1). The goal of this interview was to capture any anticipated barriers or facilitators of adherence to the suggested treatment prior to trying the routine.

Semi-structured interview guides for the initial and follow-up visits (Supplements 2 and 3, respectively) were developed by applying themes from prior studies of medication adherence.^{6,7,11–14} Clinic protocol included review of the patient's nasal endoscopy video and a discussion of findings with the patient as well as provision of a printed information sheet about NSI with a video website address (Supplement 4).

Interviews were conducted by authors Rohit Nallani (male), Josh B. Smith (male), Scott N. Fassas (male), and Emily L. Cummings (female); all four of the interviewing authors are medical doctors who were serving in the role of research fellows at the time of the study. Authors received training on qualitative interview techniques from author Kevin J. Sykes, who has completed formal training in mixed-methods research. The authors routinely debriefed with Kevin J. Sykes to ensure consistent methodology. The interviewing authors did not have a relationship with the study participants prior to study commencement. Participants were aware that the interviewers were functioning solely in a research capacity and their interactions had no influence on the participant's clinical care. Interviews were conducted face-to-face in a clinic room or via telephone, whichever method was more convenient for the participants. Only the interviewer and the participant were in the session. No repeat interviews were conducted.

Interviews were recorded using Zoom (New York, NY, USA) software; no field notes were made during or after the interview. Immediately after completion of the interview, the audio files were transcribed using Trint (London, UK) artificial intelligence software.

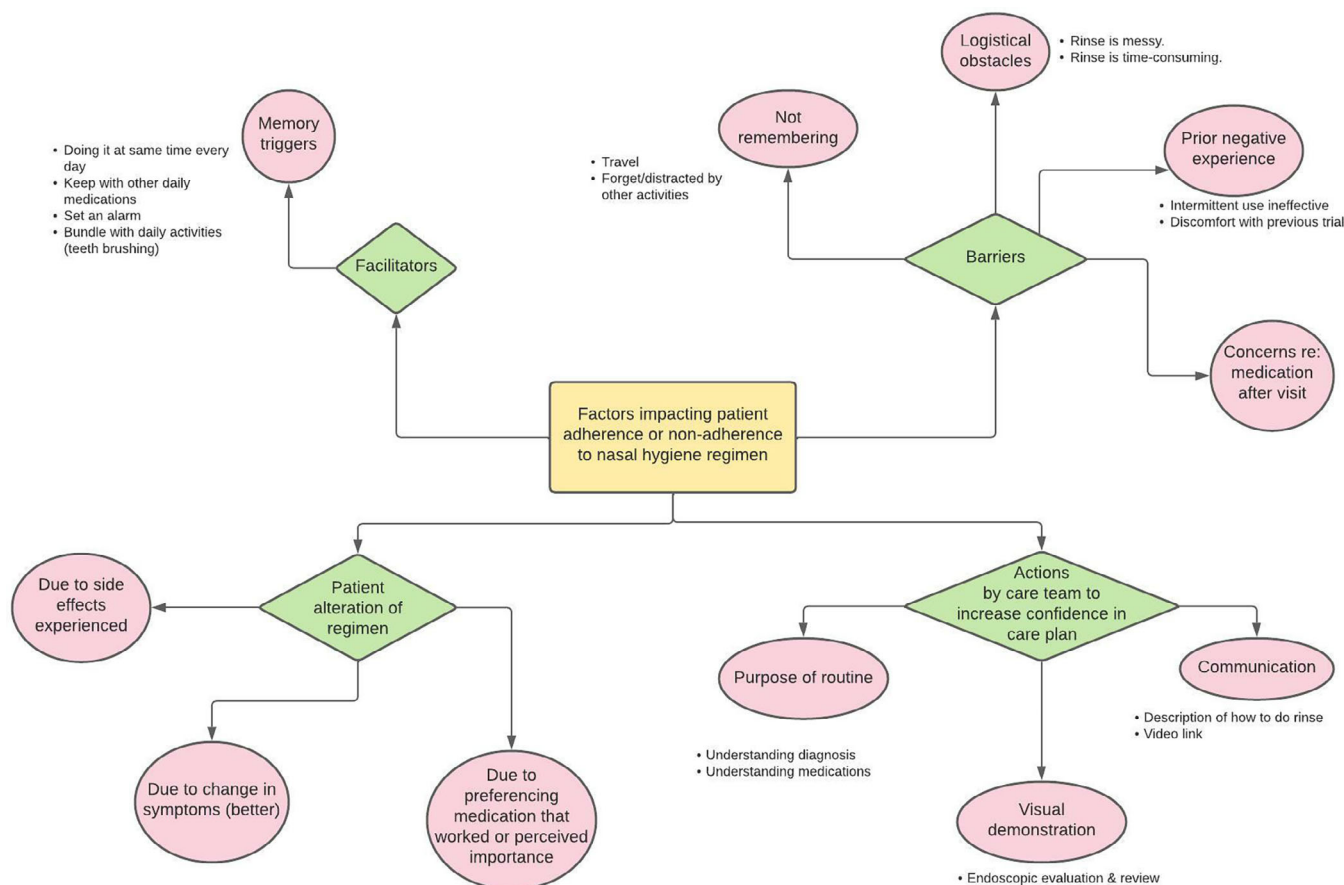


FIGURE 2 Themes of patient experience with allergic rhinitis treatment from qualitative interviews.

Transcriptions were checked for accuracy and any inconsistencies were corrected by the authors (Scott N. Fassas, Emily L. Cummings, Meha G. Fox). Corrected transcriptions were then reviewed on a weekly basis and discussed by the authors (Scott N. Fassas, Emily L. Cummings, Meha G. Fox) to identify key themes. Transcripts were not shared with patients for comment or correction. Patient recruitment continued until thematic saturation was reached.

Interviews were evaluated using an inductive approach. Transcripts from the interviews were used to identify basic themes. These basic themes were then organized into organizing themes, or categories of basic themes which are grouped together to summarize more abstract principles. The organizing themes were further grouped into global themes that show the major concepts in the text. A coding framework was created based on these themes. Transcripts were again reviewed and coded using the framework; authors Scott N. Fassas, Emily L. Cummings, and Meha G. Fox completed coding. Dedoose 9.0.46 cloud-based qualitative coding software¹⁵ was used for coding and analysis. Participants did not provide feedback on findings.

3 | RESULTS

A total of 32 patients (12 male, 20 female; age 22–78) participated (seven initial visit only, seven follow-up visit only, and 18 interviewed

at both). Seven patients did not participate in the follow-up interview; these patients did not return for a follow-up clinic office visit and could not be reached via phone. A total of 27 patients identified as White or Caucasian, three as Black or African American, one as Asian, and one as other; all 32 patients identified as non-Hispanic, Latino or Spanish origin. Median household income by zip code, based on US census data, for our patient population was \$64,994. Interviews lasted 8–15 min. Four global themes emerged from review of the interview transcripts (Figure 2). Patients discussed facilitators of adherence to the AR treatment routine, barriers to adherence, self-directed alteration of the AR treatment routine, and actions taken by the care team to increase confidence in the care plan.

Under each global theme, there were several organizing themes. Patients identified memory triggers as the main facilitator of adherence to the AR treatment routine. Memory triggers included using the nasal sprays and/or NSI at the same time every day, keeping the nasal sprays and/or NSI with other daily medications (“I already have a nighttime routine of medicines...so I’ll just add that to this” Participant ID 36), setting an alarm, and bundling with daily activities such as brushing teeth (“When I get up in the morning, I plan to do my nose first thing and then brush my teeth and I just make it part of my morning routine and I’ll do the same in the evening when I brush my teeth to get ready for bed.” Participant ID 36).

Patients reported multiple barriers to adherence to the recommended AR treatment routine. They shared not remembering to use the medications and/or NSI due to travel or being distracted by other activities. Negative experiences with prior use of nasal sprays and/or NSI (intermittent ineffective use, discomfort with previous attempt) were deterrents. Logistical obstacles contributed to decreased use of NSI. Patients reported that “the wash...is so messy. Feel like I have to clean my bathroom after every time I use it and...that kind of discourages me from using it” (Participant ID 26). It also “take[s] some additional time and hanging over the sink...[is] just not near as convenient” (Participant ID 50) as the sprays. One patient described, “I have to track down which bathroom I was in last time and go to the kitchen and do the microwave thing” (Participant ID 42) to heat up the water. A few patients developed concerns about the prescribed medications, such as propensity for addiction to INCS or risk of nosebleeds with INCS use, following the initial visit but did not reach out to the health care team to address these concerns.

Patients altered the recommended routine for multiple reasons. They either experienced side effects from the nasal spray(s) or decreased AR treatment routine use due to an improvement in symptoms. They also reported preferentially using medications that they perceived worked the best or thought were the most likely to improve symptoms. One patient shared that “the antihistamine would make [me] so sleepy during the day...so I did the antihistamine at night” (Participant ID 25). Another patient reported, “early on I definitely kept to the routine that they said...as a little bit of time went on, I sometimes wouldn't do the Benadryl [azelastine] spray and I thought, oh, I'm doing OK and then my symptoms would flare up and I was really glad I had the Benadryl [azelastine] spray and that was the bump I needed to get...my symptoms...reined in” (Participant ID 44).

Several actions taken by the care team increased confidence in the recommended treatment routine. Care team explanation of the purpose of the routine improved understanding of diagnosis and medication mechanism. One patient shared that they “always just figured it [symptoms] was just a sinus infection, not really allergies...so if that's what it is, I'm excited to try it and actually stay with it” (Participant ID 37). Another patient appreciated understanding the need to use INCS daily; they said, “I did not realize that you had to build up the steroid...I probably was never doing... [it] more than three or four or five days...and because I didn't see as much relief from them because I didn't stick with them, then I would give up on them easier” (Participant ID 44). Patients found the visual review of the endoscopic examination with explanation of relevant findings to be helpful. One patient commented that “the important part of today's visit is to visually see how those allergens are trapped and the impact on their nasal passage...to visually see that...makes an impact because it's one thing to talk about it, but it's another thing to actually see it” (Participant ID 52). Interviewees also commented on the positive impact of care team explanation of how to use the nasal sprays and NSI as well as the online video link provided.

The most common theme at the initial visit was memory triggers. At the follow-up interview, the most common theme was discussion of barriers to adherence to NSI, specifically referencing logistical

obstacles. The second most common theme discussed during the follow-up interview was the utility of memory triggers as a facilitator of adherence to the AR treatment routine.

4 | DISCUSSION

Allergic rhinitis is a common diagnosis with well-established low-risk treatment options. However, all evidence-based first-line treatments require at-home care that patients self-administer. Furthermore, these treatments are most effective with daily use requiring significant engagement in the process and investment of patient time and money. Few studies report patient adherence^{8,9} and even fewer discuss factors impacting adherence and non-adherence to daily treatment routines for AR.⁸⁻¹¹ The present study was designed to gather qualitative data from patients to identify facilitators and barriers to adherence that may inform patient-centered interventions to improve adherence. We found that counseling that included the use of memory triggers, discussion of common side effects and potential interventions, and demonstration of how to administer nasal spray and NSI may be helpful in improving adherence.

One of the main reasons for nonadherence in our study was simply forgetting to use nasal sprays and/or NSI. This is consistent with prior studies.^{8,10,11} For example, Loh et al. administered clinical surveys to assess compliance with INCS for treatment of AR and non-AR. In their study, 77.8% of patients reported forgetting to take their medications one to five times over the course of 30 days.¹⁰ Similarly, Ocak et al. found lower adherence rates in patients with a higher number of dependent children.¹¹ Caring for others could contribute to forgetting.

Patient alteration of treatment regimen based on symptom changes, as found in our study, has also been reported previously. Navarro et al. conducted a survey-based study in which 20% of patients reported adherence to treatment recommendations for a short time or only when symptoms were present and/or more intense. Their work demonstrated that patients rarely increase the dose medications due to insufficient control of symptoms.⁹ Lower adherence rates have also been noted in patients who perceived lack of benefit from medication(s).¹¹ Wang et al. found that patients were less likely to use AR treatment if they believed that the medication was not needed or ineffective.⁸

Prior studies of adherence to treatment recommendations for AR have not commented on adherence to NSI. However, a recent assessment in patients with CRS showed that 60.3% of patients used either INCS or NSI and 35.6% of patients used NSI at least 6 days a week.¹⁶

Despite the importance of self-administered treatment for AR, there is a paucity of literature regarding factors that facilitate adherence to treatment recommendations.⁸ In our study, memory triggers were the greatest facilitator of adherence noted by patients. This finding is supported by behavioral research which has shown that individual decision making is not perfectly rational. Individuals make decisions based on reflective and impulsive cognitive functions, such as responding to memory triggers, which operate in parallel.

TABLE 1 Interventions during the clinical visits to improve adherence to allergic rhinitis treatment.

| During the clinical visit |
|--|
| 1. Review endoscopic examination and findings with the patient. |
| 2. Discuss the diagnosis with the patient. |
| 3. Discuss the mechanism and desired effect of the treatment components (e.g., nasal saline rinses wash out irritants and mucus). |
| 4. Suggest memory triggers such as pairing with daily activities (brushing teeth) or medications as a reminder to use daily nasal spray(s) and/or nasal saline irrigation (NSI). |
| 5. Discuss common side effects or prior negative experiences and potential interventions. |
| 6. Demonstrate how to administer nasal spray and NSI and provide links to videos of administration. |

Therefore, strategies to improve adherence and influence behavior must target rational and irrational decision-making.¹⁷ Rooted in these principles and based on our findings, we recommend several interventions that health care providers can employ to increase adherence to AR treatment regimen(s).

4.1 | Interventions: During the clinical visit

Patients commented on several actions taken by the health care team to increase confidence in the suggested treatment plan. During a clinical visit, practitioners should review the endoscopic evaluation and relevant findings with patients. Prior studies have demonstrated increased patient satisfaction when providers reviewed videos of nasal endoscopy.¹⁸ Counseling should include a discussion of the diagnosis and the purpose of the suggested routine. We recommend that providers share tips for building a routine and suggest utilizing a memory trigger as a reminder to use nasal sprays and/or NSI. Common side effects and suggested interventions should the patient experience any side effects should be discussed. Patients should be asked about prior experience with nasal sprays and/or NSI. Strategies to mitigate side effects and avoid repeating the previous negative experience should be discussed. For example, patient dissatisfaction with prior INCS due to sensory attributes (taste, burning sensation, etc.) can be addressed by trying a different formulation of INCS. Providers should demonstrate how to administer nasal sprays and/or NSI and provide links to videos. Implementation of these behaviors during a clinical visit targets reflective and impulsive decision-making (Table 1).

4.2 | Interventions: After the clinical visit

Memory triggers were the most reported facilitator of adherence. Patients referenced using nasal sprays and/or NSI at the same time as other medications or bundling with daily activities. Use of interventions that target impulsive cognitive function, such as memory triggers, may improve adherence. One such method involves

nudge-based interventions that target the habitual aspects of decision-making.¹⁷ Nudge-based interventions influence behavior without limiting an individual's freedom of choice. Existing examples in the management of chronic diseases such as diabetes mellitus and asthma include use of short message service (SMS) reminders, monetary and non-monetary rewards, mobile application-based interventions, and low-technology reminders to place in the home.^{19,20} In the context of AR, Wang et al. demonstrated the value of daily SMS in increasing self-reported adherence to INCS and clinic attendance; patients in the SMS group were less likely to forget to use their AR medications.⁸ Such interventions should be employed in the treatment of AR to improve adherence to treatment given the high prevalence of the disease and potential for development or worsening of asthma and chronic rhinosinusitis.

4.3 | Limitations

There were several limitations to this study. First, our sample size was small; this was partially due to the study period including the COVID-19 pandemic which limited clinical volume. However, regular review of interview transcripts revealed thematic saturation. Thus, it is likely that no new insights would have been gained by increasing the sample size in this patient population. Next, we did not gather quantitative data on adherence, such as percentage of prescribed doses used. While this data may be helpful, it is limited by the patient's recall bias and potential to inflate adherence to please the treatment team. Furthermore, quantitative measure of adherence was not the primary goal of the study; the primary objective was to identify factors that facilitate or serve as barriers to adherence. Additionally, there was inconsistent completion of the patient-reported outcome surveys, limiting ability to determine improvement in outcomes based on adherence.

In this study, patients reported memory triggers, such as pairing the use of their nasal regimen with other daily activities or medications, to be the most impactful facilitator of adherence to intranasal treatment. Logistical obstacles surrounding NSI was the most reported barrier to adherence. Prior negative experience with medications and simply forgetting were other barriers. Patients altered their regimens due to change in symptoms, perceived efficacy of a component of treatment plan, or due to side effects. Visual review of endoscopic findings, discussion of purpose of routine, and description of how to administer nasal medications and NSI increased patient confidence in treatment plan and willingness to adhere to treatment recommendations.

5 | CONCLUSION

Allergic rhinitis is a common diagnosis with well-established low-risk treatment options. However, adherence to these treatments remains variable. This qualitative study identified the main facilitator of adherence was memory triggers such as nudge-based interventions. The main barriers to adherence were logistical obstacles associated with

NSI use and forgetting to use nasal spray and/or NSI. Interventions that target rational and irrational individual behavior should be devised to improve adherence to AR treatment.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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