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Original Research Article

An Educational Intervention Study: Assessing Usefulness of Patient Education and if AR Control Was Affected by Different Methods of Teaching of Nasal Spray Usage

Deepti Agarwal[1], Seema Monga[2], Arun Parkash Sharma[3]

[1]Assistant Professor, Department of ENT-HNS, Hamdard Institute of Medical Sciences, New Delhi, India

[2]Professor, Department of ENT-HNS, Hamdard Institute of Medical Sciences, New Delhi, India

[3]Associate Professor, Department of ENT-HNS, Hamdard Institute of Medical Sciences, New Delhi, India

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Corresponding Author: Dr. Deepti Agarwal
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Abstract

Aim: The aim of the present study was to determine the usefulness of patient education and if AR control was affected by different methods of teaching of nasal spray usage.

Methods: The Present study was conducted in the Outpatient Department of ENT-HNS in a tertiary care teaching hospital in Northern India. All patients aged 18 years and above with clinical symptoms suggestive of mild persistent or moderate-severe persistent AR (ARIA guidelines 2008) were recruited in the study. Total 100 patients were included in the study.

Results: Patients were between 18 to 60 years old (mean=32.4 years) and among them 40 (40%) were male patients and 60 (60%) were female patients. Based on the 2008 ARIA guidelines, 88 (88%) patients were diagnosed with moderate-severe persistent (MSP) AR, 4 (4%) had moderate- severe intermittent (MSI) AR while 8 (8%) had mild persistent (MP) AR. Assessment on the techniques during the 2nd (visit 2) showed that most of the participants were unable to show a correct technique on the usage of INCS. During the 3rd visit despite re-education, only 26% of participants were able to show the correct techniques. There was statistically significant association between ARIA classification and severity of TNSS during V1-V3. Majority of patients with moderate-severe persistent AR had severe TNSS during V1 and subsequently improved to moderate symptoms during V2 and mild/very mild during V3.

Conclusion: Our study showed the importance of educating patient regarding the proper use of INCS. Assessment of improvement after each method of patient education showed statistically significant outcome.

Keywords: Allergic rhinitis, Teaching method, Intranasal corticosteroids, Total nasal symptom score

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Introduction

Rhinitis is inflammation of the membrane lining the nose, characterized by nasal congestion, rhinorrhea, sneezing, itching of the nose and/or post-nasal drainage [1] classified as allergic or non-allergic. [2] Allergic rhinitis (AR) occurs when an allergen is a trigger for the nasal symptoms while non-allergic rhinitis (NAR) occurs when obstruction and rhinorrhoea occur. Both allergic and non-allergic rhinitis are highly prevalent and have a significant effect on the quality of life (QOL) of patients. [3] Allergic rhinitis (AR) is a common disease worldwide which affects 10-25% of the population of all ages including children, adolescents and adults. Patients usually present with nasal obstruction, rhinorrhoea, sneezing and/or nasal itchiness. [4] In the tropical countries, majority of AR cases are persistent in nature due to year-round warm and humid climate which is conducive for the proliferation of dust mites and moulds, two of the most common aeroallergens implicated in persistent AR. Management of AR is important for preventing potential complications. The treatment options include allergen avoidance, pharmacotherapy and immunotherapy. Treatment guidelines support that the use of intranasal corticosteroid sprays (INCS) as the first-line therapy for AR. [1,5]

As patients with persistent allergic rhinitis are often symptomatic throughout the year and need long-term treatment, ensuring total compliance to treatment can be difficult. The Allergic Rhinitis and Impact on Asthma (ARIA) Workshop report recommends Intranasal Corticosteroids (INCS) as a highly effective first-line treatment for patients

suffering from allergic and non-allergic rhinitis with moderate to severe and/or persistent symptoms. [6]

Intranasal corticosteroid (INCS) spray is cardinal in the medical management of AR and chronic rhinosinusitis (CRS). [7] Topical nasal steroid is the first line treatment to control nasal congestion for AR. It is more effective than oral antihistamines in controlling rhinitis symptoms, particularly nasal congestion. [8] Intranasal corticosteroids are strong anti-inflammatory agents, and have been proven highly effective as first-line treatment for patients suffering from allergic and nonallergic rhinitis with moderate to severe and/or persistent symptoms. [6]

Training on the use of nasal spray and education on rhinitis increases compliance. However, patient education is often neglected in clinical practice and its effect should not be underestimated. A number of studies have investigated the intranasal distribution of steroid using INCS with many different application techniques but to date there is no study done to determine if the method to educate patients plays a role in the efficacy of treatment of AR. [7]

Therefore, this study aims to determine the usefulness of patient education and if different methods of teaching of nasal spray usage have any bearing on the disease control.

Materials and Methods

The Present study was conducted in the Outpatient Department of ENT-HNS of a tertiary care teaching hospital of Northern India from September 2022 to August 2023. All adult patients presenting with clinical symptoms suggestive AR (ARIA guidelines 2008) fulfilling the inclusion criteria were included in the study. A total of 100 patients were recruited.

Inclusion Criteria

Inclusion criteria –

i. Age > 18 years
ii. Mild Persistent or Moderate-Severe Persistent AR who had never been on steroid nasal spray
iii. Giving consent for the study

Exclusion Criteria

Exclusion criteria were the following—

i. Age <18 years or >60 years
ii. Presence of nasal polyp, nasal septal perforation, granulomatous lesions, nasal mass, or history of previous nasal surgery.
iii. Pregnant females, patients with medical co-morbidities such as ischemic heart disease, cystic fibrosis, Hypertension and Diabetes,
iv. Patients on antihistaminic/antileukotriene medications or already on intranasal or systemic steroid.
v. Patients not giving consent for the study

Methodology

All patients were treated with Intranasal Mometasone furoate monohydrate spray. The dose prescribed was two puffs in each nostril once daily. Each puff contains 50 mcg of Mometasone furoate monohydrate. The patients were reviewed and assessed 4 times after the initial visit. The interval between each visit was 3 weeks.

Intervention

Patients were exposed to different methods of teaching on INCS spray technique on each visit. The 4 different methods of teaching are as mentioned below: Education of technique by pharmacists (E1), education of technique by researcher (E2), education of technique by researcher and providing a pamphlet on the technique (E3) and education of technique by researcher and providing a video showing the technique. The video was sent to patients through email (E4).

E1 was done by the pharmacist, as given below-

Step 1: Shake bottle gently and remove the dust cap. Gently blow your nose.

Step 2: Hold the bottle with opposite hand and point the nozzle outwards, away from the nasal septum.

Step 3: Press once and apply the second puff. Repeat the same technique on the opposite nostril.

E2, E3 and E4 were taught by the researcher.

The nasal spray technique steps that were shown to the patients were as follow:

Step 1: gently blow your nose. Remove the dust cap. Hold the nasal spray bottle with thumb at its bottom and the tip in between index finger and middle finger. No need to tilt head forward or backwards.

Step 2: hold the bottle with left or right hand depending on patient's preference. Insert nasal spray applicator about 30 degrees from floor of nostril. Do not tilt the applicator to the side of nostril.

Step 3: Press once and wait for 10-15 seconds before applying the second puff. Repeat the same technique on the opposite nostril.

Assessment and Follow-Up

Patients were seen every 3 weeks for 4 times in total after initial visit (V1). On each visit patients were assessed clinically and by using the Total Nasal Symptom Score (TNSS) Questionnaire.

The TNSS questionnaire consists of nasal symptoms (congestion, rhinorrhea, itching, and sneezing) scored on a scale of 0-3 where 0 indicates no symptom, 1 for mild symptoms, 2 given for moderate bothersome symptoms which are still tolerable. 3 is reserved for severe symptoms which

are difficult to tolerate and cause disturbance in activities of daily living and sleep. Classification of severity according to the total score: very mild (0-2), mild (3-6), moderate (7-9) and severe (>10).

Initial visit clinical examination and TNSS were taken as baseline data. Initial assessment and subsequent follow ups of patients were done by the same clinician.

Flow of the assessment is as described below:

Initial visit (V1): Patients completed TNSS questionnaire. After assessment, patient sent to the pharmacy to collect nasal spray and received direct instruction of nasal spray application technique from the pharmacist.

Second visit (V2): Patients assessed clinically and TNSS questionnaire completed. After assessment patient demonstrated nasal spray application technique using their used nasal spray bottle. Then, researcher taught the patients technique of INCS use.

Third visit (V3): Patients examined, completed TNSS questionnaire. After assessment, patients demonstrated nasal spray technique using their used nasal spray bottle. Patients failing to demonstrate correct technique were again educated and given a pamphlet with written instructions for the same.

Fourth visit (V4): Patients examined, completed TNSS questionnaire. After assessment, patients demonstrated nasal spray technique using their used nasal spray bottle. Patients still unable to show the correct technique received re-education by the researcher and a video on the technique was emailed to patients.

Fifth visit (V5): Patients were assessed clinically and TNSS scoring done . After assessment, patient demonstrated nasal spray technique using their used nasal spray bottle.

Data collection during each visit also included any adverse effect or complications such as epistaxis or septal perforation.

Statistical Analysis

All analysis was performed using Statistical Package for Social Science (SPSS) version 23 with statistical significance set at $p<0.05$. Quantitative data distribution was determined using the Kolmogorov-Smirnov test. Univariate tests were conducted through descriptive analysis and normality tests. The results are reported in the form of frequency, percentage, mean, and standard deviation, median and interquartile range (IQR). Further analysis using bivariate tests, which were chi-square test ($\chi 2$), Mann Whitney-U, Wilcoxon signed-rank test and Kruskal Wallis test were used to determine whether there was a significant correlation between TNSS score and the different methods of patient education.

Results

Table 1: Demographic data and diagnosis

Demographic and diagnostic details		No	Percentage(%)
Age	≤ 30	55	55
(Years)	> 30	45	45
Gender	Male	40	40
	Female	60	60
	MSP	88	88
ARIA	MSI	4	4
	MP	8	8

Patients were between 18 to 60 years of age, mean age being 32.4 years. Among these 40 (40%) were male patients and 60 (60%) were female patients. Based on the 2008 ARIA guidelines, 88 (88%) patients were diagnosed with moderate-severe persistent (MSP) AR, 4 (4%) had moderate- severe intermittent (MSI) AR while 8 (8%) had mild persistent (MP) AR.

Table 2: Improvement of INCS usage technique during each visit after education given to patients

Visit improvement intechnique		No	Percentage (%)
V1	No	-	-
	Yes	-	-

V2	No	98	98
	Yes	2	2
V3	No	74	74
	Yes	26	26
V4	No	14	14
	Yes	86	86
V5	No	0	0.0
	Yes	100	100

Assessment on the techniques during the 2nd (visit 2) showed that most of the participants were unable to show a correct technique on the usage of INCS. During the 3rd visit despite re-education, only 26% of participants were able to show the correct techniques. However, by the 3rd and 4th visit, a good improvement was seen as more patients were able to demonstrate the INCS delivery technique correctly. At the end of the study, all 100 (100%) patients successfully applied and demonstrated proper technique of INCS spray delivery.

Table 3: Association between ARIA classification and severity of TNSS during each visit

TNSS				**P-Value**
		MSP (%)	**Others (%)**	
TNSS V1	Mild	5 (5)	6 (6)	<0.001
	Moderate	12 (12)	4 (4)	
	Severe	70 (70)	3 (3)	
TNSS V2	Very Mild	12 (12)	5 (5)	0.012
	Mild	40 (40)	4 (4)	
	Moderate	23 (23)	1 (1)	
	Severe	15 (15)	0 (0)	
TNSS V3	Very Mild	23 (23)	7 (7)	0.040
	Mild	39 (39)	4 (4)	
	Moderate	20 (20)	0 (0)	
	Severe	7 (7)	0 (0.0)	
TNSS V4	Very Mild	32 (32)	4 (4)	0.520
	Mild	40 (40)	8 (8)	
	Moderate	8 (8)	0 (0.0)	
	Severe	8 (8)	0 (0.0)	
TNSS V5	Very Mild	45 (45)	5 (5)	0.740
	Mild	35 (35)	5 (5)	
	Moderate	5 (5)	0 (0.0)	
	Severe	5 (5)	0 (0.0)	

Baseline TNSS on V1 showed that 70 patients (70%) came with severe symptoms. The group of patients had not been on any INCS. There was statistically significant association between ARIA classification and severity of TNSS during V1-V3. Majority of patients with MSP AR had severe TNSS during V1 which subsequently improved to moderate symptoms during V2 and mild/very mild during V3.

Table 4: Improvement in TNSS before and after a different method of nasal spray teaching

Varia-bles	**TNSS E1_B**	**TNSS E2_B**	**TNSS E3_B**	**TNSS E4_B**	**TNSS E2_E1**	**TNSS E3_E1**	**TNSS E4_E1**	**TNSS E3_E2**	**TNSS E4_E2**	**TNSS E4_E3**
Z	-8.220	-8.330	-8.465	-8.555	-5.050	-6.090	-7.190	-2.480	-4.856	-4.243
P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000

The subjective assessment of improvement in nasal symptoms after each method of patient education was done using the TNSS. All the 4 methods of education were compared with baseline and shown to be statistically significant ($p<0.05$).

Discussion

Allergic rhinitis (AR) is a common disease worldwide which affects 10-25% of the population of all ages including children, adolescents and adults. Patients usually present with nasal obstruction, rhinorrhoea, sneezing and/or nasal itchiness. [4] A study done by Ganesh and group in

2017 on 103 patients evaluated the spray techniques used, side effects and compliance of INCS [7]. They concluded that poor compliance happens because of side effects or lack of improvement in symptoms. So, proper technique is important to achieve effect and henceforth compliance.

Individual nasal anatomy and the method of INCS spray application potentially affect the delivery and distribution of intranasal steroid. Several spray application methods have been described in the various literatures. A number of studies have investigated the intranasal distribution of steroid using an intranasal steroid spray with different application techniques. [8,9] Some techniques contributed more adverse effects than benefit e.g., epistaxis and septal perforation. [10] Benninger et al conducted a survey of 30 consecutive patients who had been using an INCS for longer than 3 consecutive months and who had experienced at least 1 nosebleed in the preceding 2 months. [11] They have concluded that, to prevent epistaxis the recommendation is to point the nozzle outwards, away from the nasal septum.[10] None of the studies demonstrated or stressed on how much to tilt the applicator.

Patients were between 20 to 60 years old (mean=32.4 years) and among them 40 (40%) were male patients and 60 (60%) were female patients. Based on the 2008 ARIA guidelines, 88 (88%) patients were diagnosed with moderate-severe persistent (MSP) AR, 4 (4%) had moderate- severe intermittent (MSI) AR while 8 (8%) had mild persistent (MP) AR. The review of Chong and Chew suggests that people with more computer usage, higher education, higher stress level and lesser sleeping time were presented with higher AR susceptibility which may lead to the use of nasal spray. [12] Another most important issue in treating AR is patient's compliance towards INCS. Compliance has been shown to be poor for INCS use, even in very symptomatic patients. In tropical country, most of the patients have persistent AR and symptomatic throughout the year. They need long-term treatment and ensuring total compliance to treatment can be difficult. The compliance towards INCS improves by educating patient. Effectiveness of topical intranasal steroid may also be limited by lack of patient education on the correct application technique. [12]

Assessment on the techniques during the 2nd (visit 2) showed that none of the participants were able to show a correct technique on the usage of INCS. During the 3rd visit despite re-education, only 26% of participants were able to show the correct techniques. However, by the 3rd and 4th visit, a good improvement was seen as more were able to demonstrate the INCS delivery technique correctly. At the end of the study, all 100 (100%) patients successfully applied and demonstrated proper technique of INCS using INCS spray delivery technique. The assessment of improvement of symptoms and INCS technique after each education method was done using TNSS score. A baseline score was obtained on V1 and compared between scores of the other consecutive visits (V2-V4). Axtell et al emphasized-on pharmacists' role being of utmost important in achieving a successful asthma treatment as they are the last providers to encounter patients before medication treatment is initiated. [13] Study by Basheti et al demonstrated a statistically significant difference when comparing direct pharmacist instruction on proper inhaler technique to having subjects watch a video or read an inhaler pamphlet. [14] They suggest that a brief 2.5-minutes counselling session conducted by a pharmacist can significantly improve a patient's MDI inhaler technique. Pharmacists should spend time explaining and demonstrating proper INCS technique as well as observing patient's technique. Direct instructions and demonstration of techniques had shown to be significantly more effective. As revealed by our research, the sign and symptoms and TNSS score does not show much of improvement after 1st visit (V1).

Conclusion

Our study showed the importance of educating patients regarding the proper use of INCS. Both clinical assessment and TNSS scoring after each method of patient education showed statistically significant outcome. Hence, we strongly advocate that patients should be effectively counselled about proper INCS spray application technique when they are advised a nasal spray. Patients must be given clear instructions for correct administration. Patient education is often neglected in clinical practice because it is time consuming especially in a busy outpatient clinic. Thus, we strongly recommend on usage of educational tools such as video demonstrations. Perhaps videos of the INCS spray application technique can be made available in all well-equipped pharmacies and outpatient clinics in the near future.

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