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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

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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 Department of ENT-HNS, Hamdard Institute of medical sciences, New Delhi, India and patients were recruited aged 18 and above with clinical symptoms suggestive of mild persistent or moderate-severe persistent AR (ARIA guidelines 2008). Total 100 patients were included in the study.

Results: 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. 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. 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 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 use of INCS. Both objective and subjective assessment of improvement after each method of patient education showed statistically significant outcome.

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

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). [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. 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]

In the tropics, the majority of allergic rhinitis is persistent in nature. The year-round warm and humid climate is conducive for the proliferation of dust mites and molds, two of the most common

aeroallergens implicated in persistent allergic rhinitis (PAR). 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 recommend intranasal corticosteroids 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]

Patients with persistent AR are often symptomatic throughout the year and need long-term treatment. Therefore, ensuring total compliance to treatment is important. [4] 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 AR control was affected by different methods of teaching of nasal spray usage.

Materials and Methods

The Present study was conducted in the Department of ENT-HNS, Hamdard Institute of medical sciences, New Delhi, India for one year and patients were recruited aged 18 and above with clinical symptoms suggestive of mild persistent or moderate-severe persistent AR (ARIA guidelines 2008). Total 100 patients were included in the study.

Inclusion Criteria

Inclusion criteria included AR who had never been on steroid nasal spray treatment.

Exclusion Criteria

Exclusion criteria excluded pregnant females, patients with medical co-morbid such as ischemic heart disease, cystic fibrosis and diabetes, and those on antihistaminic/antileukotriene medications or already on intranasal or systemic steroid were excluded. Patients whom diagnosed to have nasal polyp, nasal septal perforation, granulomatous lesions, nasal masses, or previous nasal surgery were also excluded from the study.

Methodology

All patients were treated with intranasal mometasone furoate monohydrate (Nasonex) manufacture by MSD. 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 6 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).

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 nostrils. 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 degree 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 6 weeks for 4 times in total after initial visit (V1). On each visit patients were assessed subjectively using the total nasal symptoms score (TNSS) questionnaire and objectively using active anterior rhinomanometry test.

The TNSS questionnaire consists of nasal symptoms (congestion, rhinorrhea, itching, and sneezing) were scored on a scale (0=none, 1=mild: symptom clearly

present but minimal awareness, 2=moderate: definite awareness of symptom which is bothersome but tolerable and 3=severe: symptom is hard to tolerate and causes interference with activities of daily life and sleep). Total nasal symptoms score is 15. Classification of severity according to the total score: very mild (0-2), mild (3-6), moderate (7-9) and severe (>10).

Objective assessment was done using active anterior rhinomanometry test (ATMOS rhinomanometry 300 machine). Active anterior rhinomanometry was performed according to the guidelines of the standardization committee on objective assessment of the nasal airway.[9] Nasal resistance at 150-Pa pressure was taken. Initial visit Rhinomanometry test and TNSS were taken as baseline data. All the Rhinometry test and follow up of patients was done by a single operator.

Flow of the assessment was as described:

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

Second visit (V2): Patients completed TNSS questionnaire and rhinomanometry test. After assessment patient demonstrated nasal spray application technique using their used nasal spray bottle. Then, researcher taught the patients technique of INCS which has been used by ORL department of hospital Putrajaya.

Third visit (V3): Patients completed TNSS questionnaire and rhinomanometry test. After assessment, patients demonstrated nasal spray technique using their used nasal spray bottle. Then, patients received education on the hospital Putrajaya INCS spray delivery technique by researcher and pamphlet.

Fourth visit (V4): Patients completed TNSS questionnaire and rhinomanometry test. After assessment, patients demonstrated nasal spray technique using their used nasal spray bottle. Then, patients received education on the hospital Putrajaya INCS spray delivery technique by researcher and a video on the technique was emailed to patients.

Fifth visit (V5): Patients completed TNSS questionnaire and rhinomanometry test. 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 relationship between rhinometry score and TNSS with the different methods of patient education.

Results

Table 1: Demographic data and diagnosis

Demographic anddiagnostic 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 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.

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	0	0.0
V3	No	74	74
	Yes	28	28
V4	No	15	15
	Yes	86	86
V5	No	0	0.0
	Yes	100	100

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.

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

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 and 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] In Malaysia, a study among paediatric patients shows that the overall incidence of rhinitis symptoms is 27%, with a significantly higher prevalence in the 12- to 14-year-old age group (38.2%) compared to the 5- to 7-year-old age group (18.2%). [7] 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.

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. [7] Some techniques contributed more adverse effects than benefit e.g., epistaxis and septal perforation. [10] Michael et al conducted on a survey of 30 consecutive patients who had been using an INS 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 objective assessment of improvement of symptoms and INCS technique after each education method was done using rhinomanometry score. A baseline rhinomanometry was done on V1 and compared between scoring of the other consecutive visits (V2-V4). These Rhinomanometry scoring were done to compare nasal resistance before and after all 4 methods of INCS nasal spray teaching technique. There was statistically significant difference ($p<0.05$) in nasal resistance when compared with baseline, also before and after each different method of teaching of the other consecutive visits (V2-V4). Axtell et al emphasized on pharmacists' role is utmost important in achieving a successful asthma treatment as they are the last providers to encounter patients before medication treatment 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 on techniques had shown to be significantly more effective. As revealed by our research, the sign and symptoms, TNSS and rhinomanometry score does not show much of improvement after 1st visit (V1).

Conclusion

Our study showed the importance of educating patient regarding the use of INCS. Both objective and subjective assessment of improvement after each method of patient education showed statistically significant outcome. Hence, we strongly advocated that patients are effectively counselled about proper INCS spray application technique when they receive a nasal spray. Patients must be

given clear instructions for correct administration. Patient education is often neglected in clinical practice because it is often time consuming especially in a busy outpatient clinic. Thus, we strongly recommend on usage of education tools such as video demonstration in near future to combat the disease. 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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