

Compliance with topical nasal medication – An evaluation in children with rhinitis

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It is our impression that children with rhinitis often dislike or struggle with the administration of topical nasal sprays and drops. This study aims to investigate children's acceptance of topical nasal sprays/drops, and to identify patient factors that may affect their acceptance. An interview (by WYZI) questionnaire survey was carried out on parents/guardians of children aged 1–15 with rhinitis, where information on the diagnosis and treatment, patients' use and responses to these medications, and their preferred treatment routes were collected. Two hundred questionnaires were completed, of which 194 were valid for analysis. The mean age of patients was 7.54 yr; male to female ratio was 1:1.6, and Chinese made up the majority (62.4%). About one quarter (24.7%) of children disliked the use of topical nasal sprays/drops sufficiently to affect compliance with the medication. Furthermore, of those who could indicate their preferred route of drug administration ($n = 75$), 73% indicated a preference for oral medication, while only 11% preferred the nasal route.

Topical nasal sprays/drops were more acceptable in older children (7–15 yr) compared to the younger ones (1–6 yr) (OR = 2.383, CI 1.223–4.644). The acceptance of nasal sprays/drops was not associated with gender, ethnic group, concurrent use by other family members, length and amount of usage, and the response to therapy. A substantial proportion of children prescribed topical nasal sprays/drops did not find it acceptable. Age played a significant factor to the acceptance of the use of topical nasal sprays/drops.

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Allergic rhinitis is common in childhood – the mean age of diagnosis has been estimated at between 9 and 11 yr of age (1). An estimated 40% of children are affected (2). Non-allergic rhinitis, other than those related to infection and adenoidal hypertrophy, is less common in children (3). In Singapore, a schoolchildren's ISAAC survey in 1994 showed that of 6238 schoolchildren surveyed (2030 primary school 6- to 7-yr-old students and 4208 secondary school 13- to 14-yr-old students), 44% self-reported persistent rhinitis (4).

There are different classes of medication that are used to treat rhinitis, including antihistamines, leukotriene receptor antagonists,

corticosteroids, anticholinergics, and decongestions. Intranasal corticosteroids and glucocorticoids are considered the most effective form of treatment for allergic rhinitis (5–7), including children (8, 9). Studies comparing the efficacy of intranasal corticosteroids and oral antihistamines show that the former provides more effective symptom relief (10, 11). Furthermore, topical delivery has the advantages of minimizing systemic adverse effects with a fast onset (12).

This study set out to evaluate the acceptance of topical nasal medical sprays in a pediatric population with rhinitis, and to identify patient factors that may affect their acceptance.

Materials and methods

A questionnaire survey was conducted prospectively using a standard questionnaire that was completed by a one-on-one interview with parents/guardians of patients aged 1–15 attending the National University Hospital (NUH) Children's Specialist Clinic A in Singapore. A total of 13 closed-ended questions (with a choice of answers including an 'others' category for alternatives) were asked. The areas covered included the patients' demographic profile, history of allergic disorders (factors and allergy trigger factors), patients' treatment (drugs prescribed, frequency), and their preference on the route of administration of medications. Additionally, patients' feedback on the use of topical nasal medications (extent of relief provided, willingness to administer, and difficulties encountered) were obtained. The questions used to establish compliance and acceptance of topical nasal medications are shown in Table 1.

Children with a clinical diagnosis of rhinitis and have had experience using topical nasal sprays and/or drops were recruited. Where

possible, the opinions of the children were sought by parents or directly by the interviewer if they were interested to participate. A pilot survey of 12 questionnaires was conducted to ensure that the questionnaire was feasible and could be understood by the subjects and their parents. This interview survey was approved by NUS-IRB (Institutional Review Board).

For the purposes of data analysis, acceptance of topical nasal medications was defined as 'quite willing' or 'very willing' to take topical nasal spray medications *and* result in successful administration of these medications 'all or almost all the time' or 'more than half the time'. Non-acceptance was defined as 'neutral', 'slightly unwilling,' or 'not willing' to take topical nasal medications *or* being successful in administering these medications 'only sometimes' or 'not at all' (refer to Q 10 and 11 in Table 1).

As there is no published data on the frequency at which children refuse topical nasal medications, a sample size calculation was based on an estimate that 50% of children using topical nasal medications would have difficulties accepting this mode of administration. At this estimate of 50%,

Table 1. Survey Questions Pertaining to preference, acceptance, and difficulties in administering topical nasal medication

Question no. from questionnaire	Question	Options provided for answers
3b	Which form of drug(s) does your child most prefer?	No preference (abide by Dr's recommendations) Tablet pills Oral liquid Nasal Spray Nasal drops Nasal dry powder Others
10	How willing is your child in taking the topical nasal medication?	Not willing at all Slightly unwilling Neutral Quite willing Very willing
11	How successful have you been in using the medicine on your child according to how often it is prescribed?	All or almost all the time More than half the time Only sometimes Not at all
12	Has there been difficulties/unpleasantness in administering the medication? Indicate which difficulty you have encountered: Child flatly refuses Child struggles away Child complains of itch/pain/discomfort Child is fearful/cries/experiences anxiety Child only allows application of one nostril Nosebleed Medicine flowing out of nose/down throat Unpleasant aftertaste Nostril dryness Others	Yes No Yes No Don't know Not applicable

the 95% confidence interval would be 43–57%, with a sample size of 200 subjects.

SPSS software version 16.0 for Windows (SPSS Inc., Chicago, IL, USA) was used for data analysis. Logistic regression analysis was carried out to compare demographic and clinical factors associated with refusal to use topical nasal medications. Level of significance was set at 0.05.

Results

Two hundred subjects were recruited. This survey was conducted between April and July 2008, of which 194 responses were analyzed. The six subjects excluded from analysis were later found not to have a diagnosis of rhinitis. The surveyed population provided a fair representation of the ethnic composition of the Singapore population (Table 2). The mean age was 7.54 yr (age 1–15) and males to females ratio was 1.6 to 1.

Of the 194 patients surveyed, 48 (24.7%, $p < 0.001$) found the use of topical nasal medication unacceptable, as defined in the Materials and Methods. The older children aged 7–15 were more accepting of the topical nasal route of administration when compared to 1- to 6-yr-old patients (adj OR 2.9, 95% CI 1.4–6.0). The other factors analyzed – gender, ethnicity, use in other family members, length of usage, and the response to therapy – did not influence their acceptance.

Table 2. Survey demographics

	Subjects (n = 194)
Age (%)	
Mean (years)	7.54 (S.D. = 3.775)
<7	86 (44.3)
≥7	108 (55.7)
Gender (%)	
Male	120 (61.9)
Female	74 (38.1)
Male:female ratio	1.6:1
Ethnicity (%)	
Chinese	121 (62.4)
Malay	46 (23.7)
Indian	19 (9.8)
Others	8 (4.1)
Nationality (%)	
Singaporeans	137 (70.6)
Others (includes Indonesians, Indians, Americans)	57 (29.4)
Classification of rhinitis (%)	
Non-specific	88 (45.4)
Infective	7 (3.6)
Intermittent allergic	6 (3.1)
Persistent allergic	73 (37.6)
Intermittent non-allergic	1 (0.5)
Persistent non-allergic	19 (9.8)

The questionnaire also included the subjects' preference for the route of drug administration. Of those who were prescribed both oral medication and nasal medications for their rhinitis ($n = 167$ or 86%), more than half (55%) did not indicate a preference for either route and would instead accept the doctors' recommendation. However, of the 45% ($n = 75$) who could indicate their preferred route of drug administration, 73% did indicate a preference for oral medication, while only 11% preferred the nasal route.

In addition, half of the children did complain of difficulties or unpleasantness with nasal sprays/drops (Table 3). Of these, the most common problems were discomfort, itch or pain (31%), and medication flowing down the nose and throat (23%).

Discussion

Compliance to medication is largely dependent on the patient's attitude toward the medications they are prescribed. The acceptance, compliance, and preference of inhaler medications and devices for asthma have been extensively studied generally (13), individually (14–16), and comparatively (17–20). Factors (21–23) and measures (24, 25) to improve compliance have also been widely studied. There has, however, not been any published study on children's responses to topical nasal medications. In our study, a substantial proportion (24.7%) of children surveyed found topical nasal sprays and drops unacceptable. About half (47.9%) of the children did complain of difficulties or unpleasantness with such medication. In contrast, a study conducted on adult subjects showed that the acceptance of triamcinolone acetonide nasal aerosol spray (Nasacort) and fluticasone propionate solution sprays (Flonase) were both well tolerated (26). It therefore

Table 3. Difficulties/unpleasantness experienced during administration*

Difficulties/unpleasantness	Percentage (n = 194)
Complaints of itch/pain/discomfort	31
Medication flowing down throat/nose	23
Struggle away	20
Experiences fear/anxiety/cries	16
Flat refusal	16
Unpleasant aftertaste	15
Only allowing application of 1 nostril	10
Nostril dryness	9
Nosebleed	0

*Difficulties/unpleasantness experienced during administration was obtained from listed options provided in Q12 of questionnaire.

appears apparent that children in general might have a lower tolerance than adults for such medication. Furthermore, our study showed that among children, the younger subjects rejected this route of therapy more when compared to older ones, indicating that younger patients had have most difficulty.

The physical and sensory attributes of intranasal corticosteroids, such as their taste and odor, could influence patients' preference toward nasal sprays and drops; yet they are often overlooked. The Allergies in America survey among adults reported that side effects such as drying sensation, dripping down throat, and bad taste did bother about 35% of the study subjects with allergic rhinitis (27). In our survey, 60 children (30.9%) surveyed did complain of discomfort, itch, or pain, while 29 children (14.9%) surveyed did complain of an unpleasant taste when using nasal sprays/drops. It has been shown that improving these characteristics such as aftertaste, odor, and burning sensation could improve compliance (27, 28). Our study did not evaluate in depth preferences for the different varieties of intranasal corticosteroids.

While parents of subjects indicated that the oral route was the most preferred route of drug administration, the acceptance and difficulties encountered in administering oral medications were not directly evaluated in this survey; only a handful of parents reported problems with the administration of oral medications (data not shown).

Of interest was the significant proportion of subjects (55%) who did not indicate a preference for oral or nasal medication but instead chose to accept the doctor's recommendations. This is possibly a cultural feature of our population of accepting the doctor's recommendation without questioning.

In conclusion, it is prudent for clinicians to anticipate that children prescribed topical nasal medications for the treatment of rhinitis may find it an unacceptable route of drug delivery, and this may impact their compliance to medicate, which in turn has a significant impact on treatment efficacy (29). It was observed that a large portion of non-compliant patients simply 'forgot' to use their medication (29); more research needs to be conducted to further establish other factors affecting compliance with topical nasal medication. Patient education, training on the use of nasal sprays and drops (29), or product enhancement may improve the compliance for these medications, otherwise alternative medications or route of administration may need to be considered.

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