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Frequency and causes of self-medication in patients with chronic rhinosinusitis, North of Iran, 2018–2019

Shirin Parvinroo[1] · Hossein Rouhi Khalkhali Pargam[1] · Rastin Hosseinzadeh Asli[2] · Elahe Rafiei[3] · Shadman Nemati[2]

Abstract

Purpose Chronic rhinosinusitis (CRS) is a frequent respiratory disease. As self-medication is a common issue in the world, this study aimed to estimate its frequency in patients with CRS.

Methods 144 CRS patients referred to a university hospital, were evaluated for self-medication, included type, duration, frequency, and its causes, their SNOT-22 questionnaire and Lund–MacKay scores. The data were analyzed using SPSS v.21 and the level of significance was considered as $P \geq 0.05$.

Results 30.6% of the cases used self-medication (65.9% used chemical drugs and 63.6% used herbal drugs), not associated with their age, gender, educational or economic level. The most common chemical drugs were antibiotics, analgesics and decongestants (75.9%, 55.2% and 10.3%, respectively) and the most common non-pharmaceutical agents included steam inhalation and herbal infusions (71.4%). The efficacy of self-medication was rated as "none" to "little" in 54.64% of cases. The mean SNOT-22 score was 59.54 ± 10.93 and 73.27 ± 8.12 in cases without and with self-medication ($P = 0.034$), and the mean Lund–MacKay score was 11.8 ± 5.3 and 17.2 ± 4.3 in cases without and with self-medication, respectively ($P = 0.002$). The top reasons for self-medication were "considering the disease unimportant" and believing chemical drugs being "harmful", "expensive", or "non-effective". Most patients who used self-medication did "not" advise it to others (80%).

Conclusion The high rate of self-medication in CRS patients calls for greater attention to this issue in these patients. It seems that self-medication is significantly associated with more severe grades of disease and lower QOL in CRS cases.

Keywords Rhinosinusitis · Self-medication · Over the counter · Herbal medicine · Pharmaceutical preparations · Medicine · Traditional

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Introduction

Chronic rhinosinusitis (CRS) is the chronic inflammation of sinonasal mucosa, with clinical symptoms (such as nasal congestion, rhinorrhea, facial pain/pressure, and reduced/loss of smell) lasting for more than 12 weeks [1]. CRS is a prevalent upper respiratory disease with a variable incidence in different geographic regions and years [2], ranging from about 2% in the general population of the United States [3] to about 11% in Europe [4]. A higher rate, severity, and burden are reported in patients with comorbid conditions (such as asthma, chronic obstructive pulmonary disease, and allergies), in specific races, and in the elderly [5–7]. In Iran, the overall prevalence of sinusitis was reported at 53% [8]. Although CRS is not directly related to mortality and morbidity, it impairs the patients' quality of life (QOL) [9] and imposes a great social and economic cost to the affected

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patients [10]. Therefore, appropriate diagnosis and treatment of CRS are of great importance [11].
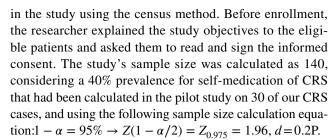
Controlling the clinical symptoms, avoiding complications, and improving patients QOL are the main goals of CRS treatment [12]. The general treatment of CRS includes daily saline irrigation, intranasal and oral corticosteroids, antibodies, and surgery [13–17]. The indications and duration of each treatment should be decided by the physician, according to the updated guidelines, for achieving the maximum efficacy, preventing adverse effects and medication interferences [18, 19]. Despite the clear and comprehensive guidelines, most patients are frustrated with their CRS management [20]. Time-consuming and difficult use of nasal irrigation, unawareness about the correct technique of using the sprays and solutions, delays in referrals, repeated medications, and also, high cost of physicians' visits and their prescribed drugs can result in reduced trust of patients to the health system and tending towards "self-medication" with over-the-counter (OTC) medications and complementary medicine [21, 22]. Furthermore, with the ongoing popularity of traditional medicine and confirming their efficacy in various populations of patients, especially those with chronic diseases, it is not surprising that more CRS patients would tend towards self-medication, rather than referring to a physician [23].

Considering the adverse consequences of self-medication, such as drug reactions and interactions, microbial resistance (because of the irrational use of antibiotics), adverse effects of the misused medications, missed diagnosis, delay in the appropriate treatment, and wasting the healthcare resources, it is necessary to investigate the patterns of self-medication in patients with CRS for a more efficient patient care [24]. In some countries, such as Iran, the frequency of self-medication is considerably high (53% of the general Iranian population, 63% of students, and 68% of the elderly) [25], but to our best of knowledge, there is not any specific study in the region and especially in Iran about self-medication and its patterns in CRS patients. Considering the lack of such study in our country, the present study aimed to estimate the frequency, patterns, and causes of self-medication in patients with CRS.

Materials and methods

Study design

The present cross-sectional study was conducted on patients with a definite diagnosis of CRS, made by an ear-nose-throat (ENT) specialist, who referred to Amiralmomenin university hospital, Rasht, in the north of Iran, from February 2018 to March 2019. All patients aged 15–70, gave consent for participation in the study, and were enrolled in the study using the census method. Before enrollment, the researcher explained the study objectives to the eligible patients and asked them to read and sign the informed consent. The study's sample size was calculated as 140, considering a 40% prevalence for self-medication of CRS that had been calculated in the pilot study on 30 of our CRS cases, and using the following sample size calculation equation:$1 - \alpha = 95\% \rightarrow Z(1 - \alpha/2) = Z_{0.975} = 1.96, d = 0.2$P.

The patients demographics, including age, gender, marital status, educational level, occupation, income, address, and insurance type, were recorded from the medical records of the hospital. Any missing information was completed by asking the patients. Also, during history taking, the ENT specialist completed the study checklist for each patients, which included the results of ENT and rhinology physical examinations (i.e. anterior rhinoscopy and endoscopic rhino-sinus examination using rigid 30° sinus telescopes), as well as clinical symptoms/signs of CRS. To evaluate the disease severity, we used SNOT-22 standard questionnaire as a valid scale, which consists of 22 questions. Each question is scored from zero to five; a score of zero means that the patient lacks that symptom and a score of five means that the symptom has appeared in its most severe form. In total, the score range of the questionnaire is from zero to 110. SNOT-22, answered by the patient, is currently the simplest and most common standard questionnaire used for assessing CRS all around the world, and the Persian version of the questionnaire was first translated and validated by Jalessi et al. in [26]. Also, history of smoking (and using hookah), substance abuse, family history of CRS, personal history of allergic rhinitis, asthma, hypersensitivity to aspirin/nonsteroid anti-inflammatory drugs (NSAIDs), as well as previous referral to a physician for CRS and the medications they received were recorded. All the patients underwent coronal CT scan of paranasal sinuses (PNS; without contrast), and the extent of their rhino-sinus disease was calculated by Lund–Mackay scoring system [27], the most popular method applied to CT description of sinus disease. A score of 0, 1, or 2 is given for normal, partial opacification, and total opacification, respectively, evaluated at five sub-sites: (1) anterior ethmoid, (2) posterior ethmoid, (3) frontal, (4) maxillary, and (5) sphenoid sinuses on each side. A score of either zero or two is given for a patent or obstructed osteomeatal complex, respectively, on each side of the sino-nasal cavity, which yields a maximum score of 12 per side.

For evaluating the self-medication in the patients, a researcher-made information sheath was used. This questionnaire was designed by the research team, based on a complete literature review and the clinical experience of the ENT specialists. After the questionnaire was designed, it was reviewed by ten experts (including ENT specialists, general physicians, and pharmaceutical experts), for evaluating its content validity, including content validity index and rate. Each expert

evaluated each question with the general content, considering four criteria of simplicity, clearness, relatedness, and necessity. In addition, the experts commented on the clearness of the items and how they should be asked from the patients.

The information sheath included ten questions, four questions were a yes/no question, evaluating whether the patient has ever used OTC medication (Q#1), re-use the previous medical prescription (Q#3) of him/her or another person (Q#4), ever experienced a negative effect from self-medication (Q#8) (if yes please explain), and whether he/she considers self-medication a trustworthy method that he/she would recommend to others. Question #2 evaluated the source of information they would use for self-medication, Q#5 evaluated the type of medication/drug they used with categories into chemical medications (including analgesics, antibiotics, corticosteroid, decongestants, adult cold tablets, nasal drops, saline serum, and others; each category included a multiple-choice on the most frequent medications and others for more explanation) and herbal/traditional drugs, which included Anbarnesa (female donkey dung) smoke, apple vinegar, other steaming agents, herbal teas, herbal extracts, tropical oils, menthol drop which contains 5% mint (*Mentha piperita*) essential oil, black seed (*Nigella sativa* L.) and honey mixture, hot water compression, and others. Q#6 asked the frequency and duration of using the above-mentioned drugs. Q#7 asked about the efficacy of self-medication on CRS by multiple choices (None, very little, little, intermediate, and high) and Q#9 asked about the cause of using self-medication by multiple choices and others for further explanation. The answer to Q#1 was considered for reporting using self-medication in the patient as positive/negative.

Statistical analysis

The collected data were input into the statistical software IBM SPSS Statistics for Windows version 21.0 (IBM Corp. 2012. Armonk, NY: IBM Corp). The descriptive results were presented by mean ± standard deviation (SD), 95% confidence interval (CI) for quantitative variables with normal distribution and by median (min–max) for quantitative variables without normal distribution. Categorical variables were described using frequency (percentage). Shapiro–Wilk test and Q–Q plot were used to determine the normal distribution of data. Comparison of categorical variables was performed using Chi-square test and Fisher's exact test. The statistical significance was set at 0.05.

Results

Out of 144 patients who completed the study, 81 patients were men (56.3%), and more than half were 30–50 years old, most were single (79.2%). Fifty-five out of our 144 CRS cases (38.2%) had CRS with nasal polyposis (CRSwNP) and mean time of their disease was 4.5 ± 0.4 years. The demographics of the participants and their difference according to the self-medication are shown in Table 1. Only three patients smoked cigarettes and reported do not smoking hookah or substance abuse. Eleven percent reported a positive family history of CRS, 1.4% had allergic rhinitis, and 15% of cases reported asthma or hypersensitivity to aspirin/NSAIDs. The most frequent symptoms were nasal discharge (70.1%) and postnasal discharge (47.2%). Only one patient had referred to rhinologist for CRS medication previously and received antibiotics.

Of all 144 patients, 44 answered yes to the first question (30.6%) and were considered positive for self-medication. As shown in Table 2, the personal views were the most frequent source of information (47.7%). Only five used a previous prescription (11.4%), three of whom used their own prescription and two from others. Most of the patients with positive self-medication (65.9%, $N = 29$) used chemical drugs (antibiotics as the commonest drugs and analgesics and decongestants in the second and third places: 76%, 55.2% and 10.3%, respectively), and 28 patients (63.6%) used traditional/herbal drugs; the type of drugs used are shown in Table 2.

The duration of using the drugs (chemical and/or herbal) ranged from 3 and 5 days (each in 11.4%) to more than 1 year (in 6.8% of cases), with 1 week and 2 weeks-durations were more frequent (each 13.6%), and 10 patients (22.7%) declared using self-medication only when being symptomatic. The frequency of using the drugs (chemical and/or herbal) was once a day in 20 patients (45.5%), twice a day in 15 (34.1%), three times a day in 8 (18.2%), and more than three times a day in one patient (2.3%).

The efficacy of these medications from the self-perspective of the subjects was rated as "none", "very little", and "little" in the majority of our cases (54.64%), and only five patients (11.4%) declared its efficacy as "high". Also, five patients reported a "negative" effect by using these medications, which included worsening symptoms after withdrawal (four patients) and gastrointestinal problem (one patient). The mean QOL score (evaluated using SNOT-22 questionnaire) was 59.54 ± 10.93 in cases without using self-medication and 73.27 ± 8.12 in cases who used self-medication ($P = 0.034$). The mean Lund–MacKay score in none self-medication users was 11.8 ± 5.3 and in self-medication subgroup was 17.2 ± 4.3 ($P = 0.002$). It seems that the the association of self-medication with more severe grades of disease and lower QOL in our CRS cases is significant.

The causes of self-medication are shown in Table 3. As demonstrated, "My problem was not that severe to refer to a physician", "I have experienced this condition before and knew what medication to use", and "chemical agents have a high rate of adverse effects" had the highest frequencies

Table 1 The demographic characteristics of CRS patients in total and according to the self-medication

Variables	Categories	Total	Self-medication		P value
			Positive	Negative	
Age (years)	18–30	22 (15.3)	8 (18.2)	14 (14)	0.349[a]
	30–50	92 (63.9)	30 (68.2)	62 (62)	
	≥ 50	30 (20.8)	6 (13.6)	24 (24)	
Sex	Male	81 (56.3)	21 (47.7)	60 (60)	0.171[a]
	Female	63 (43.8)	23 (52.3)	40 (40)	
Marital status	Married	30 (20.8)	8 (18.2)	22 (22)	0.603[a]
	Single	114 (79.2)	36 (81.8)	78 (78)	
Educational level	Below high school	53 (36.8)	15 (34.1)	38 (38)	0.894
	High school diploma	45 (31.25)	14 (31.8)	31 (31)	
	Academic degree	46 (31.94)	15 (34.1)	31 (31)	
Occupation	Housekeeper	54 (37.5)	16 (36.4)	38 (38)	0.930[b]
	Businessman/woman	36 (25)	11 (25)	25 (25)	
	Employee	28 (19.4)	10 (22.7)	18 (18)	
	Retired	14 (9.7)	3 (6.8)	11 (11)	
	Farmer	1 (0.7)	0	1 (1)	
	Jobless	11 (7.6)	4 (9.1)	7 (7)	
Lund–Mackay score	CT description of sinus disease		17.2 ± 4.3	11.8 ± 5.3	0.002
SNOT-22 score	Questionnaire		73.27 ± 8.12	59.54 ± 10.93	0.034
Total period of chronic rhinosinusitis	Year	4.5 ± 0.4	4.7 ± 0.6		0.124
Health insurance	No	9 (6.25)	5 (11.4)	4 (4)	0.132[b]
	Yes	135 (93.75)	39 (88.6)	96 (96)	

All values are reported as number (percent)

[a]The results of chi-square test

[b]The result of Fisher's exact test

(31.8%, 22.7%, and 13.6%, respectively). Of the 44 patients who used self-medication, only nine considered it as an efficient method that would advise others (20.5%).

Discussion

In this descriptive cross-sectional study, we interviewed the patients with CRS to find out the frequency, pattern, and causes of self-medication and the results showed that about one-third of the interviewed patients used self-medication, the frequency of which was not different according to the patients age range, sex, marital status, educational level, occupation, income, and insurance. According to the review of 25 Iranian studies in 2015, the overall frequency of self-medication is 53% in general population and 68% in the elderly [25]. In another study, house-to-house interview in Gorgan showed the frequency of self-medication at about 68% [28]. Different rates have been reported in other countries, ranging from 8.5% to 98.0% [29]. Although these results confirm the significance of self-medication, the reported rates are lower or much higher than that of the present study, which might be due to the fact that none of them had focused on patients with CRS. Considering the effect of demographics on self-medication, a review of studies has shown conflicting results among studies; some have reported significant effect for age, sex, and educational level of participants [28–31], while others have not [32, 33]. We observed a fraction of one-third of our CRS cases used self-medication, and this may interpreted as a "non-major" problem by some experts, but as the aspects of self-medication in patients with CRS may differ in regions/countries, and also in other chronic diseases and even from the general population, more studies are required on patients with CRS for definite conclusions and comparison of the reported rates and associated factors.

The results of the present study showed antibiotics as the commonest self-medication used (76%) and analgesics and decongestants in the second and third place (55.2% and 10.3%, respectively). Antibiotic overuse is an important issue that results in microbial resistance and its increasing trend of incidence is becoming a worldwide crisis [34, 35]. According to that, several studies have focused on antibiotic self-medication, reporting different rates for antibiotic

Table 2 The frequency of the source of information and the type of drugs used

Variable	Categories	Subgroups	N (%)
Source of information	Personal views		21 (47.7)
	Herbalist		9 (20.5)
	Family and friends		9 (20.5)
	Internet advertises		1 (2.3)
	Pharmacy technician		1 (2.3)
	Others		3 (6.8)
Type of chemical medication used (N=29)[a]	Analgesic (N=16, 55.2%)	Acetaminophen	10 (62.5)
		Ibuprofen	6 (37.5)
		Acetaminophen codeine	3 (18.8)
		Other	1 (6.3)
	Antibiotic (N=22, 75.9%)	Co-amoxiclav	10 (45.5)
		Amoxicillin	7 (31.8)
		Cefexime	6 (27.3)
		Azithromycin	1 (4.5)
		Clarithromycin	1 (4.5)
	Corticosteroid	Yes	2 (6.9)
	Antihistamine	Yes	7 (24.1)
	Adult cold	Yes	9 (31)
	Nasal decongestant (N=3)	Phenylephrine	2 (66.7)
		Naphazoline	1 (33.3)
	Saline serum	Yes	12 (41.4)
Type of traditional medicine used (N=28)[a]	Anbarnesa	Yes	2 (7.1)
	Other steams (N=20)	Eucalyptus	10 (50)
		Hot water	5 (25)
		Mint	4 (20)
		Sea salt	1 (5)
	Herbal infusions (N=8)	*Mentha pulegium*	3 (37.5)
		Mint	2 (25)
		Thymus	2 (25)
		Damask rose and violet	1 (12.5)
	Herbal extract	Yes	1 (3.6)
	Topical oil	Yes	4 (14.3)
	Menthol drop	Yes	2 (7.1)
	Black seed and honey mixture	Yes	2 (7.1)
	Hot water compression	Yes	3 (10.7)
	Other	Sinusitis powder	3 (33.3)
		Salty water inspiration	3 (33.3)
		Honey and lime in hot water	2 (22.2)
		Salty water spool	1 (11.1)

[a]As most of the patients used more than one drug, the total percent exceeds 100%

self-medication, ranging from 1 to 100% in different countries (17 studies reported low rate, 21 medium, and 7 high rates) [36]. Prescribing the appropriate number of antibiotics, to prevent left-overs, prohibiting pharmacies from providing medications without prescription to the patients, and educating the population to increase their knowledge have been suggested as effective strategies to prevent this phenomenon [30]. Although studies on self-medication have not focused on CRS, upper respiratory tract infections have been reported as the commonest reason for self-medication in European countries [37]. Another significant point is that the antibiotics are not the "Over the Counter" drug in many European and American countries. Also, its main adverse effect (i.e. increasing tolerance of the organisms against the drugs) may not affect the patients directly, but obviously this is a bad habit with many direct and indirect adverse

Table 3 The frequency of the cause of self-medication from the participants perspective

The choice marked by the patient	N (%)
I am an employee and have little time to go to the doctor	3 (6.8)
Previous medications of general physicians were not efficient	2 (4.5)
Previous treatments of specialist physicians were not efficient	2 (4.5)
The waiting time is too long for a specialist visit	3 (6.8)
I do not trust the medications prescribed by a specialist	2 (4.5)
I have experienced this condition before and knew which medication to use	10 (22.7)
It was not a serious condition and did not require going to a doctor	14 (31.8)
The chemical drugs have a high rate of adverse/side effects	6 (13.6)
Other	2 (4.5)

N number

effects on health system of the countries. More studies are required in terms of CRS to be comparable with the results of the present study. Decongestants are also reported as one of the frequent medications overused, reported in half of the patients with rhinitis, higher in patients with severe and longer symptoms, sleep disturbance, and obese patients [38]. Ansam F. Sawalha also reported decongestants as the second most prevalent self-medication (45.3%) in Palestinian students [39]. As we know, rhinitis medicamentosa and chronic, persistent sense of nose obstruction are one of the most important adverse effects of nasal topical decongestants, which is sometimes very difficult to treat. Antihistaminic self-medication was used most frequently for allergic rhinitis and sinusitis by undergraduate medical students in another study [40]. Although these studies have not focused on CRS, which may the source of different rates reported, they confirm the significance of decongestant self-medication.

In the present study, we evaluated the type of medications in two categories of pharmaceutical and non-pharmaceutical agents and the results showed their self-medication practice in 65.9% and 63.6% of the participants, respectively. Steam inhalation (71.4%) and herbal infusions were the most frequent non-pharmaceutical agents used in the present study. This is while steam inhalation has not been approved in the accepted guidelines as a definite treatment of CRS and considered not effective for recurrent sinus symptoms and CRS [41, 42]. Some have suggested the effect of steam inhalation on symptom relief (such as reducing the nasal mucocilliary clearance) [43]. Beside the controversy on the efficacy of steam inhalation on CRS, using this method as the only therapeutic method used by the patient disallows appropriate management and increases the risk of CRS complications [24, 44]. Herbal supplements are also widely used in patients with CRS and supported by the traditional medicine research [45, 46]. However, the patients using herbal teas as self-medication may not be aware of the appropriate concentration, dose, and duration of use, and their overuse may result in adverse effects or toxicity for them. Therefore, non-pharmaceutical agents should also be used under the

supervision of a traditional medicine specialist/expert and not by the patient her/himself with insufficient knowledge about the indications, contra-indications (risks and benefits) of each supplement [47].

Studying the cause of self-medication in the present study showed "considering the disease unimportant and feeling no requirement to refer to a physician", "experience of this condition before and knowing what medication to use", and "high rate of adverse effects of the chemical agents" as the most common reasons. Albeit, in our cases, this argument of some patients that considered their disease unimportant and estimated their problem as slight and non-serious was in contrary to their SNOT-22 disease-related QOL scores that we calculated. This may be a kind of "rationalization" and "defensive mechanism" from these cases for their wrong behavior, but the true reason remain to be defined. Similar to these results, "considering the disease a mild condition" has been considered as the top cause of self-medication in the previous review of Iranian studies [25–29]. Jalilian and colleagues also reported the "perceived severity" as the significant factor increasing the odds of self-medication in Hamedan pharmacy visitors [48]. Of 70 articles reviewed by Shaghaghi and colleagues, 15 studies reported "low perceived seriousness of disease" and 7 studies reported "prior experience of similar symptoms" as the top cause [29]. Azami and partners also reported "mild disease", "self-diagnosis", "previous use of medication", and "ease of access to non-prescribed medication" as the top causes in their meta-analysis of 25 studies [25]. These results are consistent with the results of the present study, although the study populations differed, as they have not considered patients with CRS. Karimy and colleagues have also reported "considering self-medication harmless", "having a history of a disease", and "availability of medications at home" as the top reasons [49]. In another Iranian study, "looking for a simple and quick response for symptom relief" was the main objective of self-medication [50]. These results are in line with that of ours and emphasize on the necessity to educate the patients about the risks and harms of self-medication

and the obligation of diagnosis and treatment by a medical physician. Another important factor considered as a cause of self-medication in Iran is the high rate and amount of "medicine storage at home" [51, 52]. Therefore, pharmacist should explain the adverse effects of self-medication, when providing OTC drugs to patients with CRS and physicians should prescribe as many as needed medicines are other strategies that should be implemented by the healthcare workers to reduce self-medication rate in our country.

As the results of the present study also depicted, only 20.5% of participants found self-medication efficient and most of the participants would not advise it to others. Therefore, it is necessary to reduce the self-medication rate in our country to prevent wasting healthcare resources, microbial resistance, adverse effects of the OTC drugs used, and complications of the untreated disease.

The main strength of the present study was the comprehensive evaluation of self-medication in patients with CRS (including frequency, associated factors, patterns, and causes), not addressed previously, as far as the authors are concerned. However, this study had some limitations as well, such as non-randomized inclusion of a small number of patients from one medical tertiary center, which increases selection bias and reduces the reproducibility and generalizability of the results to the whole population.

Conclusion

The high rate of self-medication and the high rate of antibiotics overuse in patients with CRS calls for greater attention to this issue in this specific patient group. The outlined causes of self-medication can be used for the design and implementation of effective programs for the education of this group about the risks and hazards of self-medication. For definite conclusions, further studies are required to explore this issue in a higher sample of population, selected randomly from different regions of the country.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This manuscript is derived from a research project that has been used as a thesis for his doctorate in pharmacy with the research ethics number including: IR.GUMS.REC.1398.531 which is done in Guilan university of medical science in Rasht, Iran.

Consent All participants signed the written informed consent.

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