ARQUIVOS DE ASMA, ALERGIA E IMUNOLOGIA

Original Article

Effects of social distancing during the COVID-19 pandemic on childhood rhinitis

Efeitos do isolamento social pela pandemia por COVID-19 na rinite infantil

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ABSTRACT

Introduction and objective: The COVID-19 pandemic required children to spend more time at home, and this change had a direct impact on the manifestations of various diseases, including rhinitis. Rhinitis is inflammation of the nasal mucosa caused mainly by exposure to allergens, resulting in symptoms such as rhinorrhea, sneezing, nasal obstruction, conjunctival hyperemia, and itchy eyes and nose. This study aimed to evaluate the consequences of social distancing in children with rhinitis in order to understand the changes in the disease pattern during the pandemic. **Methods:** We conducted a cross-sectional observational study with data obtained through an electronic questionnaire answered by parents and/or guardians of children aged 5 to 12 years. **Results:** From a total of 116 responses, 51.7% of children were male with a median age of 8.5 years. In 81% of cases, rhinitis symptoms improved or remained unchanged during the period of social distancing. In a quarter of the sample, there was a worsening of patients' quality of life. The symptoms with the greatest worsening were sneezing and nasal itching, and the symptom with the greatest improvement was rhinorrhea. The most frequent symptom triggers were pets, carpets, and perfumes. Medication use was reported in 59.4% of cases, with the use of over-the-counter medications in 32.7% of them. **Conclusion:** The results showed that social distancing had a positive impact on the clinical manifestations of rhinitis in the study population.

Keywords: Allergic rhinitis, social distancing, quality of life, pediatrics, child.

RESUMO

Introdução e objetivo: Devido à pandemia do novo coronavírus, as crianças passaram a ficar mais tempo em casa, e essa mudança implicou diretamente nas manifestações de diversas doenças, inclusive da rinite. A rinite é a inflamação da mucosa causada, principalmente, por alérgenos, ocasionando sintomas como rinorreia, espirros, obstrução nasal, hiperemia conjuntival, prurido nasal e ocular. O objetivo deste estudo é avaliar as consequências do isolamento social nas crianças com rinite, a fim de compreender a modificação da doença nesse período. **Métodos:** O estudo é observacional transversal, com dados obtidos através de um questionário eletrônico, para pais e/ou responsáveis de crianças entre 5 e 12 anos. **Resultados:** No total de 116 respostas, 51,7% das crianças eram do sexo masculino, e a mediana de idade foi de 8,5 anos. Em relação à rinite, em 81% dos casos foi relatado melhora ou manutenção do quadro durante o período de isolamento social. Em um quarto da amostra houve piora na qualidade de vida dos pacientes. Os sintomas com maior piora foram espirros e prurido nasal, e o sintoma com maior melhora foi a rinorreia. Os desencadeantes de sintomas mais frequentes foram animais domésticos, tapetes e perfumes. O uso de medicamentos foi relatado em 59,4% dos casos, sendo que em 32,7% não houve prescrição médica. **Conclusão:** Os resultados encontrados evidenciaram que o isolamento social teve um impacto positivo em relação às manifestações clínicas da rinite na população estudada.

Descritores: Rinite alérgica, isolamento social, qualidade de vida, pediatria, criança.

Introduction

The novel coronavirus pandemic outbreak in March 2020 led to a period of social isolation and a series of changes in children's routines, as they were required to spend more time at home. These changes have had a direct impact on the manifestations of various chronic diseases, such as rhinitis.[1,2]

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It is known that rhinitis has several subtypes. However, in general, rhinitis is defined as an inflammation of the nasal mucosa caused mainly by contact with allergens. Still, its flares can be triggered by other factors, such as weather changes, contact with respiratory viruses, irritants (strong odors and cigarette smoke), and stress.[1] Symptoms include rhinorrhea, sneezing, nasal obstruction, nasal and ocular itching, and conjunctival hyperemia.[1,2]

The spread of the novel coronavirus in Brazil has required the adoption of measures to prevent the number of cases from increasing. As a result, social isolation has become part of children's routines. As a result, children who previously spent up to two-thirds of their day at school and doing other activities now only spend their time at home.[3]

The changes this new scenario represents, either economically, access to health services, or the closure of schools, have directly affected the quality of life of the pediatric population. Children with chronic illnesses have been particularly affected.[4]

In this light, children who spend more time indoors may have more contact with household allergens such as dust mites, pet epithelia, and mold, favoring rhinitis attacks in sensitized individuals. In addition, stress, which was directly related to routine changes, as children were deprived of meeting their peers, going to school, or to the playground, is a contributing factor to worsening the disease.[1] Furthermore, many children with mental disorders had their treatments interrupted due to lockdown, as seen in the UK, where nearly 26% of children with previous mental illnesses had their access to psychological support interrupted during this period. According to a study conducted in Brazil, the anxiety level in children ranged from 19.4% to 21.8%.[5] These findings suggest poor stress management in children worldwide and in Brazil, which can have a negative effect on other pre-existing illnesses.[4]

In the midst of such an unusual scenario, parents and guardians were observed behaving differently when dealing with chronic diseases such as rhinitis in their children. It is known that this disease, when improperly treated or left untreated, leads to poorer quality of life, with repercussions on children's sleep, school performance and learning, causing irritability and frustration.[6] Some families are being stricter with their treatment, whether medication or environmental control, as they spend more time at home and are more aware of domestic issues. On the other hand, some families, for fear of the coronavirus, do not seek pediatric care to assess their child's current situation, thus hindering proper control of the disease.[4]

According to the WHO, "health is a state of complete physical, mental, and social well-being and is not merely the absence of disease or infirmity."[7] Therefore, it is of the utmost importance to understand what influence the pandemic and, consequently, social isolation have had on the lives of children with chronic illnesses. This study aimed to assess the consequences and compare the symptoms of social isolation in children with any type of rhinitis who spent more time at home exposed to household allergens during the pandemic and, consequently, had fewer upper airway infections.[4]

Methods

This is an observational, cross-sectional study based on data obtained using an electronic questionnaire on the Google Forms platform. The questionnaire included questions the researchers had designed, based on validated questionnaires for the study of rhinitis and quality of life in the pediatric population. It was disseminated on virtual platforms and social groups, and 194 participants responded.

The Ethics Committee approved this study (CAAE 44788921.4.0000.0093. Opinion No. 4.642.694).

The study included 116 parents or guardians of children aged between 5 and 12 years, who had experienced social isolation due to the COVID-19 pandemic and who answered "Yes" to the question "Has a physician or health professional ever diagnosed your child with rhinitis?", indicating to the researchers a strong indication of the presence of rhinitis. We excluded 78 questionnaires whose question was answered "No," making the participant less likely to have been diagnosed with rhinitis.

The questionnaire

The sequence of questions in the study (Figure 1) was based on validated questionnaires for assessing children's quality of life - KIDSCREEN,[8] and also for assessing the disease: RCAT,[9] CARATkids,[10] and ISAAC Questionnaire with rhinitis module.[11] Although no questionnaire aimed specifically at the 5-12 age group, the authors made adjustments in order to formulate questions that parents could answer, aiming for a clear understanding and greater inclusion of ages.

The form includes an Informed Consent Form (ICF), then 2 sections: the first section asks whether their child has ever been diagnosed with rhinitis. If so, the guardian is referred to section 2, with questions assessing the condition of the disease and their child's quality of life. The aim of the questions was to understand the profile of their children according to age and sex. Also, it aimed to establish a relationship between rhinitis associated with asthma and atopic dermatitis through direct questioning about whether they had been previously diagnosed, since the atopic triad can have a negative influence on disease control.[12] The questionnaire also asked about allergic tests and their results. A series of questions was then asked comparing symptoms before and during social isolation, with the following items: improved, worsened, or remained unchanged. They were asked about 7 symptoms related to allergic rhinoconjunctivitis[1]: nasal obstruction, nasal discharge, nasal itching, sneezing, ocular itching, tearing, and conjunctival hyperemia. In addition, they were asked about when they sought medical attention due to rhinitis symptoms and what type of care they received (emergency, teleconsultation, routine), as well as the use of medication (type and quantity compared to the period before social isolation). Regarding quality of life, questions covered 5 different points in relation to the period before social isolation: sleep, diet, involvement in schoolwork, physical activity/play, and stress patterns (irritability, anxiety, sadness, and mood swings). The questionnaire asked about exposure to major household allergens and irritants that could trigger allergic rhinitis symptoms in this sample: dust; cigarette smoke; carpets, curtains, blankets, and winter clothing (wool); pets (dogs, cats, and rodents); air conditioning; mold; pollens (gardens and plants); perfumes, cleaning materials, and clothing and room fresheners.

The criterion used for the final analysis was "worsening of the general pattern of the disease" when at least 3 out of 7 symptoms worsened or 2 of the 7 symptoms worsened, in addition to the need for medical attention for this reason. If the patient showed improvement in at least 3 out of 7 symptoms, this was considered to be an "improvement in the general pattern of the disease." In cases of a draw: 3 worsened symptoms, 3 improved symptoms and 1 symptom remained unchanged, the need for medical attention because of the rhinitis symptoms was considered: children who needed medical attention were considered to have a "worsened disease pattern," those who did not need medical attention were considered to have an "improved disease pattern." If neither of these criteria were met, they were considered as "disease pattern remained unchanged."

In addition, "general worsening in quality of life" was considered when their child worsened in at least 2 out of 5 variables mentioned. If there was an improvement in at least 2 out of 5 variables, it was considered to be an "general improvement in quality of life." In cases of a draw, 2 variables improved, 2 variables worsened, and 1 variable remained unchanged, it was considered to be a "worsening in the overall quality of life." If none of these criteria were met, "quality of life remained unchanged."

These data were collected and entered into a Microsoft Excel spreadsheet. The Kolmogorov-Smirnov and Shapiro-Wilk tests were applied to assess the normality of the quantitative data using GraphPad Prism 3.0. The quantitative variables were expressed as medians (interquartile range). The chi-square test and Fisher's exact test were used to compare the qualitative data using SPSS 17.0. Continuous variables were compared using the Mann-Whitney non-parametric test. P-values of less than 0.05 were considered statistically significant.

Results

After excluding questionnaires whose respondent answered negatively to the initial question about the diagnosis of rhinitis, 116 out of 194 questionnaires were included in the analysis. The sociodemographic data indicated a slight prevalence of male patients, representing 51.7% (n = 60) of the sample. The median age was 8.5 years, interquartile range 6-10. As for the general pattern of rhinitis, when comparing the pattern of the disease in children before the pandemic and during lockdown, 50% improved (p = 0.002), about 20% worsened, and around one-third remained unchanged (p = 0.005). In terms of quality of life, a grouped analysis was chosen, not looking specifically at sleep, diet, participation in activities, and leisure time. As a result, more than half of these cases remained unchanged, one-quarter reported a worsening, and around 20% improved.

According to the answers provided in the questionnaire, an overall improvement was seen in 57.14% (n = 4) of the 7 symptoms assessed, and the remainder remained unchanged (42.86%; n = 3)

when compared to the time before the pandemic. Individually, among the ocular symptoms, pruritus was the worst, present in 16 cases (13.8%). The symptom which improved the most was tearing, totaling 45 cases (38.8%), compared to ocular pruritus, which improved in 42 children (36.2%). As for nasal symptoms, nasal obstruction and rhinorrhea improved the most, as reported by 60 and 68 patients, respectively (51.7% and 58.6%). Sneezing and nasal itching were the symptoms that worsened the most in the children, each 21 reports (18.1%) (Table 1). The only item concerning quality of life was stress, analyzed separately. This showed improvement in only 10% of cases (12 children), worsened in 51 children (44%) and remained unchanged in 53 (46%).

As for exposure to symptom-triggering agents during social isolation – such as dust, pets (cats, dogs, rabbits, and other rodents), pollen, mold, perfumes, air conditioning, cigarette smoke, and carpets – the most frequently described were pets (45%), carpets (42%), and perfumes (35%). The least frequently reported irritant was cigarette smoke, only in 1.7% of the cases.

A comparison of the change in rhinitis pattern with the exposed allergens showed that, among children whose rhinitis worsened, the most exposed triggers were carpets and dust, which accounted for more than a half of the sample (63.6% and 54.5%, respectively). In relation to children whose disease pattern remained unchanged, there was greater exposure to perfumes (54.3%) and carpets (48.6%). Among the patients whose rhinitis improved, the most commonly reported exposed agents were domestic animals (50.8%) and dust (33.9%) (Table 2).

A comparison between the data on changes in the general pattern of the disease (worsened, unchanged, and improved) and changes in quality of life (worsened, unchanged, improved) showed that among patients who experienced a deterioration in the disease, more than half of them had an associated deterioration in quality of life (59.9%). Meanwhile, among patients who experienced an improvement in the disease, only 5.1% reported that quality of life worsened minimally. Considering that rhinitis is one of the pillars of the atopic triad - rhinitis, asthma, and dermatitis - we also compared how the general pattern of the disease changed to the presence or absence of the triad, noting that among patients whose rhinitis worsened, 18 (81.8%) reported no atopic triad. Of the patients whose disease pattern improved, 43 (72.9%) had no atopic triad, and 85.7% of the patients who reported that their rhinitis pattern remained unchanged, also had no atopic triad (Table 3).

In the sample studied, 69 children used medication to control rhinitis symptoms during the pandemic, and 36 of them were under medical follow-up with

Table 1
Description of major symptoms in pediatric patients with allergic rhinitis

	N	%
Sneezing		
Worsened	21	18.1
Unchanged	47	40.5
Improved	48	41.4
Nasal itching		
Worsened	21	18.1
Unchanged	43	37.1
Improved	52	44.8
Eye itching		
Worsened	16	13.8
Unchanged	58	50
Improved	42	36.2
Nasal obstruction		
Worsened	15	12.9
Unchanged	41	35.3
Improved	60	51.7
Conjunctival hyperemia		
Worsened	13	11.2
Unchanged	65	56
Improved	38	32.8
Rhinorrhea		
Worsened	9	7.8
Unchanged	39	33.6
Improved	68	58.6
Lacrimation		
Worsened	4	3.4
Unchanged	67	57.8
Improved	45	38.8

medication guidance before to the pandemic. Thus, 35 used more than 1 class of medication, the most commonly prescribed class was nasal corticosteroids, which accounted for 71% of the sample, and antihistamines (55%). In addition to these, systemic corticosteroids, decongestants, bronchodilators, antileukotrienes, eye drops, nasal saline solution, and homeopathic or herbal medicines were also reported, while systemic corticosteroids were the least used medication class (Table 4).

Table 2
Data on exposure to allergens and irritants in pediatric patients with allergic rhinitis

	Allergic rhinitis					
	Worsened (n=22)		Unchanged (n=35)		Improved (n=59)	
	N	%	N	%	N	%
Triggering factors						
Dust						
Unchanged	10	45.5	28	80	39	66.1
Had more contact	12	54.5	7	20	20	33.9
Animals						
Unchanged	14	63.6	20	57.1	29	49.2
Had more contact	8	36.4	15	42.9	30	50.8
Pollen						
Unchanged	17	77.3	26	74.3	43	72.9
Had more contact	5	22.7	9	25.7	16	27.1
Mold						
Unchanged	19	86.4	31	88.6	58	98.3
Had more contact	3	13.6	4	11.4	1	1.7
Perfume						
Unchanged	16	72.7	16	45.7	42	72.4
Had more contact	6	27.3	19	54.3	16	27.6
Air conditioning						
Unchanged	19	86.4	28	80	47	81
Had more contact	3	13.6	7	20	11	19
Cigarette smoke						
Unchanged	21	95.5	35	100	58	98.3
Had more contact	1	4.5	0	0	1	1.7
Carpets						
Unchanged	8	36.4	18	51.4	41	69.5
Had more contact	14	63.6	17	48.6	18	30.5

During the pandemic, 32 children (27.5%) required medical care due to the perception of an exacerbation of typical rhinitis symptoms. Of these cases, 2 were teleconsultations, 3 were consultations in pediatric emergency rooms, and the remainder were face-to-face consultations in a pediatrician's office. Of the children who did not need medical care for rhinitis symptoms (72.4%), nearly half took their medication at home.

Discussion

This study found that most participants' rhinitis symptoms improved during social isolation as a result of the COVID-19 pandemic. Although the disease and its triggers are multifactorial, with interrelated characteristics, many conditions justify its manifestations and control over time. As observed in some studies on chronic allergic diseases, these children's recovery may have been due to greater parental control over the environment and proper use of medication.[13] Another hypothesis, which Gelardi pointed out in a study with adult patients with allergic rhinitis, is that less exposure to certain triggers of the disease, such as pollen, may have contributed to this outcome,[14] although it should be noted that the pediatric population studied in our municipality is more sensitive to dust mites than to grasses and other pollens.[15]

The literature describes a significant decline in the occurrence of respiratory diseases, excluding COVID-19, during social isolation. Not only can this be explained by a lower demand for health services, justifying a lower number of diagnoses, but also a reduction due to the breakdown of the main mechanism of viral and bacterial dissemination, less circulation of people, distancing in closed places, absence of socializing in nurseries and schools, greater care with hand hygiene, and use of protective masks, among others.[4] Therefore, as airway infection is a trigger for rhinitis,[1] we believe that lower levels of infection have a positive impact on greater rhinitis control, which could explain the findings in this study.

The association between asthma and allergic rhinitis has been widely studied, and many authors consider both to be a spectrum of the same disease, which are interrelated in terms of clinical manifestations and therapeutic approach.[16] According to Brazil's

Table 3
Data on quality of life and presence of the atopic triad in relation to rhinitis pattern in pediatric patients with allergic rhinitis

	Allergic rhinitis						
	Worsened		Unchanged		Improved		
	N	%	N	%	N	%	p-value
Quality of life							
Worsened	13	59.1	13	37.1	3	5.1	< 0.0001
Unchanged	9	40.9	21	60	34	57.6	
Improved	0	–	1	2.9	22	37.3	
Atopic triad							
No	18	81.8	30	85.7	43	72.9	0.34
Yes	4	18.2	5	14.3	16	27.1	

Table 4
Data on the classes of drugs used in pediatric patients with allergic rhinitis

Medication		
Class	**N**	**%**
Antihistamine	38	55
Nasal corticosteroid	49	71
Association of corticosteroid & nasal antihistamine	0	0
Systemic corticosteroid	2	2.8
Decongestant	3	4.3
Bronchodilator	3	4.3
Saline solution	10	14.4
Eye drops	4	5.7
Homeopathy & herbal medicines	5	7.2
Leukotrienes	3	4.3
Others	3	4.3

Rhinitis Consensus,[1] which includes the guidelines of the ARIA (Allergic Rhinitis and its Impact on Asthma) study, the importance of environmental control on both diseases is reinforced, as is the treatment of these conditions in order to improve patients' quality of life. Ferraro et al.[13] showed that children with concomitant asthma and allergic rhinitis had no change in symptom control during social isolation, remaining stable. In our study, this sample improved their symptom pattern.

On the other hand, studies with samples of pediatric and adult patients sensitized to allergenic agents such as dust mites have documented a deterioration in the disease pattern during social isolation. This is because, in patients with positive allergic tests for this allergen, staying indoors has become a risk factor for the manifestation of rhinitis.[17,18] This is difficult to compare with the data in this study, as patients' allergenic sensitization was not documented, but their guardians' reports were. As for the different allergens, it should be noted that although exposure to dust mites occurs indoors and exposure to pollen occurs outdoors, the changes that social isolation imposed have altered families in uneven ways, and this study did not address the type of residence of the participants.

It could be seen that most children were taking some medication, especially nasal corticosteroids and systemic antiallergic drugs. However, only about one-third of them had a specific consultation to follow up the disease. Our hypothesis for this finding is that patients found it difficult and were afraid to go to a health care service because of the risk of being contaminated with COVID-19.[1] Ferraro also points out that the fear of contamination by SARS-CoV-2 has led to continued use of medication.[13] There is a high prevalence of children with allergic rhinitis who seek emergency care during asthma exacerbations, but only 2% of the sample required it, indicating better control of both diseases, given that severe asthma is a reason for seeking medical care.[20]

The sample also reported very low attendance at teleconsultations. This meant that a physician could not follow up on some patients, which favored self-medication during this time, as this is already a common practice in our country and can be harmful to children.[21]

PART 1 - Questions for patient screening.
"Has a physician or health professional ever diagnosed your child with rhinitis?"
☐ Yes
☐ No

PART 2 - Only if the respondent answered "Yes" to the question asked in PART 1.

"What is your child's age? (number only)" (Discursive)

"What is your child's gender?" (Check 1 item)
☐ Female
☐ Male
☐ Other

"What is your relationship with this child?" (Check 1 item)
☐ Mother
☐ Father
☐ Brother / sister
☐ Relative or legal guardian

"Has your child ever had any of the following diagnoses? (more than 1 item may be checked)"
☐ Asthma
☐ Atopic dermatitis (skin)
☐ I don't know
☐ Never had these diagnoses

"Has your child ever had an allergy test, either blood or skin?" (Check 1 item)
☐ Yes, with a positive result
☐ Yes, with a negative result
☐ Never had an allergy test
☐ I don't know

From this point on, all the questions will COMPARE how your child used to feel BEFORE the pandemic/social isolation with DURING the pandemic/social isolation, according to your perception as a guardian.

"During the time your child was at home due to the pandemic, the symptom "stuffy nose":" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, the symptom "runny nose":" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, the symptom "itchy nose":" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, the symptom "sneezing":" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, the symptom "itchy eyes":" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, the symptom "tearing/runny eyes":" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

Figure 1
Questionnaire for the survey

"During the time your child was at home due to the pandemic, the symptom "red eyes":" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, their eating habits, due to the symptoms of rhinitis:" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, their sleeping, due to rhinitis symptoms:" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, involvement with schoolwork/classes, due to rhinitis symptoms:" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, the involvement with playing and doing physical activity, due to the symptoms of rhinitis:" (Check 1 item)
☐ Improved compared to the time before the pandemic
☐ Worsened compared to the time before the pandemic
☐ Remained unchanged

"During the time your child was at home due to the pandemic, did you notice a change in stress patterns (irritability, anxiety, sadness, mood swings) due to rhinitis symptoms?" (Check 1 item)
☐ I noticed that their stress level increased
☐ I noticed that their stress level decreased
☐ I noticed that their stress level remained unchanged

"During the time your child was at home due to the pandemic, did they come into greater contact with the following items, compared to the time before the lockdown?" (more than 1 item may be checked)
☐ Dust
☐ Cigarette smoke
☐ Carpets, curtains, blankets, winter clothes (wool)
☐ Animals such as cats, dogs, rabbits, and other rodents
☐ Air conditioning
☐ Mold
☐ Grass and plant pollen
☐ Perfumes, cleaning materials, room, and clothing fresheners

"During the time your child was at home because of the pandemic, did they need to go to the doctor because of rhinitis?" (Check 1 item)
☐ Yes, they went to the emergency hospital (emergency room) because of their rhinitis
☐ Yes, they went for a routine non-emergency consultation because of their rhinitis
☐ Yes, they had a teleconsultation because of their rhinitis
☐ They did not have to see the doctor because of their rhinitis

"During the time your child was at home due to the pandemic, did they need to take medication for their rhinitis?" (Check 1 item)
☐ Yes, they took the same amount of rhinitis medication as before the pandemic
☐ Yes, but they took more rhinitis medication than before the pandemic
☐ Yes, but they took less rhinitis medication than before the pandemic
☐ No, they did not take any medication before and did not need to take it

"If your child took any medication, write down which ones they took before and which ones they took during the pandemic to treat their rhinitis." (Discursive) _____

_____

_____

Figure 1 *(continuation)*
Questionnaire for the survey

Another issue that has been widely addressed amid this pandemic is mental health. In this regard, children's stress was assessed, and symptoms including irritability, anxiety, sadness, and mood swings were found to be significantly affected during this time: only 10% of children experienced an improvement in stress, which is in line with other studies.[13,22,23]

In addition to these issues, questions related to changes in eating habits, sleep, leisure, and school activities due to rhinitis symptoms were grouped together in this study and showed no change compared to the period before social isolation. In general, the study by Chmielik et al.[24] on children with rhinitis before the COVID-19 pandemic showed that they already had a poorer quality of life compared to healthy children. These observations cannot be compared with those of healthy children, as our study had no control group.

In terms of sleep, the literature shows moderate evidence of change during social isolation, with more hours, but not necessarily poorer quality of sleep.[25-27] An Italian study with obese children pointed to an average reduction of 2.5 hours of physical activity per week during the pandemic, indicating long-term metabolic complications and a potential decline in quality of life.[28] However, in our study we did not measure the number of hours spent on this activity; we only found that, in their parents' view, children did not change their habits during lockdown due to the symptoms of rhinitis. As for eating habits, changes due to rhinitis symptoms did not affect children's daily routine in our study and the literature is not consistent, since decision-making about the menu is mostly made by guardians, who can either limit access to processed foods and fast food because they are at home, or increase their consumption at home due to stress.[26]

The main limitation of this study was the inability to have direct contact with the participants, making it impossible to diagnose rhinitis using criteria and physical examination findings at a doctor's consultation. In addition, as this was a cross-sectional study, it was not possible to follow whether, after the period of resumption of social interactions, the pattern of the disease changed or worsened again for most patients, indicating a clearer cause-effect relationship between the periods. It is therefore suggested that more studies be conducted in the pediatric population, prospectively, in order to better clarify these findings.

Conclusion

This study revealed an improved general pattern of rhinitis in children aged between 5 and 12, as per their guardians' perception. We believe that there was less exposure to infectious agents (such as respiratory viruses and bacteria) and non-infectious agents that function as triggers for rhinitis symptoms. It is concluded that social isolation had a positive effect on the disease, as well as on the quality of life of these children.

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