

Assessing Severity of Symptoms of Children with Allergic Rhinitis Using Visual Analogue Scale in Northwest India**Sunil Kumar¹, Ghanshyam Swami^{2*}, Rivneet Kaur¹, Vijendra Kumar Garg³, Parth Swami⁴**¹Junior Resident, Department of Pediatric Medicine, Sawai Mansingh Medical College, Jaipur, Rajasthan, India²Associate Professor, Department of Pediatric Medicine, Sawai Mansingh Medical College, Jaipur, Rajasthan, India³Assistant Professor, Department of Pediatric Medicine, Sawai Mansingh Medical College, Jaipur, Rajasthan, India⁴Undergraduate, Shri Kalyan Government Medical College, Sikar, India

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Conflict of interest: Nil

Abstract:**Background:** Allergic rhinitis is a common chronic condition in the paediatric population. No reports regarding the assessment of the severity of symptoms of children with allergic rhinitis in the Indian population have been found in the available literature. The aim of this study was to assess severity of symptoms of allergic rhinitis in children using Visual Analogue Scale (VAS).**Material and Methods:** Seventy-five children with allergic rhinitis participated in the study (40 girls, and 35 boys, aged 7-13 years, mean age 10.71±4.83). Children were asked to evaluate their rhinitis symptoms by using Visual Analogue Scale (VAS).**Results:** The severity of symptoms of Perennial allergic rhinitis (PAR) was higher than the intermittent allergic rhinitis (IAR) as assessed by the Visual Analogue Scale (VAS). Mild Intermittent Allergic Rhinitis (IAR) was the predominant type of Allergic Rhinitis in our study.**Conclusion:** VAS scale helps in easy interpretation of severity of symptoms. The severity of symptoms of Perennial allergic rhinitis (PAR) was higher than the Intermittent allergic rhinitis (IAR).**Keywords:** Allergic rhinitis, Visual Analogue scale (VAS), Intermittent Allergic Rhinitis (IAR), Perennial Allergic Rhinitis (PAR).

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Introduction

Allergic Rhinitis is a common chronic disease affecting 20-30% of children [1]. Allergic Rhinitis is an IgE mediated inflammatory disorder of the Nasal mucosa marked by Nasal congestion, Rhinorrhea, Nasal Blockage and Itching. Any 2 of the above 4 symptoms must be present for >1 hour every day for 2 or more than 2 weeks for the diagnosis of the Allergic rhinitis.

House dust mites, molds and airborne pollen constitute major triggering factors for AR [2]. Allergic rhinitis can lead to a range of symptoms, beside the above four cardinal symptoms like itchy eyes, postnasal drip, throat itching & mouth breathing. These symptoms can significantly impact a child's quality of life, interfering with their sleep, school performance, and daily activities.

The severity of symptoms of AR varies from mild to troublesome symptoms restricting their Leisure/Sports activities, disturbing sleep and

School absenteeism [3,4,5,6]. Assessing the severity of allergic rhinitis symptoms is essential to determine the appropriate treatment plan and management strategies. It is important for parents, caregivers, and healthcare professionals to be aware of the signs and symptoms of allergic rhinitis in children and to use appropriate tools to assess symptom severity to provide optimal care and management of this condition.

Several tools are available for assessing symptom severity. Visual analogue scale is one of the tools used for the assessment of the severity of the symptoms of Allergic rhinitis.

The Visual Analog Scale (VAS) is a simple and widely used tool for assessing the severity of allergic rhinitis symptoms in children. It consists of a 10 cm horizontal line with the endpoints labeled as "Not at all bothersome" and "Intolerably bothersome". The child is asked to mark the point

on the line that corresponds to the severity of their symptoms, with a higher score indicating more severe symptoms. The VAS can be used to assess the severity of individual symptoms such as nasal congestion, itching, sneezing, and runny nose, as well as the overall severity of allergic rhinitis symptoms. The scale is easy to use, and children as young as 5 years old can understand and complete it. It is also useful for monitoring symptom severity over time and evaluating the effectiveness of treatment.

The aim of this study was to analyze the severity of symptoms of children with AR using Visual Analogue Scale (VAS).

Material and Methods

The study was conducted in the department of Pediatric Medicine, at tertiary care centre of North West India. Data was collected between June 2021 to May 2022. This was a hospital based Cross-Sectional Observational Study. Children between 7 to 13 years of age with either sex, diagnosed to be having Allergic Rhinitis on the basis of Allergic Rhinitis and its Impact on Asthma [ARIA] guidelines were chosen. The informed written consent of the parent or guardian was taken. Ethical clearance was taken from the Institutional Ethics Committee before the start of this study. For assessing severity of symptoms, Visual Analogue Scale (VAS), was chosen as assessing tools.

Inclusion Criteria: Children aged between 7-13 years with allergic rhinitis.

Exclusion Criteria: Patients who have any known Immuno-compromised state or any form of malignancy, or on any form of antihistamines for the last 7 days or having Facial and Nasal malformation e.g. Deviated Nasal Septum, Nasal Valve Dysfunction, Choanal Atresia, Foreign Bodies were excluded from this study.

Methodology

Seventy-Five children (40 girls, and 35 boys,) aged between 7 to 13 years diagnosed to have Allergic Rhinitis were got enrolled as a study sample.

Detailed history and clinical examination was done and noted in a pre-designed proforma.

Severity of the Allergic Rhinitis symptoms in subjects was assessed by the Visual Analogue scale. The subjects were evaluated for the severity of Allergic rhinitis (AR) symptoms for the Global Discomfort in the previous week using Visual Analogue Scale (VAS). Response from Visual Analogue scale was analyzed for Severity of Symptoms of Allergic Rhinitis. VAS –is a psychometric measuring instrument to document the characteristics of diseases related to severity in individual patients. It is a horizontal 10 cm long scale with ends representing 0 [not at all bothersome] to 10 [Intolerably bothersome]. This scale is very useful for everyday practice, to know the severity of diseases. This scale is very simple and effective and has a low susceptibility of errors.

All statistical analysis was done using Epi information version 7.2.1.0 statistical software and a "p" value < 0.05 was taken as significant.

Results

Baseline demographic data are given in Table 1. Which shows, Mean age 10.71±4.83 years & Male-female ratio of 0.85. The Mean VAS scores of various symptoms were (38.4±16), (36.5±18.6), (30.4±20.4), (38.8±18.4) for Runny nose, Sneezing, Blocked Nose & Itchy Nose respectively [Table 2]. The average VAS score was 35.8±18.7.

In our study, 44.4% of cases were in Mild Intermittent Allergic Rhinitis (IAR), 22.7% of cases were in Moderate-to-Severe Intermittent Allergic Rhinitis (IAR), 2.7% of cases were in Mild Persistent Allergic Rhinitis (PAR), 30.7% of cases were in Moderate- Severe Persistent Allergic Rhinitis (PAR). [Table 3]. Mean VAS score of Mild IAR, Mild PAR, Moderate-to-Severe IAR, Moderate-to-Severe PAR was 31.9±15.6, 31.25±20.8, 39.2±19.8, 46.2±18.3 respectively [Table 4]. The average VAS score of Perennial Allergic Rhinitis (PAR) was 45±19 and the Intermittent Allergic Rhinitis(IAR) was 31.83±17 [Table 5], with a significant P value of <0.05.

Table 1: Baseline demographic data

Mean Age	10.71±4.83 years
Male: female Ratio	0.85:1

Table 2: Mean VAS score of various symptoms among study subjects

Symptoms	VAS (Mean ± SD)
Running nose	38.4±16
Sneezing	36.5±18.6
Blocked nose	30.4±20.4
Itchy nose	38.8±18.4
Average VAS score	35.8±18.7

Table 3: Classification of Allergic Rhinitis

Classification	N [%]
Mild IAR	33 [44.4%]
Moderate-to-Severe IAR	17 [22.7%]
Mild PAR	2 [2.7%]
Moderate-to-Severe PAR	23 [30.7%]
Total	75

Table 4: Allocation of Total VAS Score of various symptoms to types of Allergic Rhinitis

AR	Total VAS score
Mild IAR	31.9±15.6
Mild PAR	31.25±20.8
Moderate-to-severe IAR	39.2±19.8
Moderate-to-severe PAR	46.2±18.3

Table 5: Mean VAS Score of Intermittent Allergic Rhinitis and Perennial Allergic Rhinitis

Allergic Rhinitis	VAS Score	p-Value
Intermittent allergic rhinitis (Mild + Moderate-to-Severe IAR)	31.83±17	<0.0001
Perennial allergic rhinitis (Mild + Moderate-to-Severe PAR)		

Discussion

Out of 75 children, 33 (44.4%) had Mild Intermittent Allergic rhinitis (IAR), 17 (22.7%) had Moderate-to-Severe Intermittent Allergic rhinitis (IAR), 2 (2.7%) had Mild Perennial Allergic Rhinitis (PAR), 23 (30.7%) had Moderate-to-Severe Perennial Allergic Rhinitis (PAR). In study of Philippe Jean Bousquet et al, 2013 (7) according to Allergic Rhinitis and its Impact on Asthma (ARIA) classification, Mild Intermittent Allergic Rhinitis was diagnosed in 20% of patients, Mild Persistent in 17%, Moderate-to-Severe Intermittent in 15% and Moderate-to-Severe Persistent in 48%. These differences can be attributed to due to differences in race, ethnicity and different geographical & environmental factors.

In a Poland study done by Hanna Sikorska et al (2020) [3], the average VAS score reported by children was 43.3±28.9. Whereas in our study, the average VAS score is 35.8±18.7. Mean VAS scores of various symptoms includes Runny Nose was 38.4±16, Sneezing was 36.5±18.6, Blocked Nose was 30.4±20.4 & Itchy Nose was 38.8±18.4. With our best possible literature review, we couldn't find any further study mentioning mean VAS score for individual symptoms of allergic rhinitis in Children.

In study done by Hanna Sikorska et al (2020) [3], Children allergic to seasonal allergens had higher VAS scores compared to Children allergic to perennial allergens. Whereas in our study, the Mean VAS score of Perennial Allergic rhinitis (PAR) was more than the Intermittent Allergic rhinitis (IAR) and this difference can be due to the difference in the geographical location as our study population belonged to tropical climatic conditions in comparison to the temperate climatic condition of the above said study. Klimek L et al (2017) [8], reported that VAS for AR can be used in all age

groups including preschool children (with supervision), and represents a useful alternative to other psychometric scales for the documentation of AR symptoms and assessment of AR control. In our study, we used VAS for assessing severity of symptoms of AR, and found its ease of use among participants for documentation of severity of symptoms. The interpretation of study is almost similar to Klimek L et al (2017) [8].

In a cross-sectional study done by Toshiko Itazawa et al (2015) [9], A total of 69 children (6-18 years old) with AR were enrolled. Among AR children, 30 children (43.5%) and 39 children (56.5%) were categorized as Mild and Moderate-to-Severe, respectively. The mean VAS value of children with Moderate-to-Severe AR was significantly higher than that of children with Mild AR. Similar findings were confirmed by our study, with 35 children (46.7%) as Mild AR and 40 children (53.3%) as Moderate-to-Severe AR.

In our study, mean VAS scores of Mild IAR, Mild PAR, Moderate-to-Severe IAR, Moderate-to-Severe PAR was 31.9±15.6, 31.25±20.8, 39.2±19.8, 46.2±18.3 respectively. The mean VAS value of children with Moderate-to-Severe AR was significantly higher than that of children with mild AR. This finding was similar to above study.

Conclusion: The average VAS score of Perennial allergic rhinitis (PAR) is higher than the intermittent allergic rhinitis (IAR). VAS scale helps in easy interpretation of severity of symptoms.

This information can be used for the early & effective institution of various treatment modalities of the AR for the better control of the AR symptoms and improvement in the quality of life.

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