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A Survey on Seasonal Symptoms in Subjects with and Without Allergic Rhinitis Diagnosis

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Abstract: In Switzerland, only scarce data are available on the prevalence and treatment of allergic rhinitis. Although the presence of AR symptoms in temporal relation to the respective aeroallergen is indicative, still a substantial number of affected individuals are deemed underdiagnosed and potentially undertreated. A national online survey was conducted for consecutive participants with AR symptoms in medical practices irrespective of diagnosis, therapy, or the reason for the visit. Univariate and multivariate regression analyses were performed, as well as multiple correspondence analysis for participants with allergic rhinitis diagnosis (ARwD) and without diagnosis (ARwoD). A total of 392 of 637 participants with rhinitic symptoms self-reported an AR diagnosis with a symptom onset more than 5 years ago in 74%. Despite treatment, up to one-third of participants with ARwD had persistent severe symptoms. Asthma was reported more frequently in participants with ARwD (148/392) than with ARwoD (26/245), (42% vs. 12%, $p < 0.001$, $q < 0.001$). Allergologists were consulted more often by participants with ARwD (106/392; 30% vs. 3/245; 2%), while more participants with ARwoD visited pharmacies for treatment advice (40/392; 11% vs. 57/245; 40%). The coexistence of AR and asthma with severe symptoms is a specific phenotype with difficult to treat nasal symptoms, amongst others. Hence, appropriate diagnosis and treatment of suspected and diagnosed AR should be prioritized, especially, but not limited to, patients with AR and asthma.

Keywords: allergic rhinitis; symptoms; asthma; coexisting asthma; survey

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1. Introduction

Rhinitis is a common symptom that affects daily well-being. The underlying causes are manifold and should be clinically investigated, specifically if the rhinitis is repetitive, chronic, or difficult to treat, in particular in view of concomitant and consecutive diseases. Allergic rhinitis (AR), which is (epi)genetically determined and triggered by environmental exposure, is a typical example of this. To our knowledge, the most recent available data from the Swiss Federal Statistical Office is from the year 2012, and states that 6.5% of the Swiss population attended a physician for AR or other allergy in the last 12 months [1].

According to the recent report on comorbidities published by the Task Force of the European Academy of Allergy and Clinical Immunology (EAACI), AR is considered an

underlying condition for other systemic diseases impacting general well-being [2]. Hence, in addition to an accurate diagnosis, treatment of rhinitis tailored to the individual needs and disease burden plays a crucial role [3].

The association between AR and asthma in adults is well established [4], although the exact pathophysiological mechanisms are not yet fully elucidated [5,6]. The prevalence of asthma in the adult population in Switzerland is about 7% [7], but in patients with AR, the prevalence is probably between 15 and 40% [8]. Asthma is less well controlled in individuals with persistent AR than in those with intermittent rhinitis [9]. In addition, appropriate treatment of rhinitis can improve comorbidities [10], which was demonstrated for the severity of obstructive sleep apnea, among others [11].

Recently, it has been recognized that the distinction between AR alone and AR with asthma is important for the management of the disease. AR alone is considered a pathology of the upper airway epithelium with amongst others dysfunction or dysregulated expression of IL-17, a known protective agent for the mucosal barrier. Hence, AR alone is a recognized distinct disease with genomic and immunologic differences from AR plus asthma, resulting in clinical differences in symptom severity and treatment response, with distinct pathologies of toll-like receptors with clinical relevance, as they can be activated by allergens [12].

The survey was conducted to characterize the disease burden of subjects with rhinitis symptoms in Switzerland. Of interest was the perceived discrepancy between a diagnosed AR and a subjectively perceived illness in terms of well-being, environmental factors, possible accompanying symptoms, and the treatment options used.

2. Materials and Methods

An anonymous survey of consecutive participants with rhinitis symptoms aged 15 years and older was conducted in Switzerland during the allergy season from February to June 2023. The survey was based on structured online questionnaires and was conducted using the SurveyMonkey® tool.

2.1. Questionnaire

The content and items of the questionnaires were defined and elaborated in a meeting with the authors alongside with the implementing organization, signum I brands GmbH (Köln, Germany), who conducted the survey and operated the online tool. The questionnaires were evaluated by signum I brands GmbH and a statistician prior to the start of the survey (Table S1). The questionnaire included demographics (sex, age); symptoms of rhinitis (type, onset and duration, seasonality, impairment of daily life); presence or absence of an AR diagnosis (ARwD, ARwoD) and allergen exposure; medication used; and type of physician consulted. Participants checked boxes for the type of rhinitis symptoms, with a score of zero for no symptoms; 1 for mild (present but easily tolerated) symptoms; 2 for moderate (bothersome but tolerable) symptoms; and 3 for severe (difficult to tolerate and/or interfering with activities of daily living, sleep, or both) symptoms. Boxes were ticked for pollen, mites, animals, and food. The presence or absence of asthma and the frequency of respiratory infections were queried.

2.2. Survey Conduct

The questionnaire was accessible to all participants and to aligned persons of the Swiss Allergy Centre, aha!, regardless of diagnosis or treatment. The subjects who participated in the survey did so regardless of the reason for the visit to the doctor's office. The subjective perception of rhinitis symptoms was the stimulus for participation, hence people without this symptom did not take part in the survey. Informed online consent was used,

participants gave their consent by checking the appropriate box before starting the survey. The questionnaires in the three official languages of Switzerland (German, French, and Italian) were accessible via a QR code on leaflets and posters displayed in the doctors' surgeries. Participation was voluntary, without remuneration or equivalent offer. The response fields were checkboxes without free text fields. The time required to complete the questionnaire was 5–10 min.

This was an anonymous survey, in which neither patient data nor medical interventions were examined. Entries were anonymized and had no influence on current or future clinical decision making. Physicians were not aware of individual participation, nor could they be attributed to a participant due to the anonymity of the survey. In view of this fact, that this was an anonymous survey without examination of patient data and medical interventions, no formal ethics committee review was conducted. The survey was in accordance with the Helsinki declaration as revised in 2013.

2.3. Data Management

The datasets were stored on a secure European server in Germany, with access restricted to persons responsible for the set-up and conduct of the survey and analysis of the data at signum I brands GmbH, and the statistician. After the completion of the survey, the data were subjected to a quality and plausibility check. Missing information and "I don't know" were counted as no response, and questions with a threshold value of 12% without response values were not evaluated. Participants who ticked that they did not know the diagnosis were considered undiagnosed. The representativeness of the survey sample was assessed by a descriptive comparison of the age and language characteristics of the participants with the latest available statistics from the Federal Statistical Office [13].

2.4. Statistical Analysis

Multiple Correspondence Analysis (MCA) was conducted to explore and visualize the associations between categorical exposure variables and the outcome of AR diagnosis (yes/no). MCA allows for the identification of patterns and relationships across multiple categorical variables by projecting them onto a lower-dimensional space. Specifically, the analysis used the first two dimensions of MCA, which explains the most variance in the data, assesses the spatial distribution of patient groups (diagnosed/undiagnosed with AR). The use of MCA was particularly suited for this analysis due to the large number of categorical variables involved, allowing us to detect patterns that may not be evident in traditional univariate analyses. The MCA function from the FactoMineR package (v2.9) was used [14]. Individual data points were color coded using the fviz_ellipses function from the factoextra R package (v1.0.7) using multiple categories. Fifty variables were used as explanatory variables for the MCA (gender, age, symptoms, allergies, environment, neighborhood, pets, smoking, occupation, siblings).

A summary table of all variables was created using the Fisher exact test with the package gt summary (v1.7.2) [15]. Fisher's exact test was applied to evaluate the association between AR diagnosis (yes/no) and various exposure variables, including sex, age category, number of siblings, residence factors, cigarette smoking, and occupational handling. These categorical variables were tested to explore whether they were significantly associated with the presence or absence of an AR diagnosis. A simulated p-value (based on 2000 replicates) was used unless otherwise stated. Univariate and multivariate logistic regression models (glm method) for all explanatory variables were performed using the gt summary package. The analyses were performed with the statistical software R (v4.3.3).

3. Results

3.1. Participants

The dataset contained 8.96% missing data overall. Questions with a missing response rate exceeding 12% were excluded, and the remaining missing data were handled using case-wise exclusion. Imputation or sensitivity analysis was not performed, as the level of missing data was low and unlikely to significantly influence the primary findings. Of a total of 650 consecutive participants, 13 were excluded from analysis due to missing rhinitis symptoms or AR diagnosis. Participants with a known diagnosis of aeroallergy were assigned to the ARwD group, while those without this knowledge were assigned to the ARwoD group. A total of 392 participants with ARwD (73% female) and 245 participants with ARwoD (69% female) with a representative age and language distribution were analyzed. A total of 290/392 (74%) of participants with ARwD reported the onset of AR symptoms more than five years ago, compared to 115/245 (47%) with ARwoD. A total of 42/392 (11%) and 23/392 (6%) participants with ARwD had symptoms for 1–5 years and 1–12 months, respectively, compared to 69/245 (28%) and 23/245 (9%) with ARwoD. Symptom duration of less than one month was reported by 37/392 (9%) participants with ARwD and 38/245 (16%) with ARwoD ($p < 0.001$).

3.2. Severe Symptoms

The most common severe symptoms were a runny and stuffy nose. These symptoms were noted by 154/392 (39%) and 138/392 (35%) participants with ARwD, and by 45/245 (18%) and 46/245 (19%) participants with ARwoD ($p < 0.001$). Severe sneezing and fatigue were reported more frequently by 110/392 (28%) and 95/392 (24%) participants with ARwD than by 25/245 (10%) and 21/245 (9%) participants with ARwoD ($p < 0.001$). Itchy nose and palate were reported by 83/392 (21%) and 60/392 (15%) participants with ARwD, compared to 20/245 (8%) and 15/245 (6%) participants with ARwoD ($p < 0.001$). A total of 49/392 (13%) ARwD and 10/245 (4%) ARwoD participants suffered from severe cough. Severe impaired sense of smell or no sense of smell was noted by 31/392 (8%) and 17/245 (4%) participants with ARwD compared to 5/245 (2%) and 0/245 with ARwoD (all parameters $p < 0.001$, Fisher's Exact Test for Count Data). No significant differences were found for the symptoms dry nose ($p = 0.008$), dry eyes ($p = 0.081$) and atopic dermatitis (0.091). (Table 1; Figure S1).

Table 1. Odds ratios (OR) and 95% confidence intervals (CI) for severity of symptoms in participants with a diagnosis of allergic rhinitis (ARwD, N = 392) and without a diagnosis (ARwoD, N = 245). The outcome of the univariate regression analysis was AR diagnosis (yes/no), and the exposure was the severity of symptoms. The reference category for symptoms is no symptoms. All symptoms showed $p < 0.001$ with p-values adjusted for multiple comparisons using the Benjamini–Hochberg method, resulting in $q < 0.001$. Categories where the CI includes 1.00 are not statistically significant, even if the overall variable shows $p < 0.001$. Abbr: NA, not applicable.

Severity	Sneezing	Runny Nose	Itchy Nose	Stuffy Nose	Impaired Smell	No Smell	Itchy Palate	Cough	Tiredness
Mild	4.52 (1.97, 11.7)	4.42 (1.82, 12.4)	2.47 (1.42, 4.43)	2.91 (1.63, 5.34)	1.60 (1.11, 2.32)	1.14 (0.72, 1.83)	3.33 (2.16, 5.20)	1.56 (1.07, 2.26)	1.00 (0.63, 1.60)
Moderate	8.44 (3.83, 21.4)	9.18 (3.97, 25.0)	5.69 (3.32, 10.0)	4.79 (2.71, 8.72)	2.30 (1.42, 3.80)	1.73 (0.93, 3.41)	2.90 (1.93, 4.38)	1.99 (1.26, 3.17)	1.53 (0.97, 2.43)
Severe	20.7 (8.67, 56.2)	18.3 (7.66, 51.0)	9.92 (5.07, 20.2)	7.29 (4.02, 13.6)	5.47 (2.25, 16.4)	(0.00, NA)	5.33 (2.92, 10.3)	4.57 (2.30, 9.97)	4.07 (2.27, 7.53)

3.3. Impact on Daily Activity

The majority of participants considered rhinitis bothersome. A total of 293/392 (77%) participants with ARwD and 142/245 (68%) with ARwoD ($p = 0.024$). A total of 249/392 (65%) with ARwD and 87/245 (42%) with ARwoD were impaired in their daily activities. A total of 241/392 (63%) and 220/392 (58%) ARwD participants felt that rhinitis impaired their leisure and sports activities, respectively, while this was the case for 88/245 (42%) and 75/245 (36%) participants with ARwoD, respectively. Impairment at school or work was reported by 174/392 (46%) ARwD and by 52/245 (25%) with ARwoD (all parameters $p < 0.001$) (Figure S2).

3.4. Seasonality

Most participants had seasonal rhinitis symptoms, 310/392 (80%) participants with ARwD and 159/245 (70%) participants with ARwoD. A total of 55/392 (14%) ARwD and 24/245 (11%) ARwoD patients reported having symptoms all year round. A total of 23/392 (6%) and 43/245 (19%) of participants were only symptomatic from time to time ($p < 0.001$).

3.5. Allergies

Participants with ARwD reported a pollen allergy: 326/392 (83%) due to grass and 317 (81%) due to tree pollen. Participants with ARwoD suspected a pollen allergy: 116/245 (47%) due to grass and 106/245 (43%) due to trees. A total of 143/392 (36%) participants with ARwD each had a house dust mite and a cat allergy. In the ARwoD group, 37/245 (15%) and 41/245 (17%) suspected these allergies ($p < 0.001$) (Tables 2 and 3).

Table 2. Self-reported allergies in participants with AR diagnosis (ARwD) and without diagnosis (ARwoD); total N = 637. The outcome in both the univariate and multivariate regression analyses was AR diagnosis (yes/no), and the exposure was the presence of self-reported allergies. Odds ratios (OR) and 95% confidence intervals (CI) are presented in the table for each reported allergen. In the univariate regression analysis several allergens showed $p < 0.001$, with p-values adjusted for multiple comparisons using the Benjamini–Hochberg (BH) method, resulting in q < 0.001. In the multivariate regression analysis, allergens marked with a * indicate $p < 0.001$ and q < 0.001 after BH adjustment, while not all allergens reached significance in the multivariate model. Abbr: NA, not applicable.

			Univariate Regression Analysis				**Multivariate Regression Analysis**			
	ARwD N = 392	**ARwoD N = 245**	**OR**	**95% CI**	***p*-Value**	**q-Value**	**OR**	**95% CI**	***p*-Value**	**q-Value**
Pollen										
Grasses *	326 (83%)	116 (47%)	5.49	3.83, 7.95	<0.001	<0.001	3.43	1.85, 6.47	<0.001	<0.001
Trees *	317 (81%)	106 (43%)	5.54	3.89, 7.95	<0.001	<0.001	4.19	2.30, 7.78	<0.001	<0.001
Herbs	102 (26%)	38 (16%)	1.92	1.28, 2.92	0.002	0.003	0.87	0.44, 1.73	0.7	0.8
Animal										
House dust mites	143 (36%)	37 (15%)	3.23	2.17, 4.90	<0.001	<0.001	2.06	1.00, 4.37	0.049	0.2
Cats	143 (36%)	41 (17%)	2.86	1.94, 4.28	<0.001	<0.001	0.55	0.26, 1.13	0.11	0.2
Dogs	68 (17%)	11 (4.5%)	4.46	2.40, 9.09	<0.001	<0.001	2.71	0.87, 9.48	0.088	0.2
Rodents	34 (8.7%)	1 (0.4%)	23.2	4.95, 413	<0.001	<0.001	7.52	0.82, 201	0.078	0.2
Horses	54 (14%)	5 (2.0%)	7.67	3.32, 22.3	<0.001	<0.001	1.51	0.38, 7.84	0.6	0.7
Food										

Table 2. *Cont.*

			Univariate Regression Analysis				Multivariate Regression Analysis			
	ARwD N = 392	**ARwoD N = 245**	**OR**	**95% CI**	***p*-Value**	**q-Value**	**OR**	**95% CI**	***p*-Value**	**q-Value**
Nuts	128 (33%)	39 (16%)	2.56	1.73, 3.87	<0.001	<0.001	1.02	0.49, 2.13	>0.9	>0.9
Apple	69 (18%)	14 (5.7%)	3.52	1.99, 6.66	<0.001	<0.001	1.45	0.53, 4.17	0.5	0.6
Kiwi	49 (13%)	14 (5.7%)	2.36	1.31, 4.52	0.004	0.007	0.51	0.18, 1.52	0.2	0.4
Celery	33 (8.4%)	4 (1.6%)	5.54	2.17, 18.8	<0.001	<0.001	1.84	0.38, 11.8	0.5	0.6
Cow milk	26 (6.6%)	16 (6.5%)	1.02	0.54, 1.97	0.96	0.96	not done	not done	not done	not done
Seafood	17 (4.3%)	2 (0.8%)	5.51	1.56, 34.9	0.005	0.009	0.90	0.15, 7.70	>0.9	>0.9
Sesame	4 (1.0%)	0 (0%)	NA	0.00, NA	0.048	0.075	NA	0.00, NA	0.063	0.2
Other										
Eosinophilic esophagitis	13 (3.3%)	6 (2.4%)	1.37	0.53, 3.93	0.53	0.57	not done	not done	not done	not done
Skin eczema—neurodermatitis	115 (29%)	44 (18%)	1.90	1.29, 2.83	0.001	0.002	1.40	0.71, 2.82	0.3	0.5
Latex	23 (5.9%)	9 (3.7%)	1.63	0.77, 3.78	0.21	0.27	not done	not done	not done	not done

Table 3. Self-reported allergies with significant differences between participants with AR (ARwD, N = 392) and without AR diagnosis (ARwoD, N = 245). The outcome in both the univariate and multivariate regression analyses was AR diagnosis (yes/no), and the exposure was the presence of self-reported allergies. Odds ratios (OR) and 95% confidence intervals (CI) for each reported allergen are presented in the table. In the univariate regression analysis, all allergens showed $p < 0.001$, with *p*-values adjusted for multiple comparisons using the Benjamini–Hochberg (BH) method, resulting in $q < 0.001$. In the multivariate regression analysis, allergens with a * indicate a $p < 0.001$ and $q < 0.001$ after BH adjustment, while not all allergens reached significance in the multivariate model.

Pollen		**Food**			**Animals**				
Tree *	**Grasses ***	**Celery**	**Apple**	**Nuts**	**House Dust mite**	**Cats**	**Dogs**	**Horses**	**Rodents**
5.54 (3.89, 7.95)	5.49 (3.83, 7.95)	5.54 (2.17, 18.8)	3.52 (1.99, 6.66)	2.56 (1.73, 3.87)	3.23 (2.17, 4.90)	2.86 (1.94, 4.28)	4.46 (2.40, 9.09)	7.67 (3.32, 22.3)	23.2 (4.95, 413)

3.6. Treatments

362/392 (94%) participants with ARwD and 152/245 (66%) participants with ARwoD received any treatment for rhinitis; 321/392 (89%) with ARwD and 105/245 (70%) with ARwoD received antiallergic medication, (both $p < 0.001$). The highest proportion of medications in both groups were antihistamines in 227/392 (89%) and 67/245 (74%) ($p = 0.002$). Treatment with topical corticosteroids was reported by 42/392 (16%) ARwD and by 2/245 (2%) ARwoD ($p < 0.001$). A nasal spray has been used by 175/392 (68%) ARwD and by 54/245 (60%) ARwoD ($p = 0.2$); eye drops by 157/392 (61%) ARwD and by 52/245 (58%) ARwoD ($p = 0.6$). Allergen-specific immunotherapy was reported by 113/392 (31%) ARwD and by 4/245 (3%) ARwoD ($p < 0.001$). Homeopathy and herbal medicines have been used by 44/392 (17%) and 35/392 (14%) participants with ARwD and by 11/245 (12%) and 9/245 (10%) with ARwoD ($p = 0.3$ and $p = 0.5$, respectively). Treatment duration was not reported by all participants. The respective treatment was carried out by 123/331 (37%) of ARwD and 19/145 (13%) of ARwoD over a period of one year. Treatment duration was limited from 1 week to 1 month in 61/331 (18%) participants with ARwD and in 47/145 (32%) participants with ARwoD the treatment duration was one week to one month ($p < 0.001$).

A total of 134/350 (38%) participants with ARwD and 49/141 (35%) with ARwoD received treatment from a general practitioner. Allergologists prescribed therapies to 106/350 (30%) participants with ARwD and to 3/141 (2%) participants with ARwoD. 16/350 (5%) participants with ARwD and 4/141 (3%) with ARwoD received treatment from an ear nose throat specialist. Pharmacies were consulted for treatment by 40/350 (11%) participants with ARwD and by 57/141 (40%) participants with ARwoD. Family and friends were consulted for treatment by 17/350 (5%) participants with ARwD and 16/141 (11%) participants with ARwoD.

3.7. Asthma in Participants

148/351 (42%) participants with ARwD reported asthma, and 26/214 (12%) participants with ARwoD did ($p < 0.001$). Of 546 participants with reported frequency of rhinitis symptoms, 34/70 (49%) participants with year-round AR symptoms and 137/476 (29%) participants with seasonal rhinitis reported asthma ($p < 0.001$). Asthma was reported by participants with seasonal symptoms by 117/348 (34%) in the ARwD group and by 20/198 (10%) in the ARwoD group ($p < 0.001$). For participants with perennial symptoms, asthma was reported by 29/348 (8%) participants with ARwD and by 5/198 (3%) with ARwoD ($p < 0.001$) (Table 4).

Table 4. Self-reported asthma in participants with allergic rhinitis diagnosis (ARwD, N = 351) and participants without diagnosis (ARwoD, N = 214). Odds ratios (OR) and 95% confidence intervals (CI) are presented in the table. Univariate and multivariate regression analyses showed $p < 0.001$, with p-values adjusted for multiple comparisons using the Benjamini–Hochberg (BH) method, resulting in q < 0.001.

Self-Reported Asthma					
Univariate Regression Analysis			**Multivariate Regression Analysis**		
OR (95%CI)	***p*-Value**	**q-Value**	**OR (95%CI)**	***p*-Value**	**q-Value**
5.27 (3.37, 8.52)	$p < 0.001$	q < 0.001	3.79 (1.92, 7.76)	$p < 0.001$	q < 0.001

4. Discussion

This online survey provides up-to-date real-life data on the burden of disease in individuals with rhinitis in the spring allergy season with and without a diagnosis of AR. Three-quarters of participants with ARwD and one in two with ARwoD had their first AR symptoms more than 5 years ago. Any nasal symptoms and fatigue were significantly more pronounced in participants with ARwD than in those without a diagnosis. A third of participants with ARwD had uncontrolled severe symptoms irrespective of therapy used compared to those with ARwoD. Although rhinitis is perceived as a nuisance by the vast majority of the participants, sleep disturbances were noted as a less frequent burden in both groups. This is an interesting aspect since AR has been associated with higher risks of sleeping disorders such as insomnia and restless sleep, and is thought to increase the risk of developing obstructive sleep apnea due to a higher nasal resistance causing an increase in airway resistance [16,17]. However, all other impairments in everyday life such as performance at school and work, leisure and sport were significantly more pronounced in the ARwD group.

Symptom exposure to aeroallergens in spring, primarily to pollen, was perceived as significantly more bothersome in the ARwD compared to the ARwoD group. In this context, pollen allergy-associated food allergies, especially to celery, apples, and nuts were also five, three, and two times higher in the ARwD than in the ARwoD group, respectively (Table 3).

The majority of the population in this survey had seasonal rhinitic symptoms, whether diagnosed or not. But two thirds of participants with ARwD experienced intermittent rhinitic episodes ranging from three to twelve months (35%), and one to three months (37%), despite intake of medication. Remarkably 42% of participants with ARwD reported asthma. This number of reported asthma cases is consistent with other studies that found asthma comorbidity in AR of up to 38% [18,19]. Asthma was more frequent in participants with perennial rhinitic symptoms than in those with seasonal symptoms. To either avoid or retard the development of asthma in allergic rhinitis, it is important to keep allergic rhinitis controlled by appropriate treatment and initiate immune specific intervention early enough, as it is a recognized risk factor for asthma [12,20–22].

A survey in the UK showed that asthma control depends on the severity of AR. Also, asthma control was achieved in 20% of patients with coexisting persistent AR, which was significantly lower than the 66% of patients with asthma and intermittent AR [9]. Furthermore, treating AR may improve coexisting medical conditions [10], as was shown amongst others for the severity of obstructive sleep apnea [11]. Hence, appropriate awareness and perception are critical to enable individualized approaches to control AR symptoms and, additionally, to extend investigations in the plus asthma group. However, one third of the participants with ARwD with asthma reported seasonal symptoms, and 8% reported annual symptoms. This ratio was similar in the ARwoD group, suggesting that seasonality was not a determining factor for asthma.

Seasonal rhinitis was uncontrolled despite the intake of medication in the majority in both groups. It is of note that most of the participants with ARwD with a more than five-year long history of symptoms still reported severe nasal symptoms. To prevent the development of CRS—many patients with CRS have an atopic disposition—AR should be treated adequately and sufficiently with medication [23]. AR is considered a multifactorial disease with predisposing genetic characteristics. Environmental factors, Th1/Th2 imbalances, and damage to the epithelial barrier can influence the onset and progression of the disease [12]. Based on the reported symptomology indicative for AR, half of the ARwoD participants had symptoms for more than five years, and about two-thirds regularly took medications. The results show that rhinitis is not taken seriously as a relevant symptom and, thus, that a large proportion of these individuals do not seek or receive appropriate treatment.

A European online survey revealed an AR prevalence of 16.5% in non-specialized primary care, along with suboptimal treatment of AR. The authors finally concluded that, in particular, the severity of AR was underestimated, and subsequently adequate treatment not prescribed [24,25]. In an Italian study, only a third of patients with predominant AR and mild asthma were satisfied with the treatment for rhinitis when asked about their satisfaction with the current treatment [26]. A more recent survey in France showed that patients with AR retain symptoms and report relevant disease burden despite ongoing treatment [27]. Dissatisfaction with the treatment can also be attributed to an inappropriate perception of the disease, as only a few patients are aware that AR requires long-term measures in addition to short-term treatment.

In this survey, 40% of the individuals with ARwoD obtained advice on medications in pharmacies. This percentage may seem high, but it is realistic, especially as “seasonal” rhinitis does not necessarily have to be treated by an allergologist. The pharmacy first approach might be a well-established behavior, a survey carried out in Switzerland in 1993 showed that the pharmacy is often the first port of call for allergies [28]. In an Australian survey, 56% of 296 pharmacy customers with persistent nasal symptoms suggestive of AR and seeking drug treatment did not have a GP diagnosis [29]. Both our study and European research suggest that therapeutic choices are suboptimal in terms of selection and coverage of the entire disease burden, even in the presence of significant symptoms.

Although medication for AR was mainly prescribed by general practitioners in this survey population, it appears that AR is likely to be self-managed. However, this approach carries the risk that in the absence of a diagnosis, potential comorbidities such as asthma or pollen-associated food allergies may be misinterpreted and underestimated. The lack of professional diagnosis and appropriate therapeutic guidance contributes to underdiagnosis and meaningful control of the disease [30]. Without a doubt, the pressure of suffering is also a driver of AR. There are various reasons why the GP is not always consulted as a contact person, e.g., a lack quick appointments or mounting health insurance costs.

On the other hand, simplified access to diagnosis (e.g., digital recording of allergen test results) could promote the adherence of patients with AR symptoms. Different physicians are concerned and would benefit from a structured availability of test results to optimize patients care, as pulmonologists are necessarily aware of allergen testing. This is of specific relevance for individuals who belong to the AR plus asthma population, which is considered an entity with major systemic manifestations and hence, would benefit from the tailored treatment of AR. Various specialists (e.g., pulmonologists, ENT, gastroenterologists), as well as GPs, could benefit from the availability of test results and thus optimize patient care. In a survey in Spain, ENT-specialists and allergologists assessed measures to optimize the management of patients with AR [31]. The authors concluded that, in addition to a low adherence to therapy on the part of the patients, the lack of reimbursement of costs on the part of the health insurance companies—even in the case of self-medication—and the lack of interdisciplinary cooperation between GP and specialists were points of criticism.

Notably, one-third of the ARwD group and four (3%) with ARwoD received an allergen-specific immunotherapy (desensitization). Although the type of immunotherapy is not the subject of this survey, this treatment needs to be initialized by allergologists based on the respective diagnosis. Correctly indicated allergen-specific immunotherapy is a very effective and established treatment for AR (with or without associated asthma) [32]. But often, wherever patients are advised about AR, they are not referred to the allergologist for a detailed follow-up [33].

5. Conclusions

This survey revealed that a large proportion of allergic rhinitis affected individuals have asthma, and the coexistence of AR and asthma is considered a disease entity with high and difficult to treat disease burden. The identification of those individuals is deemed relevant to optimize their treatment early enough in the disease progression. The results of the survey contribute to better understanding actual patients' needs and real-life pathways of seeking information for treatment, which enables to us design and rethink approaches to reach an informed understanding of the disease aligned with self-awareness. Based on this actual view on patients with AR symptoms, specific steps can be taken to enhance disease perception and subsequent adherence in order to reduce disease burden adequately. It is imperative to enable patients to take informed decisions when consulting physicians and to adhere to treatments.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/allergies5010007/s1, Figure S1: Type and severity of allergic rhinitis symptoms. Results of a Multiple Correspondence Analysis (MCA) based on data from 637 participants; Figure S2: Impairment in daily live in participants with rhinitis symptoms. Results of a Multiple Correspondence Analysis (MCA) based on data from 637 participants. Table S1: Survey Questionnaire; Table S2: Self-reported respiratory infections in participants with allergic rhinitis diagnosis (ARwD, N = 392) and without allergic rhinitis diagnosis (ARwoD, N = 245).

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