Self-Reported Drug Hypersensitivity Amongst Late Adolescents in Mexico: A Population Based Study

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J Investig Allergol Clin Immunol 2018; Vol. 28(4): 281-282
doi: 10.18176/jiaci.0268

Key words: Drug hypersensitivity. Adolescence. Cross-sectional study. Risk factors.

Palabras clave: Hipersensibilidad a medicamentos. Adolescencia. Estudio transversal. Factores de riesgo.

Drug hypersensitivity reactions (DHRs) are considered public health problems throughout the world owing to associated morbidity and socioeconomic costs [1]. Epidemiological studies have shown that more than 5% of the population have experienced a DHR at some point in their lives [1-3]. For many years, antibiotics have been the main culprits, followed by nonsteroidal anti-inflammatory drugs (NSAIDs). Risk factors for DHR include female sex, age, presence of allergic disease, ethnicity, and genetics [3-6]. Given the lack of previous studies aimed at defining the magnitude of DHR in Latin America, our main objective was to identify factors associated with the prevalence of DHR in late adolescents.

A cross-sectional study was carried out among 1992 late adolescents aged 15 to18 years. Sampling was probabilistic, stratified, and clustered. Each participant filled out a structured questionnaire that included questions related to age, sex, personal history of nonatopic and atopic diseases, and family history of allergic disease (either parent). The prevalence of DHR was determined using the following question: *Are you allergic to any medication*? The strength of association between DHR and covariates was estimated using the adjusted odds ratio (aOR) and 95% confidence interval (95%CI). DHR was entered into the model as a dependent variable. ORs were adjusted using binary logistic regression analysis. The Ethics and Research Committee of the host hospital endorsed the project.

Overall, the prevalence of DHR was 13.3% (95%CI, 11.8%-14.8%) and was higher in women than in men (15.2% vs 11.0%, *P*=.005). A personal history of asthma or allergic rhinitis and a family history of asthma, atopic dermatitis, or drug hypersensitivity were more common in adolescents with DHR (*P*<.05).

In our study, 3.5% of adolescents experienced a DHR to penicillin and 1.6% to sulfonamides. Acetaminophen

Table. Multivariate Models of Factors Associated With Drug Hypersensitivity in Late Adolescents

	Unadjusted Model			Adjusted Model		
	OR[a]	95%CI	*P*	OR	95%CI	*P*
Gender						
Male	1					
Female	1.27	0.97-1.68	.087	1.33	1.01 - 1.74	.041
Personal history of asthma						
No	1			1		
Yes	1.78	1.25-2.52	.001	1.93	1.38-2.72	<.0001
Personal history of allergic rhinitis						
No	1					
Yes	1.43	0.94-2.19	.097	–	–	.073
Family history of asthma						
No	1					
Yes	1.26	0.93-1.70	.134	–	–	.098
Family history of rhinitis						
No	1					
Yes	0.94	0.62-1.42	.758	–	–	.733
Family history of atopic dermatitis						
No	1					
Yes	1.27	0.75-2.15	.380	–	–	.277
Family history of drug hypersensitivity						
No	1			1		
Yes	2.41	1.81-3.21	<.0001	2.49	1.89-3.31	<.0001

[a]The OR of the variables that served as a reference are not shown in the adjusted model.

and acetylsalicylic acid were the most frequently involved NSAIDs (0.4% each). The DHR most frequently manifested as skin reactions (139/264, 52.6%), mainly hives, wheals with vesicles, and pruritus. Respiratory complaints—coughing, sneezing, and nasal obstruction—were reported in 24.2%. More than 20% of adolescents with DHRs had intestinal symptoms, mainly nausea and vomiting. The symptoms of DHR were compatible with anaphylactic reactions, with an accumulated prevalence of 0.65% (95%CI, 0.37% to 1.13%); 5 cases were caused by antibiotics (penicillin) and 2 by an NSAID (acetylsalicylic acid and ibuprofen). In 6 cases, the triggering drug was not indicated.

Multivariate analyses showed that the independent variables associated with DHR in late adolescents were female sex (aOR 1.33, P=.041), a personal history of asthma (aOR, 1.93; P<.0001), and a family history of drug hypersensitivity (aOR, 2.49; P<.0001) (Table).

Our study offers relevant information regarding the epidemiology of DHR in a Mexican region. We found that slightly fewer than 15% of late adolescents self-reported adverse reactions to drugs. We also found that female sex, a personal history of asthma, and a family history of drug hypersensitivity were all associated with the prevalence of DHR.

Our data support the hypothesis that DHR are more frequent in women than in men. Estrogens play a key role in the regulation of the immune system, since they amplify the function of antigen-presenting cells, polarize the responses of the lymphocytes towards T_H2, and promote the synthesis of IgE and degranulation of mast cells and basophils [7]. However, estrogen can only explain immune-mediated DHRs, but not non–immune-mediated DHRs. Drug reactions may vary owing to the physiological differences between the sexes, which could also influence the predominantly negative reactions in women more than in men. Women tend to have lower body weight, decreased gastrointestinal mobility, lower enzyme activity, and a lower glomerular filtration rate [8], all of which increase the bioavailability of medicines and, therefore, the risk of sensitization.

In this study, a family history of drug reactions was associated with the prevalence of DHR. Our data are consistent with previous reports [2,5,6]. It is likely that patients with previous adverse reactions to medications are quicker to identify them in their own family. It has also been reported that DHRs tend to aggregate in families [9], although we find this unlikely, since it would only be relevant for immune-mediated reactions. Lastly, we found a significant association between a personal history of asthma and prevalence of DHR. Multiple studies conducted around the world, including Mexico, support the hypothesis that allergic conditions are a risk factor for drug hypersensitivity [1,3,5,6].

Our study has several limitations. Given that it is based on questionnaires, our survey data are subject to possible recall bias; consequently, there was no way to clarify whether the hypersensitivity reactions were allergic or not. Furthermore, our use of the term allergy to facilitate understanding among teens could greatly influence self-reported prevalence. However, our study provides valuable knowledge about the epidemiological panorama of DHR in late adolescents, a rarely analyzed group.

In conclusion, self-reported DHRs are common in late adolescents. They manifest primarily as skin reactions and respiratory symptoms. Antibiotics and NSAIDs were the most commonly linked drugs. This study also shows that women had a higher prevalence of DHR than men. Lastly, having asthma and a family history of reactions to medications were also associated with DHR.

Funding

The authors declare that no funding was received for the present study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Manuscript received March 3, 2018; accepted for publication April 16, 2018.

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