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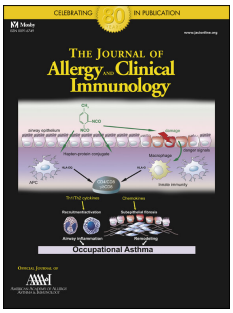

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Migration and allergic diseases in a rural area of a developing country

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Capsule summary

Migration processes as the absence of the mother at home through temporary or permanent migration could be an important determinant of the increase of allergic diseases in rural areas of developing regions.

Key words: allergic diseases, developing country, migration, rural area

Word count: 975

To the Editor:

Studies in Developing Countries (DCs) have frequently reported a lower prevalence of allergic diseases (AllDis) in rural areas compared with urban settings, and this has been attributed to the protective effects of environmental exposures such as rural lifestyle.[1] Recent evidence from studies conducted in Africa and Asia showed that AllDis are increasing in urban and even in rural settings, reducing the urban-rural prevalence gap.[2,3] It has been hypothesized that temporal increases in AllDis prevalence might be associated with urbanization processes, especially with the change from rural to more modern urban lifestyles.[1]

Migration is an important component of the urbanization process and involves socioeconomic, environmental and lifestyle changes in rural and urban populations. However, the effects of migration on AllDis in urban and rural settings of DCs have not been explored.[4] The impact of migration on AllDis has been largely investigated by comparing populations that have migrated from DCs (presumed low-risk for AllDis) to developed countries (presumed high-risk).[5] These studies have shown that being born in a country of low risk provides protection against asthma, but this protection may decline with the length of residence in the new environment.[5] Others studies have shown that age of migration and time since migration are associated with the risk of asthma and other AllDis, often leading to a higher risk of atopy and allergy among migrants than the local population.[6]

The SCAALA (Social Changes, Asthma and Allergy in Latin America) study has been investigating the effects of migration on the prevalence of AllDis in schoolchildren living in rural and urban areas.[4] We studied 4295 rural and 2510 urban children aged 5-16 years attending a convenience sample of schools in Esmeraldas province, Ecuador. Data on potential risk factors, migration (direction and distance of migration, age at migration, and time since migration), and wheeze, rhinitis, eczema symptoms within the previous 12 months were collected using an investigator-administered questionnaire that included the core

allergy questions of ISAAC phase II.[4] Atopy was measured by skin prick testing to 7 aeroallergens.

Results from the rural area showed that children who migrated during the first year of life had a greater risk of wheeze and rhinitis compared to non-migrant children, and children with history of international migration (children from rural areas of Colombia) had a higher prevalence of rhinitis than non-migrant children (Table 1). The study also evaluated the effects of maternal migration on allergic outcomes in children using the variables, maternal history of migration and children living with one or no parent. These analyses suggested that children whose mothers had a history of migration had a greater risk of eczema than children whose mother did not and children who did not live with any parent had more wheeze than children living with both parents (Table 1). The magnitude of the latter association was greater for all allergic symptoms among children of migrant mothers (Table 2). No associations were observed for atopy (at least one positive allergen skin test).

The present study is unique in investigating migrants within a rural area of a DC, where migrants come from urban and rural settings. In this setting, age at migration and international migration were important factors associated with a higher risk of AllDis in rural populations. A novel observation was the effect on the prevalence of AllDis of migrant status of the mother: children of migrant mothers not living with either parent had a two-fold greater risk of all 3 AllDis compared to children living with both parents. These data raise a question: *Could it be that social effects of migration, such as absence of parents at home, are important determinants of the increase in AllDis in rural populations of DCs*? In order to answer this question, we need to consider some demographic patterns in these regions. It is well known that people in rural villages move to urban areas, temporally or permanently, in search of work to improve their quality of life. A high proportion of these rural migrants are single women who provide economic support for their families. Most of these women leave their children in the community of origin to be cared for by relatives. Some of these immigrants are able to settle in the city while others return to their rural communities.[7] In

the SCAALA rural population 31% of the children and 23% of the mothers had history of migration, and 15% of the children lived with no parent.

If the absence of parents at home (especially the mother) is an important determinant of the increase of AllDis in DCs, then two migration trends that have occurred over recent decades might help us understand temporal trends in AllDis. In the past, most economic migrants were young men, but now "*feminization of migration*" is a growing trend worldwide because of a greater demand for female labour.[8] Second, "*circular migration"* is a common phenomenon in regions that are undergoing high levels of urbanization, and it refers to repeated migrations between rural and urban areas due to improvements in transport and modern forms of communication.[9]

Migration affects not only the individual who migrates but also their family. Migration impacts on roles, support structures, and responsibilities of family members resulting in changes in social and psychological factors. In the case of maternal migration, children who remain in their community may experience heightened levels of stress and depression due to separation from their primary carer. Psychological mechanisms have been proposed to explain how emotional factors, in the context of family, might affect the development of allergic diseases.[10] For this reason, we propose that the absence of the parents at home, through temporary or permanent migration, may contribute to the increase of AllDis in rural and urban populations of DCs.

Finally, further analyses in different populations living in rural and urban areas evaluating the effects on migration on AllDis are required. A better understanding of the social, psychological and environmental effects of migration on AllDis in DCs is required.

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Table 1. Odds ratios (OR) and 95% confidence intervals (95% CI) for associations between migration variables and allergic symptoms adjusted for sex, age and socioeconomic status.

			Wheeze	Rhinitis	Eczema
Variables	**Categories [A]**	**n**	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Direction of migration	No Migrant	2964	1	1	1
	Rural to Rural	555	1.13 (0.84-1.52)	1.02 (0.7-1.49)	1.23(0.82-1.83)
	Urban to Rural	776	0.97 (0.74-1.27)	1.18 (0.86-1.61)	1.16 (0.81-1.66)
Distance of migration	No Migrant	2964	1	1	1
	National	1263	0.99 (0.79-1.25)	1.04 (0.79-1.38)	1.21(0.90-1.64)
	International	68	1.71 (0.88-3.32)	**2.39(1.16-4.92)***	0.64(0.16-2.66)
Age at migration (years)	No Migrant	2964	1	1	1
	<1	269	**1.47(1.02-2.12)***	**1.59(1.03-2.46)***	1.25 (0.73-2.14)
	1-5	560	0.96 (0.71-1.31)	1.18 (0.83-1.69)	1.17 (0.78-1.75)
	>5	502	0.88 (0.62-1.24)	0.76 (0.48-1.19)	1.16 (0.75-1.79)
Time since migration (years)	No Migrant	2964	1	1	1
	<3 vs NM	383	0.98 (0.68-1.4)	0.94 (0.6-1.49)	0.96 (0.57-1.61)
	3-5 vs NM	197	0.56 (0.31-1.02)	0.9 (0.48-1.69)	1.53 (0.86-2.7)
	>5 vs NM	751	1.21 (0.94-1.58)	1.26 (0.92-1.73)	1.21 (0.85-1.73)
Maternal history of Migration	No	3314	1	1	1
	Yes	981	1.22 (0.96-1.53)	1.24 (0.93-1.65)	**1.88(1.39-2.53)***
Parents living in the child's house	Both	2490	1	1	1
	One	1146	1.07 (0.84-1.36)	1.16 (0.87-1.54)	1.21 (0.88-1.67)
	None	659	**1.57 (1.2-2.05)***	1.29 (0.92-1.81)	1.27 (0.86-1.86)

Outcomes were defined as: recent wheeze—reported wheezing during the previous 12 months; recent eczema—having a reported itchy rash with a flexural distribution in the previous 12 months; and recent rhinitis—nasal stuffiness or sneezing without a cold accompanied by itchy eyes in the previous 12 months. * p value < 0.05

Table 2. Odds ratios (OR) and 95% confidence intervals (95% CI) for associations between allergic symptoms and parents living in the child's home (live with parents) stratified by maternal history of migration. ORs adjusted for sex, age and socioeconomic status.

		Maternal history of migration					
		NO			YES		
	Live with parents	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Wheeze	One vs. both	1	0.76-1.34	0.976	1.2	0.77-1.87	0.429
	None vs. Both	1.44	1.06-1.95	0.02	**2.17**	**1.25-3.77**	**0.006**
Rhinitis	One vs. both	1.03	0.73-1.46	0.858	1.46	0.85-2.52	0.171
	None vs. Both	1.1	0.74-1.64	0.627	**2.07**	**1.05-4.08**	**0.036**
Eczema	One vs. both	0.96	0.63-1.46	0.857	1.63	0.95-2.77	0.074
	None vs. Both	1.03	0.64-1.65	0.916	**2.12**	**1.07-4.17**	**0.031**