

ENVIRONMENTAL DETERMINANTS

Home/Social Environment and Asthma Profiles in a Vulnerable Community from Caracas: Lessons for Urban Venezuela?

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Background. Asthma is a significant public health problem in Venezuela affecting the predominantly urban and poor majority of the population. Information regarding home and the social environment, key elements in asthma, is found to be deficient in these deprived socioeconomic sectors. This study was carried out to depict a life with asthma in this context which has been served over the years by a National Asthma Control Program. **Methods.** A survey of families residing in a socioeconomically deprived community of Caracas was carried out with the assumption that this community reflects the image of a life with asthma emanating from our deprived urban areas. Home physical settings were inspected for the following items: moldy walls, floors, ceilings, windows, sewage, garbage disposal, running water, plumbing, electricity, telephone, construction debris, furniture, bathrooms, food storage, and home appliances. In addition, we also gathered information regarding smoking habits, fumes exposure, pets and/or animals, and sighting of roaches and/or rodents. The presence of people with asthma was observed and their status of control was assessed through the asthma control test (ACT). Comparisons were made between families with asthmatics and those without asthmatics. **Results.** Randomly, 242 of 750 families (32.26%) were surveyed, with “head of family” providing information (75.6%) on most occasions. No significant association was found with respect to the previously explored items in those families with or without the presence of asthmatics. Medically diagnosed asthma was found in 14.91%, with ACT scores of <19 points in two-thirds of these adults and asthmatic children. Asthmatics reported symptoms occurring mostly during the night and an almost exclusive use of rescue medications. Families provided most treatments and children preferred to use the oral route for control medications. Significant work and school absenteeism were detected in more than 50% of these asthmatics. **Conclusions.** No physical home environmental/risk factors turned out to be significantly associated with families reporting the presence of asthmatics. The high impact of asthma found in this Caracas slum underscores the realities of Venezuela’s impoverished urban majority. To properly address this important challenge, our National Asthma Control Program needs to be reassessed.

Keywords ACT, asthma, asthma control, asthma impact, home environment, slum

INTRODUCTION

Asthma is a major public health problem in Venezuela with recent and significant increases in morbidity (1, 2). The International Study for Asthma and Allergies in Children study (Phase III, Caracas, Venezuela, 2003) reports current asthma in 16% of urban adolescents (13–14 years). At the same time, it states that in younger ages (6–7 years) the prevalence rate has been estimated to be at 20% (2–5); approximately half (7.5%) of this asthma is severe (5), underscoring the linear relationship between severe disease and health-care utilization. Venezuela has an ambulatory health network under the aegis of Ministry of Health (MoH) that cares for 80% or more of the population across the country (1, 2); it has handled high and increasing numbers of asthma exacerbations over the recent years, coming close to 1 million/year, a substantial burden for 28 million inhabitants (2).

At these MoH facilities, complaints from asthma rank first among all respiratory illnesses, and when considering all diseases it comes second only to the “viral syndrome,” alternating on occasions a third place with diarrhea (2).

Asthma is now being considered a socially patterned disease (6), with geographic and sociodemographic variations largely unexplained through genetic or environmental risk factors; it also seems to be more frequent and severe among poor populations (7–10). Environmental and social milieu exposures and suboptimal medical care (9, 10) are important issues in this regard. Demography reflects an urbanized country (>80%) predominantly of young people (43% < 19 years old) living under variable conditions of poverty (close to 50% of Graffar’s IV and V) (2, 11, 12).

A children’s study, performed from infancy to adolescence by a nonprofit organization all across Venezuela (Fundacredesa) (13, 14), found asthma to be influenced by poverty, with significant ($p < .05$) higher prevalence rates among Graffar’s IV & V economic scales when compared to I, II, and III grouped together. It seems that

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the young, poor, and urban demographic features of Venezuela's majority are shared by asthma.

It is known that home physical environmental factors such as house deterioration and maintenance (15–26) have a bearing on asthma symptoms. A recent review showed that wood stoves, moldy areas, and exposure to tobacco smoke were highly significant in this regard (22). The presence of mold, for example, was found to be prevalent in homes of New Yorkers with current asthma (21) compared with control households. In relation to allergens, counseling on dust reduction and cockroach mitigation has shown a diminution in asthma symptoms as per large interventional studies (24, 25). Furthermore, the design and construction of asthma-friendly homes has been undertaken successfully (26).

Another factor of equal or greater importance is home-related psychosocial stress, with ample and recent information (27–31) confirming this as well. On the other hand, discrepancy has been raised recently when increased risk of asthma was not found to be associated with social and/or physical characteristics of the home environment when controlling for body mass index and/or ethnicity (32, 33). What's more, a cohort study ($n = 245$) in New York found no association between sensitization to indoor allergens and increased asthma morbidity in inner-city adults (34).

Acknowledging the high impact of asthma that predominantly affects the socioeconomically deprived urban majority (2, 13, 14), and also knowing that home and the social environment are key elements in this disease (6), collecting information in relation to habitat and trigger/indoor asthma risk factors from this context is essential. Furthermore, general information on asthma is found wanting from our underprivileged urban majority. Half of the inhabitants (50.9%) of Caracas live under similar housing conditions to “Los Erasos” slum (an underprivileged urban area), which is located in a northern sector of Caracas and close to our private medical facility. This proximity facilitated the study of this community allowing us to obtain information on asthma, perhaps applicable to the rest of Venezuela.

MATERIALS AND METHODS

Over many years in Latin America, a set of preconceived and/or previously defined criteria have been employed (35) to classify people's living conditions. Examples are the ones used in Graffar's or in other methodologies (35). Such criteria are perhaps foreign to the contexts in which they are applied and nonetheless are highly influenced by many variables and cultural beliefs like family structure, definitions of what is considered employment, income or inflation, levels of education, and other varied social aspects and even government bias. The idea behind these methodologies is to develop a system that could separate the poor or extremely poor segments of a population from those that are not. A norm in relation to poverty cannot be established independently from the social and economic contexts where needs emerge and are defined (36).

Social scientist (Prof. Maria G. Ponce) from the Universidad Católica Andres Bello (Caracas, Venezuela) developed (37) a more pertinent classification of living conditions that is rooted and more in touch with realities within the context of our country. Such was obtained by employing a statistical analysis (latent class, factor, or “cluster” analysis) on the numerous data derived from the National 2001 Census of housing and population, allowing certain variables or “factors” to surface from this analysis. By way of characterizing these “factors,” or variables, some of them very distinct, living human conditions could be separated into phenotypes. Nine such phenotypes of human life conditions were identified and described in detail. These identified “factors” included income, education, housing materials, the presence of a bathroom for crowding estimations, education level, appliances, physical home hardware, and garbage disposal. These groups were labeled: *Comfortable* 1 and 2; *Moderate* 3; *Modest* (Modest implies a “barrio house,” with garbage disposal by container, a minimum of appliances, education above primary level, and a low income. More information pertinent to this important work can be obtained from Dr. Ponce's paper (Temas de Coyuntura, No. 52, UCAB)) 4 and 5; *Basic* 6; *Precarious* 7; and *Rural* 8 and 9. These phenotypes were incorporated for research purposes into a Caracas city map allowing for easy accessibility to locations. The slum of “Los Erasos” was found cartographically to conform to the Modest* phenotype, along with 50.9% of the population of Caracas (37) (see Figure 1), making this community a probable mirror image of our capital city and likely Venezuela. The study of their home environment, given the weight it has in relation to asthma (38), might shed some light on our high burden of this disease.

We employed structured questionnaires (see Questionnaires 1, 2, and 3) for demographic data collection as well as habitat/habit characteristics that have been considered in the literature as asthma risk factors. We also obtained information regarding the presence of asthmatics and their level of control by asthma control test (ACT) (39, 40), along with relevant information on treatments. These possible risk factors for asthma were compared between homes reporting the presence of asthmatics with those that did not, pursuing to single out characteristics of a life with asthma immersed in such urban and poverty context.

The community allowed for on-site interviews and proper data collection. The questionnaire employed was found easy to understand when submitted to members of different families during a previous rehearsal. Interview days were previously announced and Saturday mornings were chosen, for reasons of personal safety, as suggested by community representatives. Families are usually busy with home chores during weekends and children are out from school, increasing the presence of dwellers available to answer the random door knocking of our survey. A previous cadastre was employed and houses were identified by numbers to keep anonymity. One out of every three sequential homes, that is to say 242 families (32.26%) of 750 living in the community, were randomly visited during the last quarter of 2007. The three community “councils”

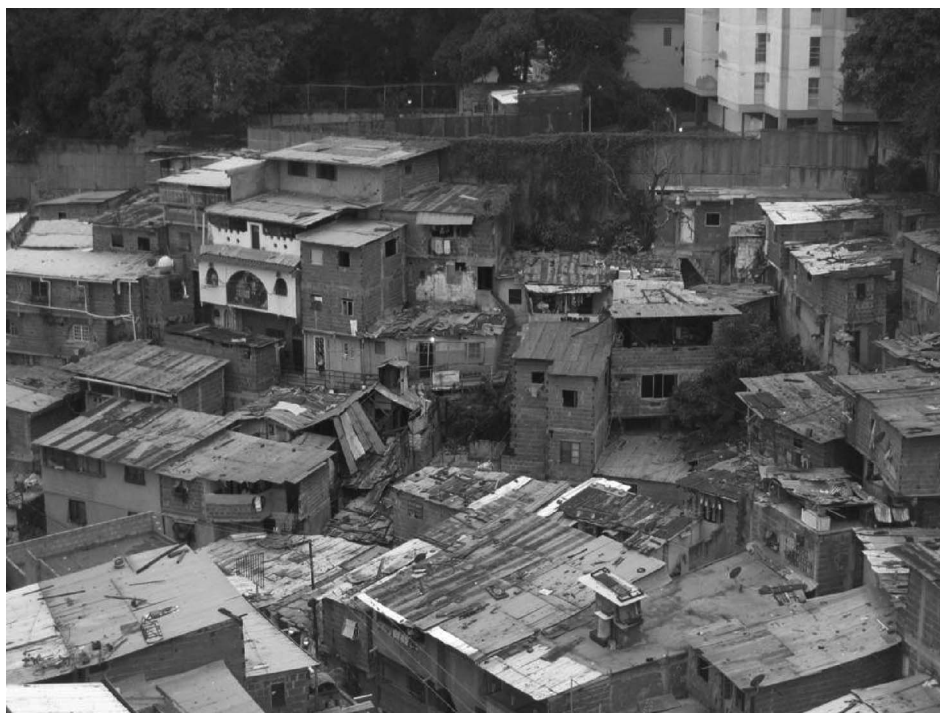


FIGURE 1.—A close view of “Los Erasos” from our private medical facility.

in charge of community affairs approved this project as well as the Institutional Review Board of Centro Medico de Caracas.

These 750 families occupied 425 homes or houses; some houses have two to three floors or levels, with one family occupying each level and all with a rather uniform use of construction materials. The total population is close to 5000 people, with an average of 6.6 inhabitants per family (data supplied by the community). Demographic information from a previous 2007 survey performed by two of the three community councils (41) of this slum revealed a young population (44% < 18 years of age) with an equal gender distribution similar to Venezuela’s demography. In addition, “Los Erasos” has identical house/construction materials that are characteristics of the majority (71.9%) of Venezuela’s households, colloquially known as a “barrio” house (12). This community is known for its low mobility and long residence in the area, facts that confer stability to the collected data.

Interviewers delivering the questionnaire were properly trained and a “head of family” (HoF) or whoever acted as one was identified; responsible study physicians were always present on site. In Venezuela and mostly within this context (12), families are structured around a dominant and respected female figure, a mother/grandmother or elder aunt that runs family affairs; extended families are the norm with nuclear families the exception. This female figure is usually portrayed as “HoF” and the instruction level, age, and genre of this person was registered (see Questionnaire 1). In addition, different habitat characteristics, such as moldy walls, floors, ceilings, windows, furniture, sewage, garbage disposal, food storage, running water, plumbing, electricity, bathrooms, home appliances

(TV, fan, refrigerator, kitchen), telephone, smoking habits, the presence of animals or pets, furniture, sighting of roaches/rodents, construction debris, and the use of any sorts of cleaning sprays or exposure to fumes or chemicals as well as washing detergents, among others, were noted. If HoF informed of the presence of asthmatics among family members, a second (see Questionnaire 2) and different survey was used for these individuals, both children and adults.

The criteria for labeling someone as having “asthma” were as follows: (1) a recent history of recurrent administration of nebulized bronchodilators at an ambulatory or hospital setting; (2) a medical diagnosis of asthma, meaning being told by a physician that he/she has asthma (43); and (3) the use of prescribed asthma medications on a regular basis (inhaled steroids or other). Around 90% of asthmatics identified answered to, at least, the first two of these criteria.

This second additional and different survey (see Questionnaires 2 and 3) gathered some demographic data and certain features of rooms of asthmatics and/or areas within the home environment used as sleeping quarters: mattresses, pillows, sofas, rugs, and other fixtures. Patient/family behavior relative to exacerbations, the health facilities attended for asthma care, and data regarding medications employed in acute and chronic management (see Questionnaire 2) were noted. For the purpose of statistical analysis, descriptive statistics and chi-square were employed for the majority of items, with comparisons made between families with asthmatics and those without asthmatics.

ACTs according to age were administered to individuals identified as “asthmatics” to determine the level of asthma control (adults >12 years and children 4–12 years old); this is the age criteria set for ACT. However, the

Grupo de trabajo en asma					Pag.1
Comunidad: Los Erasos			Todas las viviendas		
Levantamiento Epidemiológico de Asma					
Comunidad de los Erasos		San Bernardino		Vivienda N°	
Encuestador					
Encuestado		Resp. del grupo familiar?		SI	NO
Sexo	Femenino	Masculino	Telf.		
Nivel de instrucción		Prim Incomp.		Prim Comp.	
		Sec. Incomp.		Sec. Comp.	
		Univer.incomp.		Univer. Comp.	
Cuál es el vínculo familiar?		Padre		Madre	
		Otro		Especifique	
Ocupación		Cuántas personas viven en esta casa?			
Vive una persona que tenga o haya tenido asma?			No se	SI	NO
Cuántas?		Adultos		Niños	
Datos de la casa					
Metros cuadrados			Pisos		
Paredes de		Pisos de		Techo de	
Tiene ventanas?		SI	NO	N°	
Servicios de la casa (marque con X los servicios con los que cuenta)					
Aguas blancas		Aguas negras		Electricidad	
Baños		Nevera		Teléfono	
Televisión Cable o satelital				Ventilador	AC
Donde guarda los alimentos preparados?					
Donde guarda los alimentos no perecederos?					
Usa Margarina?		SI NO	Frecuencia		
Tipo de cocina		Kerosene	Eléctrica	Leña	Gas
Observa en paredes humedad, goteras, filtraciones, moho, manchas verdes, o algo extraño?					
SI		NO			
Se está contruyendo en casa?		SI	NO		
Se fuma en la casa?		SI		NO	
En caso afirmativo, qué?		Cigarrillos		Tabaco	
		Otros			
Hay animales en la casa?		SI		NO	
		Cuáles		Cuántos?	
Ha visto cucarachas o chiripas?		SI		NO	
Usa insecticidas o plaquitas?		SI		NO	
Cuántas veces a la semana?					
En la vivienda hay?					
Cortinas		Alfombras		Felpudos	
Peluches		Cajas		Libros	
Detergentes que usa para lavar la ropa (Encierre en un círculo):					
Diario	Dos veces por semana	Tres veces		Mas veces	
Detergentes que usa para limpiar la casa: (Encierre en un círculo)					
Diario	Dos veces por semana	Tres veces		Mas veces	

Grupo de trabajo en asma				Vivienda N°	Pag.2
Comunidad: Los Erasos			ADULTOS (+ 12 años)		
Levantamiento Epidemiológico de Asma					
Se refiere la persona que padece o padeció asma,					
Fecha de Nacimiento (dd/mm/aaaa)					Pag2
Persona con asma		Edad		Sexo	
Diagnosticada por médico		SI	NO		
Dónde duerme el asmático? (Coloque una X al lado de la palabra)					
Colchón		Sofá		Colchoneta	
Goma espuma		Alfombra		Otros	
Usa almohada?		SI		NO	
De pluma		Sintética		Algodón	
Control del asma					
Durante las últimas 4 semanas:		(Encierre en un círculo)			
Con qué frecuencia el asma le impidió completar las tareas? (trabajo, estudio, hogar)					
Siempre	Casi siempre	Algunas veces	Pocas veces		Nunca
Con qué frecuencia sintió falta de aire					
Varias al día	Una al día	3 a 6 por Semana	1 a 2 por Semana		Nunca
Con qué frecuencia los síntomas lo despertaron en la noche o temprano en la mañana?					
Más de 4	2 a 3 por Semana	1 por Semana	1 ó 2 en el mes		Nunca
Con qué frecuencia usó el inhalador o se nebulizó?					
3 o más /Día	<3/Día	2-3/Semana	1/Semana		Nunca
Cómo calificaría el control de su asma las últimas 4 semanas?					
Ninguno	Mal controlada	Poco controlada	Controlada	Perfectamente controlada	
En caso de crisis de asma, qué hace el grupo familiar?					
Los adultos van al trabajo si hay crisis de asma?			SI	NO	
El niño asiste a clases, si hay crisis de asma?			SI	NO	
Cómo se traslada?		Vehículo Propio	Por puesto	Caminando	
No se traslada		Vehículo vecino	Taxi	Otros	
A qué horas son las crisis generalmente?			Día	Noche	
Quién le atiende?					
En casa	Médico de siempre	Ambulatorio	Hospital	Clínica	
Nombre (Ambulatorio/Clínica u Hospital)					
Como se controla el asma?					
Sin nada			Medicamentos		
Remedios caseros			Cuál?		
Con sinceridad responda (encierre la respuesta en un círculo)					
Ud. consigue su medicación para el asma?				SI	NO
Considera muy costoso los medicamentos?				SI	NO
Ud. trata su asma en :		Crisis		Continuamente	
Si se mejora suspende el tratamiento?				SI	NO
Usualmente cómo consigue el Tratamiento?			Familia	Ambulatorio	Hospital
Seguro Privado		Empleador	IVSS	Otros	Nadie
Qué medicación prefiere para el asma?				Oral	Bombas
Datos de la persona con asma					
Nombre			Apellido		
Parentesco con el entrevistado					

QUESTIONNAIRE 2.

cutoff age range for an adult to be labeled as “asthmatic” was 44 years old, trying to avoid confusion with symptoms of chronic obstructive pulmonary disease (COPD), but not implying at the same time that asthma does not exist beyond this age. No data on the prevalence of asthma could be derived from this survey, since the ages of all inhabitants of these homes were not registered.

RESULTS

Habitat Characteristics

As previously mentioned, houses/homes from “Los Erasos” hold the usual construction characteristics (“barrio house”) of more than 70% of Venezuela’s urban houses, i.e., friezed block walls, cement floors, and for ceilings

Grupo de trabajo en asma				NIÑOS	Pag.2
Comunidad: Los Erasos				Vivienda N°	
Levantamiento Epidemiológico de Asma					
Se refiere la persona que padece o padeció asma,					
Fecha de Nacimiento (dd/mm/aaaa)					Pag2
Persona con asma	Edad			Sexo	
Diagnosticada por médico	SI	NO			
Dónde duerme el asmático? (Coloque una X al lado de la palabra)					
Colchón		Sofá		Colchoneta	
Goma espuma		Alfombra		Otros	
Usa almohada?	SI			NO	
De pluma		Sintética		Algodón	
Control del asma (Encierre en un círculo)					
Cómo es su asma hoy?					
Muy mal	Mal	Bien	Muy Bien		
Tiene problema con su asma cuando corre, ejercita o hace deporte?					
Un gran problema y no puedo hacer lo que quiero	Es un problema y no me gusta	Es poco, esta bien	No es un problema		
Usted tose debido a su asma?	Si, todo el tiempo	Sí, la mayoría del tiempo	Sí, algunas veces	Nunca	
Usted se despierta durante la noche debido a su Asma?	Si, todo el tiempo	Sí, la mayoría del tiempo	Sí, algunas veces	Nunca	
Durante las últimas 4 semanas, por término medio, ¿cuántos días por mes su niño tenía algún síntoma de asma de día?					
Nada	1 a 3 días/mes	4-10 días/mes	11-18 días/mes	19 a 24 días/mes	Cotidianos
Durante las últimas 4 semanas, por término medio, ¿cuántos días por mes su niño jadeó durante el día debido al asma?					
Nada	1a 3 días/mes	4-10 días/mes	11-18 días/mes	19 a 24 días/mes	Cotidianos
Durante las últimas 4 semanas, por término medio, ¿cuántos días por mes su niño se despertó durante la noche debido al asma?					
Nada	1 a 3 días/mes	4-10 días/mes	11-18 días/mes	19 a 24 días/mes	Cotidianos
En caso de crisis de asma, qué hace el grupo familiar?					
Los adultos van al trabajo si hay crisis de asma?		SI	NO		
El niño asiste a clases, si hay crisis de asma?		SI	NO		
Como se traslada?		Vehículo Propio	Por puesto	Caminando	
No se traslada		Vehículo vecino	Taxi	Otros	
A qué horas son las crisis generalmente?		Día	Noche		
Quién le atiende?					
En casa	Médico de siempre	Ambulatorio	Hospital	Clínica	
Nombre (Ambulatorio/Clínica u Hospital)					
Con sinceridad responda (encierre la respuesta en un círculo)					
Ud consigue su medicación para el asma?		SI	NO		
Considera muy costoso los medicamentos?		SI	NO		
Ud trata su asma en :		Crisis	Continuamente		
Si se mejora suspende el tratamiento?		SI	NO		
Usualmente como consigue el Tratamiento		Familia	Ambulatorio	Hospital	
Seguro Privado		Empleador	IVSS	Otros	Nadie
Qué medicación prefiere para el asma			Oral	Bombas	
Datos de la persona con asma					
Nombre			Apellido		
Parentesco con el entrevistado					

QUESTIONNAIRE 3.

either a cement plaque ("platabanda") or galvanized sheet roofs (acerolit®, Láminas de Acero, Materiales Los Andes, Venezuela; www.materialeslosandes.com/acerolit.html) and/or zinc sheets (12, 41). This community also conforms to the living conditions and sociodemographics of 50% of people living in Caracas (37). A crowded environment was detected with an average of 5.4 inhabitants per bathroom; an estimation method is suitable in this context. Only 42.7% of families reported owning their homes, with the caveat that homeownership is not a good reflection of living conditions for the poor urban majority (37). However, none of the above characteristics was found to be different between families with or without reported presence of asthmatics.

A detailed account of all the different elements analyzed (see Questionnaire 1) relates to the number of windows, the presence of running water, sewage/garbage disposal, electricity, telephone, and home appliances (refrigerator, fans, cable TV, air conditioning, stoves). In regard to stoves, all are run on liquid gas, with no wood burning detected. Moldy walls were noted in 61% of homes (Table 1). According to common knowledge, roaches can be encouraged if food is not well kept. The food was kept in cabinets under storage conditions throughout. Margarine has been linked to allergies (42) and its consumption was ample, widespread, and reported on a daily basis. Again, there was no statistical difference among families with and without asthmatics for any of the above items.

TABLE 1.—Environmental factors.*

	Yes		No	
<i>Presence of windows</i>				
All	222	92.50%	7	2.90%
Asthmatics	104	90.40%	3	2.60%
No asthmatics	118	94.40%	4	3.20%
<i>Smoking environment</i>				
All	137	57.10%	98	40.80%
Asthmatics	71	61.70%	40	34.80%
No asthmatics	66	52.80%	58	46.40%
<i>Construction debris</i>				
All	32	13%	189	78.80%
Asthmatics	17	14.80%	83	72.20%
No asthmatics	15	12%	106	84.80%
<i>Animals</i>				
All	107	44.60%	133	55.40%
Asthmatics	48	41.70%	65	56.50%
No asthmatics	57	45.60%	68	54.40%
<i>Cockroaches and rodents</i>				
All	208	87.02%	31	12.97%
Asthmatics	101	88.60%	13	11.40%
No asthmatics	107	85.60%	18	14.40%
<i>Use of insecticides</i>				
All	156	74%	54	25.71%
Asthmatics	74	72.49%	28	27.45%
No asthmatics	82	75.93%	26	24.07%
<i>Moldy environment</i>				
All	144	61.28%	91	38.72%
Asthmatics	70	62.25%	42	37.50%
No asthmatics	74	60.16%	49	39.84%

p-value:

*p = ns (between homes with asthmatics and those without asthmatics).

Carpets were reported to be in 34% of homes, while rugs were found in 50%. Moreover, stuffed animals, boxes filled with construction debris, and books were found in more than 80% of homes. For home cleaning, an array of odorous products (average >3 times/week) was reported in 100% of families and the use of laundry detergents was reported on a weekly basis for the totality of families interviewed. No difference was found between families with and without asthmatics for this upholstery and cleaning items mentioned.

A tobacco environment (mostly cigarettes) was reported in 57.10% of homes and pets were found in 44.60% of homes, with a varied fauna of dogs, cats, and birds. Sighting of roaches reached 87.02%, while the rodents were a modest 6.6%. In regard to insecticide use, either tablets plugged in walls and/or in spray form were reported from "little" to several times/week in close to a 100% of families. No significant association was found with any of the items explored in families with or without reported presence of asthmatics.

It should be noted that one family was found to lack running water, sewage disposal, electricity, inside toilets, and a refrigerator; yet none of its members suffered from asthma.

Demographic Data/Asthma Profiles

A total of 750 families live in this community and 242 were randomly interviewed (32.26%); these families occupy 425 houses. An estimation of 1287 inhabitants (5.31 inhabitants/family) was made by dividing the estimated number of people among the number of families interviewed. Most families answered to the random "door knocking" aspect of this survey, with respondents belonging to the already mentioned HoF figure in 75.6% of cases, conferring reliability to the information gathered. Mothers responded 85% of the times, while grandmothers, elder aunts, or female spouses playing a lesser role; fathers accounted close to 5% of respondents. The level of instruction of HoF was predominantly elementary and high school (completed and uncompleted), with 11.7% reporting some university level.

One out of every two families (49.17%) reported the presence of at least one asthmatic (119/242). A total of 192 medically diagnosed asthmatics, 100 adults (> age 12) and 92 children (0–12 years old), have been found, providing evidence for the presence of asthma in 14.91% (7% for children and 8% for adults) of this population. This result was obtained by dividing the total number of asthmatics by the total number of surveyed inhabitants (192/1.287). If we are to follow the age range set by the World Bank that considers children as <18 years old, the presence of asthma in adults came close to 40% with a 60% corresponding to children.

ACT test was administered to 96 of 100 willing and/or available adult asthmatics (96%) and to 59 of 88 (4 years and over) willing and/or available children or caregivers (67%). A total of 80.7% of the initial medically diagnosed "asthmatics" answered the ACT test, permitting confirmation of symptoms of asthma, as reported by families. Figures 2 and 3 show the description by genre/age and

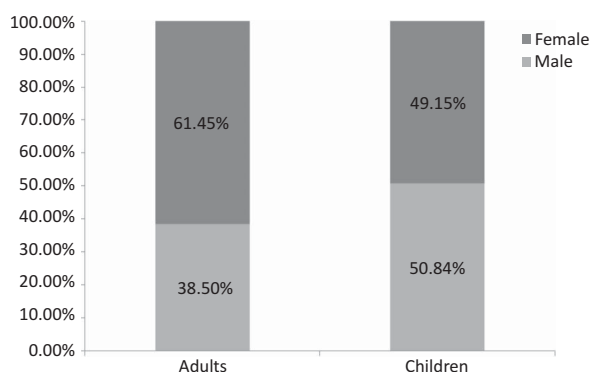


FIGURE 2.—Percentage distribution of patients by gender; children (aged 4–12 years old) and adults (over 12 years).

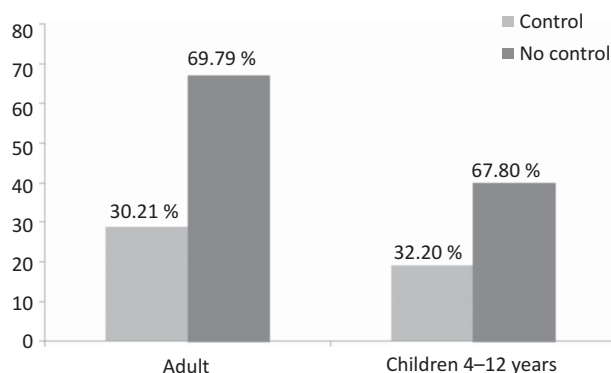


FIGURE 3.—Percentage of patients controlled according to the ACT scores for children and adults (control ACT > 19 points).

also the ACT control level of these asthmatics; 19 points or less served as the cutoff value indicating a noncontrol status. Most asthmatics were found to have slept on mattresses, with an equal use of either cotton or synthetic fabric pillows.

Patient and Family Behavior with Regard to Asthma

- (1) During an adult asthma exacerbation, 48.5% of patients missed work. In one-third of families, children could not attend school during the caregiver episode.
- (2) During an asthma exacerbation, 87.5% of children missed school; therefore, responsible adults or caregivers missed work 40% of the times.
- (3) The use of a public transportation means to access a health facility was reported 42% of times during an adult asthma exacerbation and for children, 22% of times; attendance to a healthcare facility by foot (walking) during an asthma exacerbation was found in 28% of adults and 43.2% of children. Adults weather out a crisis 15.5% of times without seeking medical assistance, while children a 10.2%.
- (4) During an asthma exacerbation, 41% of children attended a hospital setting and 27.8% an ambulatory care facility. Adults received hospital care (30.9% of

adult asthmatics) and ambulatory care (16.5% of adult asthmatics).

- (5) In most patients, asthma exacerbations occurred at night; 58.7% corresponding to adults and 63% corresponding to children.

Medications

See Table 2 for details.

DISCUSSION

Venezuela, with roughly 28 million inhabitants, is actually considered by the World Bank an upper middle income country (11), a recent upgrade from the low middle income status of not too long ago. Gross national income per capita is among the highest in Latin America, with a 30% increase during the past 10 years, mostly from high oil revenues. A National Asthma Program developed under Global Initiative for Asthma (GINA) guidelines has existed for many years (1), although with weak implementation; it was last revised in 1998 and has been unable, so far, to address our high morbidity from asthma (1, 2).

“Los Erasos,” an underprivileged vulnerable community, “barrio” (41) or slum area from Caracas, shares demography and home/socioeconomic environment characteristics similar to 50% of people living in Caracas (37); therefore, it can be considered a “model,” or reflection of day-to-day happenings related to asthma and perhaps other

TABLE 2.—Therapeutic aspects.

	Adults		Children	
	Yes	No	Yes	No
Gets medication	78 (80.4%)	10 (10.3%)	71 (80.6%)	17 (19.3%)
Considers it to be expensive	80 (82.5%)	10 (10.3%)	81 (92%)	5 (5.6%)
<i>Treats its asthma:</i>				
During crisis	71 (73.2%)		63 (71.59%)	
Continuously	20 (20.6%)		11 (12.5%)	
Stops upon improving	59 (60.82%)	26 (26.8%)	63 (71.6 %)	11 (12.5%)
<i>How does he/she gets medication:</i>				
Ambulatory facility	23 (23.7%)		23 (26.1%)	
Family	46 (47.4%)		53 (60.22%)	
Hospital	12 (12.4%)		5 (5.7%)	
Instituto Venezolano de los Seguros Sociales (social security)	4 (4.1%)		6 (6.8%)	
Private insurance	1(1.0%)		2 (2.27%)	
Others	8 (8.2%)			
N/A ^a	9 (9.3%)			
<i>Administration preference:</i>				
Oral	49 (50.5%)	52 (59.1%)		
Inhalers	42 (42.3%)	33 (37.5%)		
N/A ^a	6 (6.2%)	3 (3.4%)		

^aNot available.

health problems in the underprivileged urban majority. Studying their home environment might yield information on our high burden of asthma, considering that house deterioration and disarray as well as indoor allergens are known home risk factors for asthma.

The questionnaires (see Questionnaires 1–3) employed in this survey have some distinctive features: “HoF” or whoever acted in lieu of provided the required information in more than 70% of cases; in addition, a large number of families were randomly surveyed (one-third of total number of families) and persons with asthma, either adults or children, were identified. Asthma as diagnosed by a physician (42) (by self-report or parent report) in more than 90% of cases and with actual symptoms confirmed somehow by ACT (38, 39) (70% with noncontrol status) give support to the high morbidity from this disease, as previously mentioned. The “in situ” data collection, for proper evaluation of housing and other environmental features, adds credibility to this endeavor. This is the first time, to the best of our knowledge, that a survey with exclusive reference to home and asthma from a socioeconomically deprived urban group in Caracas has been conducted.

Visible presence of roaches/rodents (44) as well as moldy areas (23) in walls has been implicated in asthma and serve as good indicators that the indoor environment is out of balance. We lacked the capability to measure allergen levels or other pollutants for a more thorough evaluation. However, no significant associations were found with the above or with any of the different items explored (see Figures 1–3) that are known to have some bearing on asthma (rugs, carpets, pets, etc.) in those families where asthmatics lived. All other items that could be considered as possible inhalant risk factors (irritants, fumes, or chemical sprays) yielded similar results. Margarine consumption is widespread in this community and although it has been reported to have a possible relation with allergies (43), no difference was found between families with and without asthmatics.

A recent review emphasized the definite influence of the home environment on asthma (22), but our findings within this urban poor context of a city like Caracas do not lend support to this statement. However, we reached conclusions similar to Suglia (32, 33), although employing a different methodology. This author also found psychosocial stress factors having no relation to asthma. Furthermore, Wisnivesky et al. (34) from New York found no association between indoor allergen sensitization and asthma morbidity in inner-city adults, a finding that points to the need for more research.

Out of 242 families surveyed, with an average of 5.31 inhabitants per family, 14.91% or one out of seven inhabitants was identified with asthma. At least, one in every two families reported the presence of an asthmatic, making it a common disease within this framework. ACT showed 70% of asthmatics, both children and adults, in a noncontrolled (19 points or less) status, implying actual symptoms and confirming somehow the diagnosis of asthma as referred by families. A noncontrol status favors a propensity to develop exacerbations (45) adding support to the

MoH data regarding the high load of acute episodes cared for at ambulatory services across Venezuela (close to 1 million/year). Uncontrolled asthma in the United States, for example, has been reported close to a 40% for both children and adults (45).

Other results have a better appraisal of this reality; as in previous reports most asthmatics receive treatment only during exacerbations and abandon it prematurely (2, 7, 46). Asthma occurs predominantly during nighttime (47), and in our population 10–15% of patients do not seek medical attention during crisis. Asthmatics and their families found medicines to be expensive and parents—families are usual suppliers of most treatments. When asked for route preference, there was an inclination for oral medications among children. Similar findings as above have been reported elsewhere (46). Significant absenteeism from school and work denote a high impact of asthma, affecting both personal and family quality of life.

Public health-care services are available and used by this community, varying from ambulatory facilities to hospital care, assuring us of a physician asthma diagnosis, as previously referred to. Nevertheless, obstacles for proper asthma management seem to lie not in the unavailability of acute health care, but in a lack of knowledge in control strategies from dispensers of health care and patients alike.

In summary, physical home environment/risk factors seem not to add much in explaining the high burden of symptomatic asthma found in this slum, which we believe to be a reflection of our underprivileged urban majority. However, worth mentioning is the fact that other social elements (psychological stress factors) have been recently demonstrated as a most important issue in relation to asthma, both in prevalence and severity. Violence (29, 48), familial or external, stands out as an example among many of these elements. Although our scrutiny was not oriented to the collection of psychosocial data, we must admit that violence in Venezuela is among the highest in Latin America, manifested in a homicide rate of >19,000/year or 59/100,000 inhabitants. It does affect with some predilection the young and economically weak urban majority of our population (49), just like the community surveyed by us. We think our asthma seems to sway amid a context of poverty and violence.

If we ever expect to effectively address this very important challenge, contextualized proposals should be oriented toward devising simple and feasible control strategies, discovering oral medications that are effective and establishing minimum levels of asthma education in the population. We have tried different approaches in the past, for control as well as for exacerbations, with this simple concept in mind (50–52). Educational approaches needed for the proper use of inhaled control medications appear from our point of view too cumbersome for our urban and poor majority whose lives are from day to day an act of survival (53, 54). In view of this, our National Asthma Control Program based on GINA guidelines needs to be reassessed.

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DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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