

Research Article

Prevalence of Asthma, Nutritional Status and Family Functionality in School Children of a Primary Care Unit in Tijuana, Mexico

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Abstract

Background: The prevalence of asthma in Mexico varies according to the region, in cities of the center and south it ranges between 7 and 17%.

Objective: To determine the prevalence of asthma, nutritional status and family functionality in school children of a primary care unit in Tijuana.

Methods: For the prevalence of asthma, the questionnaire "Diagnosis of Asthma for Epidemiological Studies" was applied in schoolchildren of the family medicine unit #27 in Tijuana. Nutritional status was measured with the body mass index for age according to Centers for Disease Control and Prevention (CDC) growth charts; for family functionality, family APGAR was used. In the bivariate analysis, odds ratio, Chi-square and Mann-Whitney U with a 95% confidence interval were used, a $p < 0.05$ was considered significant.

Results: 58 cases of asthma were found with a prevalence of 28%. In nutritional status, 93 (45%) children were overweight or obese. Family dysfunctional was found in 51 (25%) families.

Conclusions: The prevalence of asthma, obesity and family dysfunction are high in this area of Tijuana compared to central and southern Mexico.

Keywords: Asthma; Pediatric Obesity; Family Functionality

Introduction

Asthma is the most common chronic airway disease in pediatrics [1], has variable symptoms but the classic manifestations are wheezing, dyspnea, cough, chest tightness, bronchial hyper reactivity and variable airflow obstruction [2-4]. Pathophysiology continues under study but there is evidence of a complex interaction between genetic and environmental factors [5]; although genetics is important in the development of asthma, environmental factors such as climate change, pollution, changes in the home environment and industrialization can explain variations in prevalence of this disease [6].

The frequency of asthma worldwide varies from 235 to 300 million people [4]. In Latin America, according to The International Study of Asthma and Allergies in Childhood (ISAAC), a prevalence of 17% is estimated [7] with variations according to age and region; in children, Brazil reports 13% [8]; Argentina from 10 to 18% [9]; Bolivia 14% [9]; Chile from 11 to 21% [10]; Colombia from 9 to 17% [11]; Venezuela from 15 to 20% and Peru 20% [9]. In Mexico, the prevalence of asthma ranges between 1 and 15% [9].

The prevalence of asthma is based on the clinical diagnosis and the report of questionnaires created for the evaluation of symptoms. These instruments are auxiliary tools in the diagnosis and monitoring of patients; the most used is ISAAC, which evaluates the frequency of asthma symptoms, atopic dermatitis and allergic rhinitis in children aged 6 to 7 years and adolescents aged 13 to 14 years [12]. In Mexico,

Mancilla-Hernández and collaborators created and validated the questionnaire "diagnosis of asthma for epidemiological studies" to determine the prevalence of asthma in Mexican children, which has been applied in different regions of the country [13].

According to the Mexican questionnaire, Puebla has a prevalence of 14%; Tulancingo 17%; Tlaxcala 7%; Cancun 14% [14] and Cuernavaca 11.9% [15], with an average of 12.7% in the five cities. The use of the Mexican questionnaire in different regions of the country allows a more precise evaluation of the prevalence of asthma considering the national context, also offers a more comprehensive view on the background, symptoms and evolution of patients.

Asthma requires constant attention from all family members, especially parents. Due to its evolution, multiple visits to the doctor and even hospitalizations in the emergency services may be necessary. These paranormative crises and disease events cause changes in the daily life of the family, with repercussions on normal family functioning and adjustment of roles [16]. The family influences the behavior of the children by supporting healthy lifestyle habits such as balanced eating and frequent physical activity, which are important resources in the treatment of asthma and shape the behavior of children through observation and adaptation [17]. All of the above, the general objective of the study was to determine the prevalence of asthma, nutritional status and family functionality in children aged 6 to 12 years in a primary care medical unit in Tijuana, Mexico.

Methods

Location

Tijuana is the sixth most populous city in Mexico with 1.6 million inhabitants and is located as the sixth metropolitan area of the country. Together with the cities of Rosarito, Tecate and San Diego, they make up the largest transnational metropolitan area in Mexico with more than 2.2 million inhabitants. Tijuana's climate is dry and very dry, with temperatures ranging from 5-30°C, with an annual average of 19°C. Rains are very scarce with an annual average rainfall of 200 millimeters [18].

Study design and population

An analytical cross-sectional study was carried out in Tijuana, Baja California, Mexico, between January and April 2019. The research was carried out in the family medicine unit #27 (FMU #27) of the Instituto Mexicano del Seguro Social (IMSS); first level care unit and main center of health care in the region. Patients of school age (6-12 years) who agreed to participate in the study by informed consent and informed consent by parents were included. Children with lung diseases (except asthma), neurological or psychiatric were excluded from the study; the patients were recruited in the waiting rooms of the outpatient clinic of family medicine.

Variables

The collection of variables was done with a standardized data sheet; the variables to be studied were the following: age, which was collected directly from the patients and their medical card; sex, through phenotypic characteristics; nutritional status, the Quetelet formula (BMI= weight/height²) was used to calculate the body mass index, then the percentile patient for age was calculated according to the tables of the Center for Disease Control and Prevention (CDC), was considered overweight and obese who exceeded the 85th and 95th percentile respectively.

Family functionality was measured according to the family APGAR questionnaire, which consists of five questions that seek to demonstrate the individual perception of the functional status of the family, was created by Smilkstein [19] in 1978 and validated into Spanish in 1996 [20], is considered a functional family if the score is equal to or greater than 7 points in at least two family members older than 10 years; finally, the diagnosis of asthma was made with the Mexican questionnaire "diagnosis of asthma for epidemiological studies", which was validated in 2014 with a cronbach alpha of 0.7 designed for children and adults, consists of nine items, taking as diagnosis a score greater than or equal to 0.75 [13].

Statistical analysis

In the qualitative variables we use frequencies and percentages; for quantitative variables, median and interquartile range. Asthma frequency was determined using the formula for punctual prevalence. The normality test was performed using the Kolmogorov-Smirnov test. Chi-square analysis was performed to test the differences in the categorical variables and the odds ratio was used to calculate the relative risk. The results were evaluated in a 95% confidence interval, a p <0.05 was considered significant. For data analysis, the IBM SPSS program, version 20 (Armonk, NY, USA) was used.

Ethics

The study was approved by the local health ethics and research

Table 1: General characteristics of the population.

Variable	Total (n=207)	With asthma (n=58)	Without asthma (n=149)	P
Age*	8 (3)	9 (2)	8 (3)	0.04†
Body Mass Index*	17.8 (4.6)	18.2 (6.4)	17.7 (4.4)	0.70†
Sex**				
Men	116 (56)	31 (53)	85 (57)	
Women	91 (44)	27 (47)	64 (43)	0.63‡
Nutritional Status**				
Underweight	4 (2)	0 (0)	4 (3)	
Normal weight	110 (53)	32 (55)	78 (52)	
Overweight	41 (20)	10 (17)	31 (21)	0.61‡
Obesity	52 (25)	16 (28)	36 (24)	
Overweight + Obesity**				
Yes	93 (45)	26 (45)	67 (45)	
No	114 (55)	32 (55)	82 (55)	0.98‡
Family Functionality**				
Functional family	156 (75)	47 (81)	109 (73)	
Disfunctional family	51 (25)	11 (19)	40 (27)	0.23‡

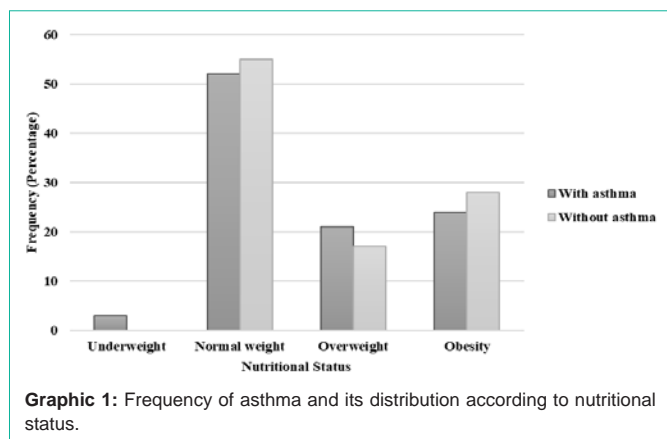
n=Frequency; *=Median (interquartile range); †=U Mann-Whitney; ‡=Ji-square; **=Percentage.

committee number 204; with registration number R-2019-204-009. The research was conducted under bioethical principles, the general health law in health research and the Helsinki declaration. The parents of the minors signed the informed consent and the participants the informed consent.

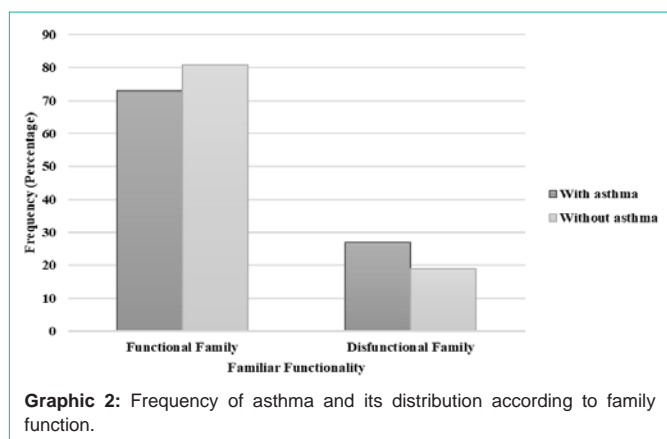
Results

207 questionnaires for asthma detection were applied to children aged 6 to 12, of which 91 (44%) were women and 116 (56%) men. The participants had a median of 8 years with an interquartile range (IQR) of 3. Of the 207 patients, 58 cases of asthma were found according to the questionnaire applied, which corresponds to 28%; 31 (53%) of the male sex and 27 (47%) of the female sex, the median age was 9 years with IQR of 2 (Table 1). In nutritional status, four children (2%) were underweight, 110 (53%) normal weight, 41 (20%) overweight and 52 (25%) obese. The median body mass index was 17.85 with an interquartile range of 4.68. Malnutrition in the sample studied reached 47%, with a marked tendency towards overweight and obesity (Graphic 1). Of the patients positive for asthma, 16 (28%) had obesity and the median BMI was 18.20 with an IQR of 6.4.

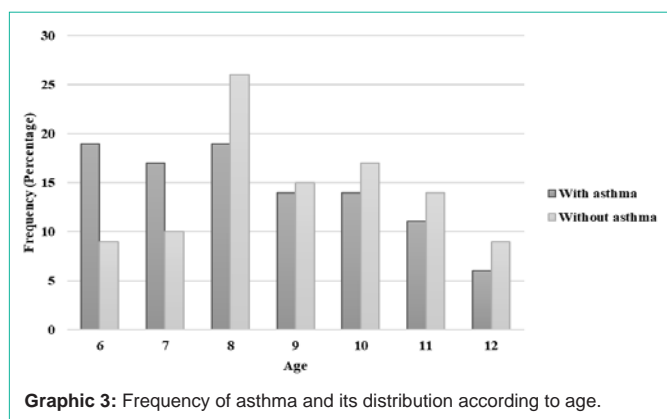
The perception of family functionality through family APGAR determined that 156 families (75%) are functional and 51 (25%) presented moderate to severe family dysfunctionality (Table 1). In the group of patients with asthma, 11 (19%) schoolchildren had a dysfunctional family and 47 (81%) functional family (Graphic 2). The associations between the groups formed from the presence of asthma (Table 1) showed no differences in sex (OR=1.1, 95% CI 0.6-2.1, p=0.63), obesity (OR=1.1, 95% CI 0.6-2.3, p=0.61), family dysfunction (RM=1.5, 95% CI 0.7-3.3, p=0.23) and body mass index (p=0.70); Only age showed a significant difference (p=0.04) between the groups and an increase in the prevalence of asthma was observed at an older age (Graphic 3).



Graphic 1: Frequency of asthma and its distribution according to nutritional status.



Graphic 2: Frequency of asthma and its distribution according to family function.



Graphic 3: Frequency of asthma and its distribution according to age.

Discussion

The most important finding of our research was the high prevalence of the diagnosis of asthma (28%), overweight (20%) and obesity (25%) in school age. In the prevalence of asthma, our results are much higher than the found in central and southern Mexico and even the national prevalence; in the cities of Cuernavaca [15], Puebla, Tulancingo and Tlaxcala [14], located in the center of the country we found an average prevalence of 12.4%; in Cancun, located in the southern zone, there is a prevalence of 14% [14], there are few studies where the “asthma diagnostic questionnaire is used for epidemiological studies”, for this reason, comparisons with the same instrument are limited.

In the nutritional state, malnutrition shows alarming data, almost half of the children studied are overweight or obese. These results are superior to those shown in the National Health and Nutrition Survey half way 2016 (ENSANUT MC 2016), where it can be seen that in the northern region of Mexico, overweight and obesity is present in 30% of children aged five to eleven years and up to 35% in urban areas [21]. In Latin America the situation is not different, the overweight and obesity in school children vary from 14% to 38% in countries such as Brazil, Colombia, Chile and Mexico [22], the highest prevalence is in Chile (38%) and the lowest in Colombia (14%); although the findings are worrisome, they are below what was found in our study, that is, this area of Tijuana has one of the highest rates of overweight and obesity in the Americas region; the management of patients with weight disorders began after this study, it is necessary to focus efforts on preventive measures mainly in the family and school setting.

In recent years there is a significant increase in the prevalence of childhood obesity and asthma, these results indicate that obesity increases the risk and morbidity of asthma in early stages of life, especially before 7 years [23], our population is above that age range and that condition could explain that one third of our patients with asthma suffer from obesity, however the association showed no significant differences between the groups. In the family environment, family dysfunction is defined as the inability to face crises and fulfill basic functions such as care, affection, communication, adaptability, problem solving, participation and rules of coexistence; this family status is a factor most frequently associated with families of children with asthma [24], especially if the disease is not controlled, it has also been recognized as a trigger of acute events [25]. In our study, we did not find a significant association between the presence of asthma and family dysfunctionality, but almost a quarter of patients with asthma had dysfunctional families.

The evaluation of family functionality should be considered part of the comprehensive approach of patients with asthma, knowing the family climate and its environment allows a more precise orientation on the crises that the family is going through and guides on the presence of emotional disorders such as anxiety, depression or stress [26,27], entities present in dysfunctional families. Several studies have determined that almost half of children with asthma have family dysfunctionality [28]. Among the strengths of the study, it stands out as the first study of this type in the northwestern border region, in a multifaceted population in constant evolution and exposed to multiple risk factors for the development of allergic diseases. Another important point is the early assessment of patients with a positive result for asthma, obesity and family dysfunctionality, which translates into a comprehensive follow-up to plan interventions and timely detections in this age group.

The weaknesses of our study are the number of patients studied since it was limited to the FMU 27, compared to other national studies there is an important difference in the sample. Another limitation was the time of the study since it was carried out between the months of January and April, which correspond to the end of winter and the beginning of spring, so there could be variation in the prevalence to include all seasons of the year.

Conclusion

In conclusion, the use of the “asthma diagnostic questionnaire

for epidemiological studies” allows integrating the clinical shown by patients and offering a more stable approach to the presence of asthma, which is superior to what questionnaires based on a single question offer to guide the diagnosis. In our population a high prevalence of asthma, overweight and obesity was found; although the number of dysfunctional families was less than other research, it does not detract from the importance of the family in the health-disease process. A look towards this area of the country is required to carry out more extensive studies that clarify the panorama of allergic respiratory diseases in this region.

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