

PERINATAL RISK FACTORS IN ASTHMATICS PROSPECTIVE STUDY**Dr. Maryame El Hammoumi*, Dr. Benbrahim, Pr. Benchkroun, Pr. El Hafidi, Pr. Mahraoui Chafiq**

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ABSTRACT

Asthma is a heterogeneous disease, of variable progression, of various causes and whose response to treatment is variable. It is the most common chronic disease in children and represents a major public health problem. According to statistics from the World Health Organization (WHO), it affects nearly 235 million people and is responsible for 250,000 deaths per year worldwide. As for Morocco, the International Study of Asthma and Allergies in Childhood (ISAAC) reveals that 10 to 20% of the Moroccan population is affected by asthma. This multifactorial disease involves multiple genetic, environmental and behavioral factors. It represents a public health problem by its frequency and its morbidity. This review article includes a prospective study of perinatal asthma risk factors, lasting 4 months from May to September 2018 including all age groups, which took place within the department Pneumo-Allergology and infectious disease at the Rabat children's hospital. Of the 101 cases identified during this period, age varies between 7 months and 12 years with an average age of 4 years, there is a male predominance with a sex ratio of 1.5 of which 60% are boys and 40% are girls. Familial atopy accounts for 49.5%, while personal atopy accounts for 12.87% of cases. The environmental factors or allergens is 12%. Prenatal factors including maternal age, obesity during pregnancy, maternal stress, passive or active smoking and the use of antibiotics, all represent factors involved in the early onset of asthma in children. There are also other perinatal factors such as the notion of neonatal distress (4.95%), macrosomia (14.85%), upper part of the delivery (58%). Asthma is a heterogeneous disease, of variable progression, of various causes. It is the most common chronic disease in children and represents a major public health problem. This multifactorial disease involves multiple genetic, environmental and behavioral factors.

INTRODUCTION

Asthma is the most common chronic disease in childhood. It affects 16% of the Moroccan pediatric population. In about fifteen years its frequency has doubled in children. It should also be noted, in the context of national surveys, that the prevalence of asthma is much more frequent in children than in adults. The prevalence rate in children between 13 and 14 years old is 20% and in adults it is between 15 and 17%. And we can say that the prevalence in children is experiencing a worrying trend.

The diagnosis of asthma is easy to make. Tangible signs: the patient has symptoms such as wheezing, difficulty breathing after exertion, dry coughs, especially at night. All of this can be detected after a simple physical examination. Sometimes a chest x-ray can be done to rule out other conditions, including lung cancer. It is also possible to do allergy tests to find out the origins of the allergy. And for better management and continuous monitoring of patients, the doctor may order spirometry, or a functional exploration of breathing, in order to assess the degree of the disease. An evaluation which will make it possible to determine the treatment to be

followed. This is mainly based on taking inhaled corticosteroids which can be combined with long-acting bronchodilators and helps reduce the frequency and intensity of attacks.

Medical monitoring and the prevention of risk factors reduce attacks and allow good asthma control.

The general objective of this study is to clarify the pre- and peri- natal risk factors for asthma in children, to determine and of course prevent the main factors involved in this.

METHODS

This is a prospective study lasting 4 months from May to September 2018, which took place in the Pneumo-Allergology and Infectious Disease Department at the Rabat Children's Hospital.

The 7 month and 12-year age groups were included. That is a total of 101 cases.

Information is collected on an operating sheet grouping together the following risk factors: heredity, environment

and allergens, pre and perinatal risk factors, as well as other factors during infancy.

The analysis and calculation of this data was performed on software, allowing the percentages of each factor to be calculated independently.

Résultats

Of the 101 cases recorded during this period, 60 cases were boys (59.41%), and 41 cases were girls (40.59%).

Almost 50 cases of patients have a familial atopy or 49.5%, dominated by maternal atopy including 24 cases (23.76%), the father 13 cases (12.87%), siblings 9 cases (8.91%), and atopy of both parents present including 4 cases (3.96%).

And almost 13 cases have a personal atopy, namely atopic dermatitis, or 12.87%.

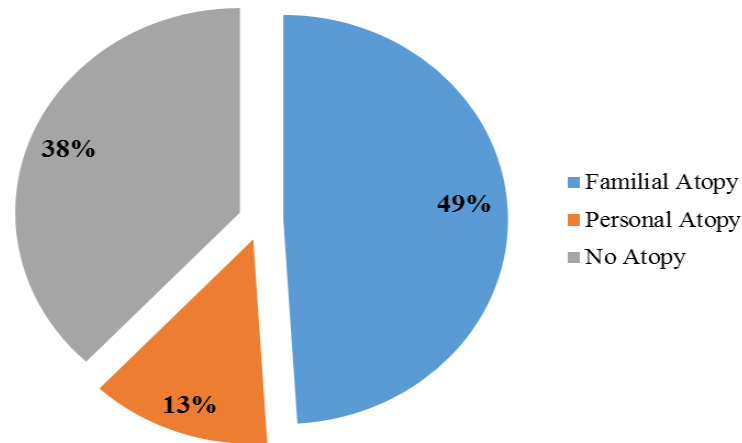


Figure 1: Distribution of cases according to their atopic profile.

I- Environmental Risk Factors

• Allergens

- Mites: found in 31 of the cases, or 30.69%
- Pollens: 13 cases or 12.87%
- Cold air: 15 cases or 14.85%

- Mold: 12 cases or 11.88%
- Dogs: 8 cases or 7.92%
- Strong odors: 7 cases or 6.93%
- Small farm (rural area): 4 cases or 3.96%

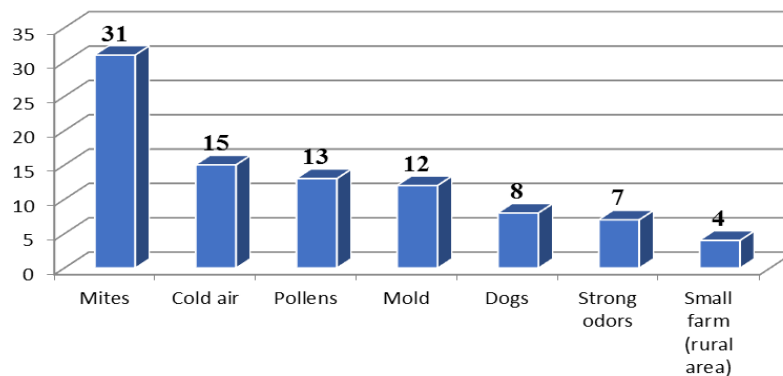


Figure 2: the various allergens implicated as environmental risk factors for asthma.

• Respiratory tract infection

- Common cold: described in 23 cases, or 22.77%

- Flu: including 15 cases or 14.85%
- Sinusitis: 5 cases or 4.95%

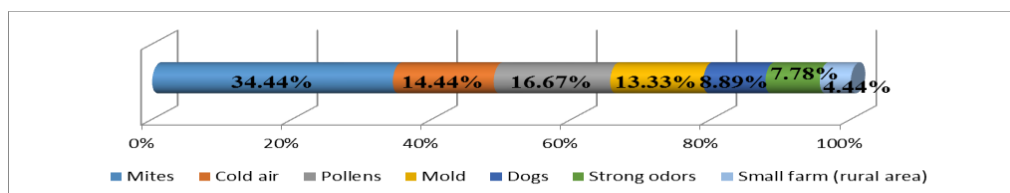


Figure 3: The most common respiratory tract infections that induce asthma.

II- Prenatal Risk Factors

Among the prenatal risk factors described in our study were:

• **Age**

In 33 cases of the sick (32.67%), came from mothers under 25 years old.

On the other hand, a paternal age of more than 34 years is described in about 30 cases of our children, or 29.70%. 22 cases are from fathers under 24 (21.78%), thus 5 cases of our patients are from mothers over 35 years old.

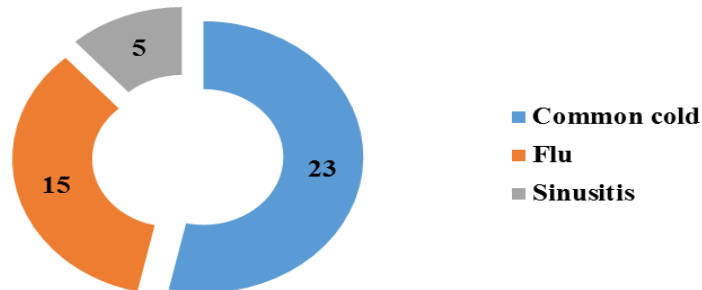


Figure 4: Comparative diagram of the different paternal age groups.

• **Smoking**

Maternal active smoking is described in 4 mothers of our patients, or 3.96%, Thus in more than 25 mothers of our patients have passive smoking, or 24.75%.



Figure 5: Passive smoking is responsible in a third of cases of early asthma in children.

• **The stress**

There are 3 entities described in this chapter

- Anxiety: 16 mothers of our patients suffer from anxiety during pregnancy, or 15.84%

- Depression: described in 5 cases, or 4.95%

- Others: 2 cases or 1.98%

3 mothers of our patients are under medical treatment.

Entité	Number	%
Anxiety	16 mamans	15.84%
Depression	05 mamans	4.95%
Others	02 mamans	1.98%

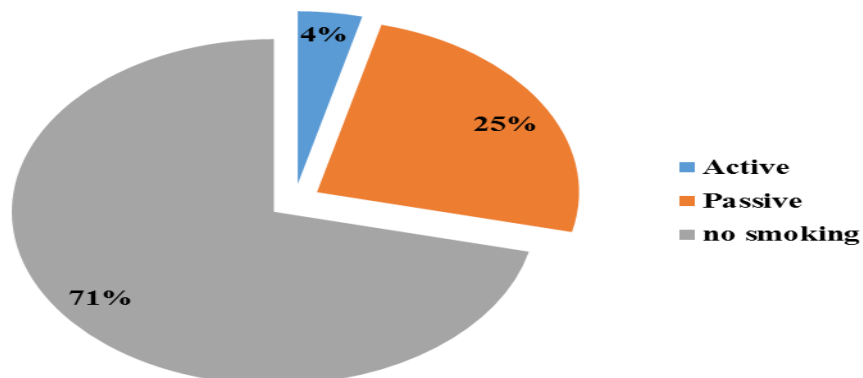


Figure 6: Maternal psychiatric status plays a role in increasing the risk of asthma in infants.

- **Other factors**

The mother's weight at the end of pregnancy:

- Excess weight is described in 15 cases, or 14.85%
- Low weight, in 6 cases, or 5.94%

Consumption of antibiotics or paracetamol during pregnancy

- Including 9 cases, there was an excessive use of antibiotics and paracetamol (8.91%).

III- Perinatal Risk Factors

- **Methods and modalities of delivery**

- Upper part of the delivery described in more than half of our cases, 59 cases or 58.42%.
- The vaginal birth: in 42 cases, or 41.58%
- Notion of epidural in 18 cases, or 17.82%
- Delivery assisted by Forceps or speculum: in 6 cases, or 5.94%

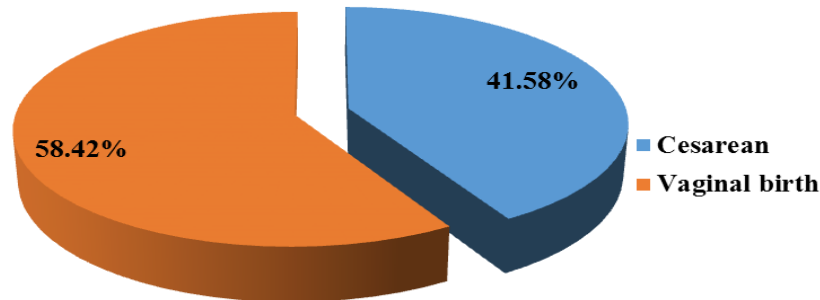


Figure 6: Caesarean section is the most common perinatal risk factor.

- **Birth weight**

- Macrosomia described in 15 cases, or 14.85%
- Hypotrophy in 9 or 8.91%

- **Concept of neonatal suffering**

- Notion of oxygen therapy is described in 5 cases, or 4.95%

- **Prematurity**

- Described in 5 cases of our patients, or 4.95%

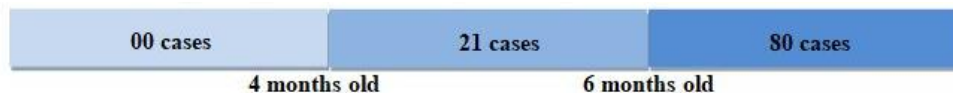
IV- During the post-natal period

- **Exclusive breastfeeding**

55 cases of our patients benefited from exclusive breastfeeding, or 54.46%.

- **Food diversification**

1. Before the age of 4 months no cases described
2. Between 4 and 6 months: 21 cases, or 20.79
3. After the age of 6 months: 80 cases of patients with asthma began to diversify after the age of 6 months, or a percentage of 79.21%



- **Overweight during the first 2 years of life**

The notion of overweight is described in 11 cases of our patients, or 10.89%

- **The use of antibiotics during the first 2 years of life**

It is described in almost 32 cases, or 31.68%

DISCUSSION

Asthma is a complex disease defined by bronchial hyper reactivity and chronic inflammation of the airways.

In Morocco, like everywhere in the world, asthma is an increasingly frequent disease. According to statistics from the World Health Organization (WHO), it affects nearly 235 million people and is responsible for 250,000 deaths per year worldwide. As for Morocco, the International Study of Asthma and Allergies in Childhood (ISAAC) reveals that 10 to 20% of the Moroccan population is affected by asthma. It should be noted, moreover, in the framework of national surveys,

that the prevalence of asthma is much more frequent in children than in adults. "The prevalence rate in children between 13 and 14 years old is 20% and in adults it is between 15 and 17%. And we can say that the prevalence in children is experiencing a worrying trend ". The prevalence rate is 20% in Casablanca and 16% in Rabat. In the cities of southern Morocco, the prevalence of the disease varies from 12 to 14%.^[1]

Epidemiological studies show that there are disparities between men and women. There is a greater prevalence among boys compared to girls before the age of 10, while this tendency reverses to puberty, and this due to the protective role of testosterone.^[2]

In our study, male predominates with 60 cases (59.41%) compared to female sex with 40.59%.

Almost 50 cases of patients have a family atopy or 49.5%, dominated by maternal atopy, including 24 cases, 23.76%.

Among the endogenous risk factors, one finds a family allergic ground. The risk of being asthmatic is more important if other people in the family (parents, brothers and sisters) are asthmatic. On the other hand, we cannot say that it is a hereditary disease because there is no single responsible gene. Moreover, a person presenting this genetic predisposing factor, without being exposed to a favorable asthma environment, will not be asthmatic.^[3]

And almost 13 cases have a personal atopy namely atopic dermatitis or 12.87%.

In addition, atopic eczema is often found associated with asthma. Often, the child suffers from eczema during the first two years then the skin condition disappears being replaced by respiratory pathology. Little is known about the reasons for this affiliation.

These genetic factors predispose you to developing asthma, but also to becoming allergic to substances that are breathed in on a daily basis, such as: mites, house dust, animal hair or pollen. This predisposition is called "atopy". In our study the strongest allergy was 30% dust mite allergy. In addition, a French study has shown that more than 60% of asthmatic children have an allergy to dust mites.^[4]

Viral infection is the most common asthma trigger, especially in young children. In our study, the most common viral respiratory tract infections are colds and flu.^[5]

In contrast, the most common allergies in young children are intolerance to dust mites and pet hair. Children over the age of six can also be allergic to particles from the outside environment, usually pollen and mold. Breathing in cold (below freezing) air, inhaling irritating fumes (such as tobacco smoke, cleaning products, cosmetics), and getting intense exercise can also be triggers for some children. In general, winter is the worst season for asthma because of the upsurge in viral infections and more time indoors, which increases exposure to many sources of allergies.^[6]

Prenatal Risk Factors

With regard to prenatal risk factors, we note in the first place, the age of the parents. A young age with both parents is a predisposing factor to asthma according to a study carried out by the Center of Expertise and Reference in Public Health in Quebec.^[7] In addition, we have also noted the notion of infancy especially in the mother.

A new study from the University of San Francisco in California shows that smoking tobacco during pregnancy can affect a baby's lungs and increase the risk of asthma.^[8]

Smoking in utero and postnatal has been implicated in the occurrence of asthma in children.^[9] A study conducted as part of the NHIS cross-sectional study.^[10] (4331 children aged 0 to 5 years) indicated that the prevalence of asthma was higher in children of mothers who smoked more than half a pack a day than in children of non-smoking mothers (4.8% versus 2.3%).^[11]

Of which our study almost a quarter of our patients had passive smoking with a percentage of 24.75%.

According to the results of a study by the University of Verona, in collaboration with an INSERM Unit, children whose mothers have experienced a stressful event during pregnancy have an increased risk of developing asthma and eczema, and this significantly. The link between asthma and prenatal stress is even more obvious: the risk of asthma can then increase by + 65% for maximum stress at 32 weeks, and by + 53% for strong anxiety at 18 weeks of pregnancy.^[12]

Other prenatal factors predisposing to asthma, we note the excess weight in late pregnancy, in our study represents about 15%. Two studies claim that too much weight gain during pregnancy leads to an increased risk of obesity and respiratory disease, namely asthma, in children.

Perinatal Risk Factors

The risk of asthma increases in the event of cesarean section, this is remarkable in our study with a percentage of almost 60% of the cases being born by the high way.

One explanation offered is that during a vaginal birth, the bacteria present in your vaginal flora (lactobacilli in particular) colonize your child's intestines, which quickly provides better protection.

The intestinal flora of children born by cesarean section is indeed not identical to that of children born vaginally.^[13]

This could also explain the effect on food allergies.

Researchers at the University of Edinburgh reviewed data from 80 studies, corresponding to 29 million births. They show that cesarean section increases the risk of asthma and obesity postnatal and during childhood and complications in later pregnancy for the mother.

Overall, however, it appears that exclusive breastfeeding within 3 to 4 months lowers the risk of asthma. But there is very little data on the possible role of breastfeeding length on asthma risk.^[14]

Note that the use of antibiotics during the first 2 years of life represents a significant risk factor for asthma, and which represents approximately 32% of cases in our study. A study from the University of Manchester found

that giving children less than one year of antibiotics may promote the onset of asthma.^[15]

CONCLUSION

Asthma is an entity of multifactorial origin and its appearance can be linked to immunological (early exposure to infections, allergens), physiological (role of hormones) causes, etc. Genetic causes are less well known, but they exist and seem to play a role. a role in the severity of this pathology.

In the course of this study, one could conclude that there are endogenous risk factors including non-modifiable heredity and other modifiable and controllable exogenous factors whose elimination could prevent the onset of asthma.

REFERENCES

1. <http://www.lavieeco.com/news/economie/asthme-le-taux-de-prevalence-est-de-10-a-20-au-maroc.html>.
2. Androgen signaling negatively controls group 2 innate lymphoid cells Sophie Laffont,1 Eve Blanquart,1 Magali Savignac,1 Claire Cénac,1 Gilles Laverny,2 Daniel Metzger,2 Jean-Philippe Girard,3 Gabrielle T. Belz,4,5 Lucette Pelletier, 1 Cyril Seillet,4,5* and Jean-Charles Guéry1.
3. Révision médicale : Dr Jesus Cardenas, Directeur médical de Doctissimo, 16 février 1https://www.pourquoidoctor.fr/MaladiesPkoidoc/1147-Asthme-de-l-enfant-et-de-l-adolescent-des-allergies-tres-frequentes.
4. <https://www.pourquoidoctor.fr/MaladiesPkoidoc/1147-Asthme-de-l-enfant-et-de-l-adolescent-des-allergies-tres-frequentes>.
5. lasthme-chez-lenfant-non-realise-par-loffice-education-des-patients-du-cusm hopital montréal pour enfant.
6. Centre Hospitalier Universitaire Vaudois. Allergie aux acariens de la poussière de maison 1Lajoie P, Leclerc JM, Chevalier P. Asthme et allergies chez l'enfant : rôle des facteurs environnementaux et programmes de prévention. Direction de la santé environnementale et de la toxicologie. Institut national de santé publique du Québec, 2013; 76.
7. Platts-Mills TAE, Erwin E, Heymann P, Woodfolk J, 2005. Is the hygiene hypothesis still a viable explanation for the increased prevalence of asthma? *Allergy*, 60(Suppl.79): 25-31.
8. <https://www.magicmaman.com/tabagisme-pendant-la-grossesse-les-risques-d-asthme-confirmer-bebe,2220,2103622.asp>
9. Cook DG, Strachan DP: Health effects of passive smoking. 3. Parental smoking and prevalence of respiratory symptoms and asthma in school age children. *Thorax*, 1997; 52: 1081-94.
10. Weitzman M, Gortmaker S, Sobol A: Maternal smoking and behavior problems of children. *Pediatrics*, 1992; 90: 342-9.
11. Smoking and asthma: dangerous liaisons Riccardo Polosa* and Neil C. Thomson# Asthme et tabac: association dangereuse Asthma and smoking : a dangerous mix C. Charpentier-Chaix*, K. Abou Hamdan*, G. Wirtz*, M. Morisset**, M. Schlessler*
12. Communiqué de l'ERS - Octobre 2008 <https://www.enfant.com/grossesse/sante-et-bien-etre/le-stress-pendant-la-grossesse-favorise-l-asthme-chez-l-enfant.html>.
13. <https://www.ncbi.nlm.nih.gov/pubmed/20566857>.
14. Breastfeeding and childhood asthma: a six-year population-based cohort study. P Fredriksson, N Jaakkola, JJK Jaakkola. *BMC Pediatrics*, 2007; 7: 39.
15. Assessing the association of early life antibiotic prescription with asthma exacerbations, impaired antiviral immunity, and genetic variants in 17q21: a population-based birth cohort study.