

## EPIDEMIOLOGICAL PROFILE OF RESPIRATORY DISEASES IN HEALTH CENTERS OF THE PREFECTURE OF MEKNES, MOROCCO

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### ABSTRACT

**Objective:** The aim of this research is to study the epidemiological profile of consultations for respiratory diseases in the health centers of the Meknes prefecture. **Methods:** This is a retrospective and descriptive research studying the incidence of respiratory pathologies in the health centers of the Meknes prefecture over a period of 5 years (2010-2014). **Results:** Chronic obstructive pulmonary disease (COPD) was more pronounced in males (82.26%), while respiratory pathologies (all types), acute respiratory diseases and asthma attacks were more frequent in females with rates respectively noted (53.55%, 53.71% and 53.31%). Respiratory affections were more prevalent during the fall/winter period. Urban residents were more subject to respiratory diseases than rural residents. **Conclusion:** Respiratory pathologies represent a real health and socio-economic problem for families and health structures in the Meknes prefecture.

**KEYWORDS:** consultations; respiratory diseases; COPD; asthma; Meknes.

### INTRODUCTION

Respiratory pathologies represent one of the major causes of morbidity and mortality.<sup>[1]</sup> Worldwide, 300,000,000 people suffer from asthma, 210,000,000 from chronic obstructive pulmonary disease (COPD), and one third of the world's population is infected with the latent form of tuberculosis.<sup>[1]</sup>

Annually, 417,918 deaths are attributable to exacerbation of asthma,<sup>[3]</sup> 3,000,000 to COPD,<sup>[4]</sup> 1,200,000 to tuberculosis,<sup>[5]</sup> 4,000,000 to pneumonia, 1,000,000 to measles, and 350,000 to whooping cough.<sup>[6]</sup>

In developing countries, the prevalence of respiratory diseases is unknown.<sup>[1]</sup>

In the United States, respiratory diseases are the fourth leading cause of disability among people aged 15 years and older,<sup>[7]</sup> and in Canada they are the third leading cause of hospitalization and death after cardiovascular disease and cancer.<sup>[8]</sup>

In Morocco, respiratory diseases, regardless of patient age, account for nearly 5.5 million medical consultations:

3.7 million in the public sector and 1.8 million in the private sector.<sup>[9]</sup>

Nationally, very few published studies have rigorously addressed respiratory affections in subjects aged 5 years and older. Therefore, the main objective of this research is to study the epidemiological profile of respiratory pathologies at the level of health centers under the jurisdiction of the Meknes prefecture.

### MATERIALS AND METHODS

This is a retrospective and descriptive study of the incidence of respiratory pathologies at the health centers of the Meknes prefecture (Fig. 1) over a 5-year period (2010-2014). The health data are obtained from the Prefecture's epidemiology unit of the Meknes prefecture, which centralizes the quarterly reports received from the various health structures. The information used is: age, sex, health center and reporting quarter. These data were entered and analyzed using Microsoft Excel 2010.

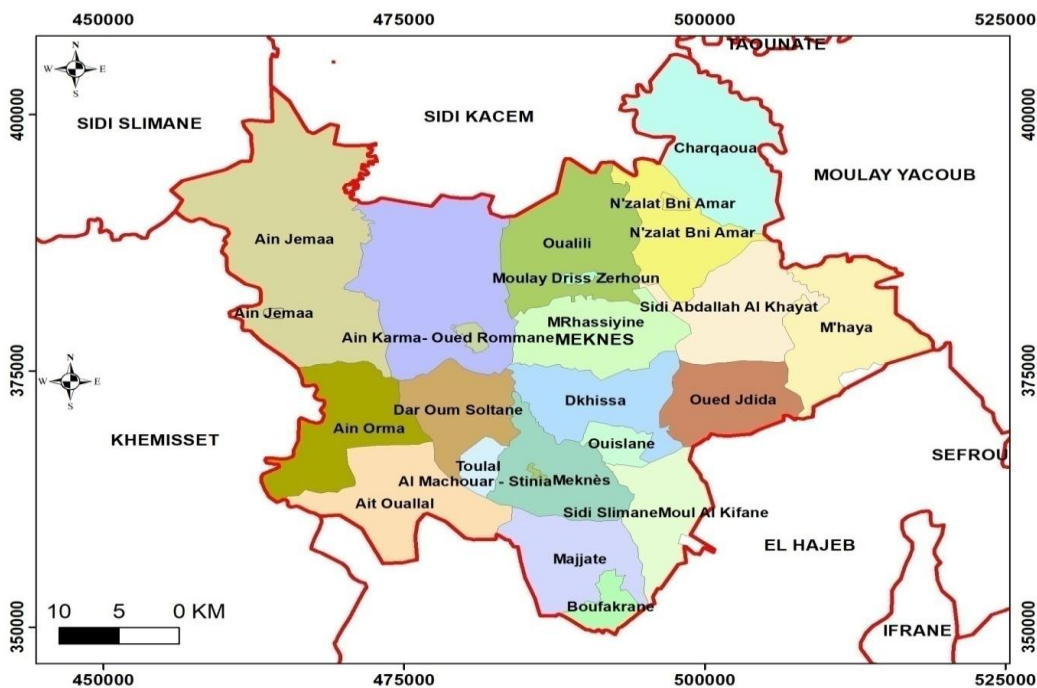


Figure 1: Geographical location of the Prefecture of Meknes.

**RESULTS**

The distribution of respiratory consultations by sex shows that female subjects were more affected by respiratory pathologies (all types), acute affections and

asthma attacks with, respectively, 53.55%, 53.71%, and 53.31. The exacerbation of COPD was more pronounced in males, with a rate of 82.26% (Table 1).

Table 1: Distribution of respiratory consultations by gender (2010-2014).

Reasons of consultations	Male		Female	
	Effective	Percentage	Effective	Percentage
Respiratory pathologies	117756	46,45	135814	53,55
Acute Respiratory affections	74374	46,29	86298	53,71
Asthma crisis	5411	46,69	6179	53,31
Exacerbation of COPD	218	82,26	47	17,74

The analysis of the age distribution of consultants shows that consultations for respiratory pathologies (all types) and acute affections were more frequent in the 15-49 age

group, whereas for asthma attacks and COPD exacerbation, the age group most represented was that of 50 years of age and over (Table 2).

Table 2: Distribution of respiratory consultations by age (2010-2014).

Reasons of consultations	Age group		
	[5-14 years]	[15-49 years]	50 years and +
Respiratory pathologies	90074	91200	72296
Acute Respiratory affections	57928	58753	43991
Asthma crisis	1165	5165	5260
Exacerbation of COPD	11	101	153

The analysis of the seasonal distribution of visits shows that respiratory pathologies (all types), acute conditions, asthma attacks and COPD exacerbation were more prevalent during the fall-winter period with rates of 56.66%, 59.56%, 54.72% and 54.34% respectively (Table 3).

**Table 3: Distribution of Respiratory Consultations by Season (2010-2014).**

Reasons of consultations	Autumn-winter		Spring-Summer	
	Effective	Percentage	Effective	Percentage
Respiratory pathologies	143672	56,66	109898	43,34
Acute Respiratory Affections	95697	59,56	64975	40,44
Asthma crisis	6342	54,72	5248	45,28
Exacerbation of COPD	144	54,34	121	45,66

The spatial distribution study of the consultants shows that city dwellers were more prone to respiratory pathologies (all types), acute infections, asthma attacks and COPD exacerbation (Table 4).

**Table 4: Breakdown of respiratory consultations by origin (2010-2014).**

Reasons of consultations	Urban		Rural	
	Effective	Percentage	Effective	Percentage
Respiratory pathologies	183299	72,29	70271	27,71
Acute Respiratory Affections	121927	75,89	38745	24,11
Asthma crisis	8858	76,43	2732	23,57
Exacerbation of COPD	175	66,03	90	33,97

## DISCUSSION

In Morocco, among those over 5 year's old consulting public health facilities, respiratory diseases are responsible for 31.4% of consultations. This rate varies according to age group: 46% of consultants are between 5 and 14 years old, 26% are aged between 15 and 49, and 22% are aged 50 and over.<sup>[9]</sup> In the majority of cases (85%), these patients have acute respiratory infections and 15% have chronic respiratory disease or suspected pulmonary tuberculosis.<sup>[9]</sup>

In Meknes, respiratory pathologies (all types) are more frequent among female consultants with a sex ratio of 1.15. This result contradicts those reported by Alamoudi<sup>[1]</sup> and Sultana *et al.*,<sup>[2]</sup> who found a male predominance. The age group most affected was 15-49 years (35.97%), while the age group 50 years and older was the least represented, with a rate of 28.51%. In Morocco, half of the consultants are between 15 and 49 years of age, 40% are under 15 years of age, and 10% are 50 years of age or older.<sup>[9]</sup> In Saudi Arabia, the age group most prone to respiratory diseases was 45-65 years, with a rate of 41.8%, and subjects aged 13-25 years were the least represented at 9%.<sup>[1]</sup> In Meknes, 72.28% of patients reside in urban areas. This result contradicts to that reported by Sultana *et al.*,<sup>[2]</sup> who found a predominance of rural origin. In this study, respiratory pathologies are more prevalent in winter and autumn. This increase in frequency may be due to temperature variations. Low temperatures can decrease immune resistance to infectious respiratory diseases; inhalation of cold air triggers bronchoconstriction which can lead to asthma attacks and low humidity may dry out mucous membranes and thus reduce their resistance to infections.

For Acute Respiratory Infections, women (53.71%) are slightly more affected than men (46.29%) with a sex

ratio of 1.16. The age group most represented is between 15 and 49 years of age, with 36.11%, while the age group least affected is 50 years of age and over, with 29%. These results confirm those of the study conducted by Boularab in Morocco.<sup>[10]</sup> This research showed that age is a risk factor in the 15-49 age group, particularly greater in women (Relative Risk (RR) varies from 2.48 to 2.82) than in men (RR varies from 1.71 to 2.20). In this series, 32% of Acute Respiratory Infections cases are reported in winter. This result is consistent with that reported by Boularab, who noted that almost a third of cases are reported in the first quarter (January-March).<sup>[10]</sup>

Asthma attacks are more common among female than male consultants (53.31% versus 46.68%), with a sex ratio of 1.14 in favor of the female sex. Female dominance has been reported in other studies on the same subject.<sup>[1,10,11,12,13,14,15]</sup> On the other hand, some authors have noted a predominance of males especially in pediatric populations,<sup>[16,17,18,19]</sup> In Meknes, the most affected age group is 50 years and over (45.38%) followed by the 15-49 years age group (44.56%) and subjects aged 5-14 years are the least represented with a rate of 10.05%. In Morocco, Boularab study showed that age is a protective factor for the 5-14 age group, with RRs ranging from 0.05 to 0.20.<sup>[10]</sup> The size of the airways, as well as hormonal factors, could explain these different trends in asthma incidence in both sexes. In this series, 76% of the patients were from urban areas. This finding was made in Guelmim, Morocco, where 81% of asthmatics are urban dwellers,<sup>[20]</sup> A similar result was also observed in Uganda, where the prevalence of asthma is considerably higher among urban (9.7%) than rural (4.4%) residents.<sup>[21]</sup> This finding is in contrast to that reported by Sultana *et al.*,<sup>[2]</sup> who noted a predominance of rural origin. Asthma attacks are more frequent during the autumn-winter period. This increase may be linked to variations in temperature. The drop in temperature

promotes the spread of viruses responsible for respiratory infections, some of which are likely to cause asthma episodes,<sup>[22]</sup> and also contributes to the development of moulds and dust mites that release pneumallergenic substances that may be involved in the genesis of asthma in healthy people and the onset of asthma attacks in people with asthma.<sup>[22]</sup>

In Meknes, COPD exacerbation is more common in male patients (218 cases) than in female patients (47 cases) with a sex ratio of 4.63 in favor of males. These results are similar to those of the study carried out in the pneumology Department of the Avicenne Military Hospital in Marrakech (Morocco), where a clear male predominance was observed (99%).<sup>[23]</sup> Similarly, a study conducted in the same department in Marrakech revealed that 99.5% of patients are male.<sup>[24]</sup> However, some authors have reported a predominance of females.<sup>[25,26]</sup> This may be explained by the fact that in Morocco, the number of female smokers is much lower than that of men, in contrast to some industrial countries where the prevalence of female smokers exceeds that of men.<sup>[27,28]</sup> In this study, the age group most affected was 50 years and older with a rate of 57.73%. In Marrakech, the 61-70 age group accounted for 38% of all cases, while only 5% were under 40 years of age.<sup>[23]</sup> In Saudi Arabia, the age group most at risk is 46-65 years.<sup>[1]</sup> In Meknes, 32.45% of COPD exacerbations are reported in winter. This result rhymes with that reported by El Ihyaoui, who recorded an increase in COPD symptom exacerbations during the winter season.<sup>[24]</sup> The drop in temperature favors the spread of viruses. These viruses are found in 30-60% of COPD patients<sup>[29]</sup> and the viruses frequently identified in exacerbations are rhinoviruses, influenza virus and respiratory syncytial virus.<sup>[29]</sup> In Marrakech, the infectious etiology is found in 72.03% of patients.<sup>[24]</sup> In Meknes, 66% of COPD exacerbations are recorded in urban areas. This result contradicts that of Sultana et al.<sup>[2]</sup> who reported a predominance of rural origin of COPD. In Uganda, the prevalence of COPD is considerably higher among rural than urban dwellers (6.1 versus 1.5%, respectively;  $P < 0.001$ ) and the etiologic fraction of risk is 51.5% for rural residence.<sup>[21]</sup>

## CONCLUSION

The analysis of the epidemiological situation of respiratory diseases at the level of health centers under the jurisdiction of the Meknes prefecture over a five-year period showed that female subjects were more affected by respiratory pathologies (all types), acute affections and asthma attacks, while COPD exacerbation was more frequent among male subjects. Those aged 50 years and older were more affected by asthma attacks and COPD exacerbation, and the 15-49 age group was more prone to respiratory diseases (all types) and acute respiratory affections. Respiratory affections were more prevalent in the fall/winter period and urban residents were more exposed to respiratory diseases than rural residents. Respiratory pathologies represent a real health and socio-

economic problem for families and health structures in the prefecture of Meknes.

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