

Trends in hospital morbidity among adults in the region of Monastir (Tunisia) between 1996 and 2007

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R É S U M É

But : Etudier les tendances de la morbidité hospitalière chez les adultes de la région de Monastir durant une période de 12 ans (1996 – 2007).

Méthodes : Nous avons analysé les données de la morbidité hospitalière de l'hôpital universitaire de Monastir (Tunisie) entre le 01/01/1996 et le 31/12/2007. Les données étaient puisées du registre de la morbidité hospitalière implémenté au niveau du service de médecine préventive et d'épidémiologie depuis 1995. La classification internationale des pathologies (10ème révision) a été utilisée pour l'identification et la classification des états morbides.

Résultats : Au cours de la période d'étude, nous avons collecté 150749 admissions avec une prédominance masculine sex ratio = 1,27. Parmi ces admissions, 24,4 % étaient âgés de plus de 64 ans. Les états morbides diagnostiqués étaient dominés par les cardiopathies ischémiques (4,2 %) suivis par les cancers et le diabète sucré (3,3 % et 2,5 % respectivement). Les tendances chronologiques, basées sur le test de corrélation des rangs de Spearman, ont montré que les pathologies chroniques ont significativement augmenté en passant de 4,4% en 1996 à 9,1% en 2007 ($r' = 0,881$, $p < 0,001$). Contrairement, les pathologies infectieuses et parasitaires ont subi une tendance significative vers la baisse en passant de 4,3% à 2,9% ($r' = 0,981$, $p < 0,001$).

Conclusion : Les tendances de la morbidité reflètent la transition épidémiologique de notre pays et appelle à un développement des soins ambulatoires afin de diminuer les besoins d'hospitalisations.

S U M M A R Y

Aim: To study trends of hospital morbidity among adults in the region of Monastir during a period of 12 years (1996 – 2007).

Methods: We analyzed data from the morbidity database of the university hospital of Monastir (Tunisia) between 01/01/1996 and 31/12/2007. Data were drawn from the register of hospital morbidity implemented in the Department of Preventive Medicine and Epidemiology since 1995. The International Classification of Diseases (tenth revision) was used to identify and classify morbid conditions.

Results: During the study period, we collected 150749 admissions with male tendency (sex-ratio = 1.27). Among these admissions 24.4% were over than 64 years. Morbid conditions were dominated by Ischemic Heart diseases (4.24%) followed by cancers and diabetes mellitus (3.3% and 2.52% respectively). Chronological trends, using Spearman correlation rank test, showed that overall rate of chronic conditions increased significantly from 4.4% in 1996 to 9.1% in 2007 ($r' = 0.881$, $p\text{-value} < 0.001$). In contrast, the rate of infectious and parasitic diseases decreased from 4.3% to 2.9% ($r' = 0.981$, $p\text{-value} < 0.001$).

Conclusion: Morbidity trends reflect the epidemiological transition of our country and call to a backing of the ambulatory system and the development of specific services able to decrease the needs of hospitalizations.

Mots-clés

Transition épidémiologique – Hospitalisation – Pathologies chroniques – Pathologies infectieuses – Tendance – Tunisie

Key - words

Epidemiological transition – Hospitalization – Chronic diseases – Communicable diseases – Trends – Tunisia

Since the XXth century developed countries are experiencing a demographic and epidemiological transition. These transitions were characterized by a change in the age and mortality structure of the population, an increase in chronic and degenerative diseases and a decline in infectious diseases [1].

In Tunisia, like developing country, we also experienced a period of social and demographic transitions (westernized life style, reduction of infant mortality, lower fertility and rise of life expectancy at birth...) [2].

These transitions have changed the epidemiological profile with constantly increasing in chronic diseases over the past 50 years [2]. Better knowledge of the new epidemiological profile will help decision makers to target actions to cope with these changes. Our objective was to study trends of hospital morbidity among adults in the region of Monastir during a period of 12 years.

POPULATION AND METHODS

Monastir is an urban region situated in the Central Eastern part of Tunisia. The inhabitants number was 466.700, representing 4.6% of the Tunisian population [3]. Its Public Health structure includes one university and three regional hospitals. The University Hospital receives the majority of hospitalizations of this region. In fact, the private sector of the region attracts mainly some pediatric and obstetric conditions.

We obtained data from 1/01/1996 to 31/12/2007 from the morbidity database of the university hospital of Monastir. This database was implemented in the department of Preventive Medicine and Epidemiology since 1995 and receives information quarterly from all departments of the university hospital of Monastir.

The database variables included patient's socio-demographic characteristics, co-morbidities and length of stay. Information about the type of admission (planned or unplanned) and the discharge status (home return, transfer to other departments or others hospitals and death) were also collected. We used International Classification of Diseases codes from the tenth revision (ICD-10) to identify and classify morbid conditions. Data collection was performed by nurses who received a prior training in order to standardize their practices. However, the diagnosis of hospitalization will be retained after its validation by the medical staff. At the department of Preventive Medicine, collected data were checked and entered with "Epi-info" software.

In order to illustrate the trends of hospital morbidity we used tracer diseases. Erysipelas (A46), Gastroenteritis (A09) and Hydatidosis (B67) were used as acute diseases. Chronic diseases were studied using Diabetes (E10 – E14), Cancer (C00 – C97), Chronic Pulmonary diseases (I26 – I28) and Ischemic Heart diseases (I20 – I25).

Data analysis was performed by "Epi info" software. This analysis was based on appropriate statistical tests (Student's t-test to compare means, Chi-square for the comparison of percentage). The significance level chosen in our study was 5%. The study of chronological tendencies was performed using the

correlation test of Spearman rank (r').

RESULTS

1- Admission characteristics

During the study period we collected 150749 admissions in the university hospital of Monastir. One patient out of four (24.4%) was elderly and sex ratio (Male / Female) was 1.27.

More than half of the admissions (58.3%) were unplanned and home return was the most common discharged status (85%). The mean length of stay was 8 ± 6.3 days and 62% of patients stayed less than 7 days (table 1).

Table 1 : Admission characteristics of the study population from 1996 to 2007

Admissions characteristics	Number of admissions (%)
Age	
< 65 years	75.6
≥ 65 years	24.4
Gender	
Female	44
Male	56
Admission type	
Planned	41.7
Unplanned	58.3
Discharge status	
Home return	85
Transfer	14.6
Death	0.4
Length of stay	
≤ 7 days	68
> 7 days	32

According to the ICD-10, Ischemic Heart diseases were the most frequent morbid conditions (4.24%) followed by cancers and diabetes mellitus (3.3% and 2.52% respectively). Erysipelas was the most frequent condition in the group of acute diseases (1.99%) followed by Gastroenteritis (1.06%) and Hydatidosis (0.79%) (Table 2).

Table 2 : The proportions of tracer diseases among adults in Monastir hospitals from 1996 to 2007

Main diagnoses (ICD-10)	Number of admissions	(%)
Ischemic Heart diseases (I20 – I25)	6394	4.24
Cancers (C00 – C97)	4973	3.30
Diabetes mellitus (E10 – E14)	3796	2.52
Chronic pulmonary diseases (I26 – I28)	1981	1.31
Erysipelas (A46)	2998	1.99
Gastroenteritis (A00 – A09)	1596	1.06
Hydatidosis (B67)	1201	0.79
Others	127810	84.79
Total	150749	100

2- Factors related to chronic and acute diseases

Stratified analysis according to gender showed that the frequency of a length of hospital stay more than 7 days was significantly more important in the group of chronic diseases in both genders (67% and 60.6%). The proportion of transfer to others departments or hospitals and patient's death were also significantly higher in the group of chronic than acute diseases (table 3).

Table 3 : Study of factors associated to Chronic Diseases according to patient's gender in Monastir University Hospital from 1996 to 2007

Variables	Chronic diseases (%)	Acute diseases (%)	p-value
Male			
Length of stay ≥ 7 days	67	46.30	< 0.001
Transfer	17.70	5.20	< 0.001
Death	0.90	0.20	< 0.001
Female			
Length of stay: ≥ 7 days	60.60	54.20	< 0.001
Transfer	14	5.60	< 0.001
Death	0.80	0.15	< 0.001

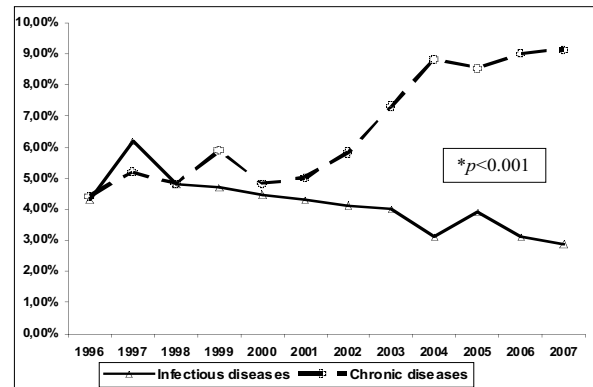
Stratified analysis by age found that there's no significant difference in hospital stay between the two groups of diseases (chronic and acute) when the patient's age does not exceed 65 years. However, transfer to another department and the occurrence of death was significantly higher in the group of chronic diseases than acute diseases. In fact, 16.2% of chronic hospitalizations and 4.8% of acute ones were transferred to another department or hospital (p -value < 0.001) and the occurrence of death was observed in 0.8% of chronic hospitalizations and 0.1% of acute ones.

In elderly patients, we concluded that prolonged hospital stay (> 7 days) was significantly higher in the group of chronic diseases. Indeed, 66.2% and 51.7% of chronic and acute hospitalizations stayed more than 7 days in the university hospital of Monastir (p -value < 0.001). As well as transfer to another department or hospital and the occurrence of death were significantly higher in the group of chronic diseases (p -value < 0.001).

3- Trends of chronic and acute diseases

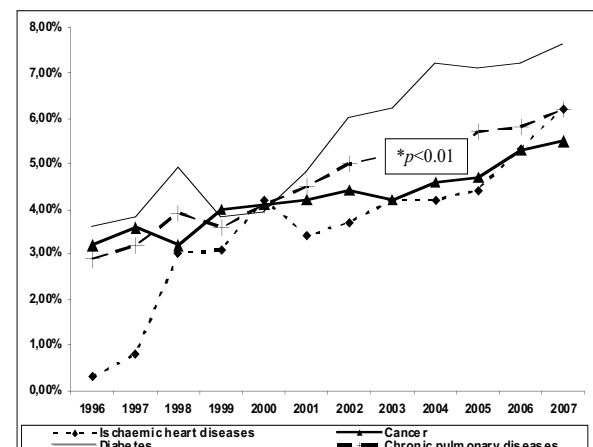
The overall rate of chronic conditions increased significantly from 4.4% in 1996 to 9.1% in 2007. In contrast, the rate of infectious and parasitic diseases decreased from 4.3% to 2.9% (p -value < 0.001) (figure 1). After that, we studied trends of the selected tracer diseases. Indeed, diabetes mellitus increased from 3.8% to 7.4% (p -value < 0.01) and cancer rise significantly from 3% to 5.3% (figure 2). The trends of the selected infectious diseases showed that the rate of hydatidosis decreased significantly from 1% in 1996 to 0.2% in 2007 (p -value < 0.01). Erysipelas rate was significantly reduced by 1.5% (from 2.5% to 1%) and gastroenteritis decreased from 1.5% to 0.3% (figure 3).

Figure 1 : Trends of infectious and chronic diseases in Monastir from 1996 to 2007.



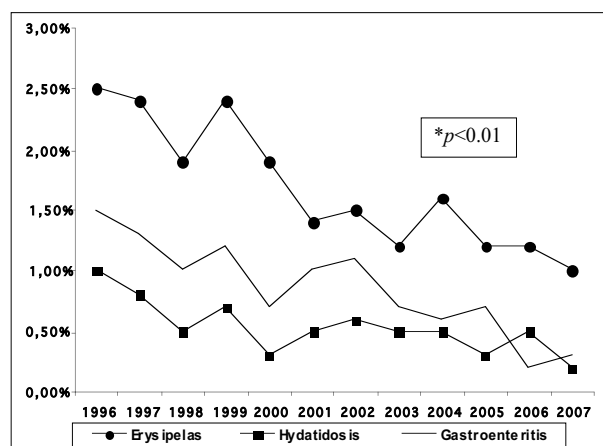
(*p-value using Spearman rank test)

Figure 2 : Trends of four chronic diseases in Monastir from 1996 to 2007



(*p-value using Spearman rank test)

Figure 3 : Trends of three infectious diseases in Monastir from 1996 to 2007



(*p-value using Spearman rank test)

DISCUSSION

Since 1950 Tunisia showed, as developed countries, a decrease in infectious and perinatal diseases and a rise in chronic and degenerative diseases [2]. Different components, of this transition (infant mortality, rise of life expectancy at birth...) were actually known [3]. However the current diseases profile and their trends were not well studied due to the lack of an exhaustive data registration in both hospital and ambulatory system.

In this context we have addressed the need for updated projections of the trends of chronic and infectious diseases and their burden on healthcare system. Our main intent was to provide updated projections for the 21st century in order to known challenges and priorities of our health care system.

This study was conducted through the hospital morbidity register that is kept by the department of preventive medicine and epidemiology in the university hospital of Monastir. It is the only region in Tunisia that includes a system of continuous registration of hospitalizations and covers all public hospitals of the region. Data collection quality in our register can be considered as acceptable. In fact, with the prior investigators training we can limit potential bias. Medical records (which are the main source of data collection) have a well defined structure that facilitates the collection of information and if necessary, investigators ask staff for more clarification.

Our study can be considered as representative of the Tunisian hospital population. Indeed, according to the last census over than 65% of the Tunisian population is urban [3].

Actually In most industrialized nations and many developing countries we assist to a transformation in the demographic population's profile. In fact, Life expectancy at birth in the world has increased from a global average of 46 years in 1950 to 66 years in 1998 and the frequency of aging population increasing constantly [4]. With this transformation we are witnessing the emergence of chronic diseases witch becomes, in the last 10 years, the leading cause of death [5]. In fact, according to the World Health Organization, Approximately 58 million deaths are expected to occur in 2005. It is projected that 60% of all deaths will be caused by chronic diseases like cardiovascular disease, cancer, respiratory disease and diabetes and 80% of these deaths occur in low and middle income countries in equal numbers among men and women [6].

In our study, we observed similar results to developed countries [7]. In fact, 13% of admissions have 65 years and over and the top ten of hospital diagnosis, according to the tenth revision of the international classification of diseases, were dominated by chronic illnesses. These diseases consumed more than quarter of hospitalizations days. Hospital mortality was also significantly higher in the group of chronic diseases and leading to the important burden on the healthcare system. These results reflect the rapid evolution in the morbidity profile of the Tunisian population. In fact aged person rise from 5.4% in 1995 (in the same region) [8] to 13% in our study. These results confirm the Public Health progress in our country with an

increasing in life expectancy. It also shows the important change in dietary habits and lifestyle of our population [9].

According to literature, chronic diseases (especially in elderly patients) were associated with prolonged hospital stays with higher complications rates [10]. Our study confirmed also these results with a significantly prolonged hospital stay in the group of chronic diseases with significantly higher rate of transfer to others care units.

Recent studies shows that chronic diseases especially diabetes mellitus, chronic pulmonary diseases and cardio-vascular diseases increased constantly and leading to higher morbidity in both developed and developing countries. Indeed, chronological trends of diabetes show a significant increase during the past thirty years [11], it is also the case of others chronic diseases like cancer that increasing rapidly [12, 13]. Literature findings were confirmed in our present study, in fact the four chronic diseases used as indicator of the evolution of chronic diseases (diabetes, chronic pulmonary diseases, essential hypertension and cancer) showed a significant increasing trends during the dozen years. These results were probably related to a westernized life style notably changes in nutrition, smoking, lack of exercise and stress. These factors are thought to be associated with an increased risk of chronic and degenerative disease [14].

Concerning infectious or communicable diseases we observed a decline in their rate in developed countries, but most of developing countries are faced to a double burden due to emergence of chronic illnesses and persistence of same infectious diseases [15, 16]. In our case we assist to a significant decreasing trend in this kind of pathologies. This decline is related to the effectiveness of different national programs against infectious diseases like vaccine-preventable diseases which are applied sine the 60s.

While developed countries have adapted human and financial resources, the situation of developing countries was hampered by many difficulties [17]. The majority of these latter are not well prepared to face the new challenges [18, 19]. In our case, since the 50s, we assist to an improvement of socioeconomic and health status of the Tunisian population, leading to several advantages such as reduction of communicable diseases and of perinatal mortality rate and increasing of life expectancy at birth [2]. However, this modernization of lifestyle has led to the emergence of new habits like the net increase in smoking and alcohol rate, new diet habits sedentary status [9]. Viewing these new challenges our resources should be oriented to health promotion and educational programs. We should also target many preventive actions like screening activities. In fact many preventive actions have proven their effectiveness like the screening of gynaecologic and colorectal cancers, smoking cessation (etc...). Treatment should also be clearly focused on cost-beneficial strategies [20].

Morbidity trends reflect the epidemiological transition of our country and call to a backing of the ambulatory system and the development of specific services able to decrease the needs of hospitalizations.

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