

Evaluation of the Care Costs for Non-Communicable Diseases Incurred by Patients in the Greater Tunis Area

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How to cite this article: Halima Ben Hmad, Lina Bel Arbi, Chourouk Themri et al. Evaluation of the Care Costs for Non-Communicable Diseases Incurred by Patients in the Greater Tunis Area. Indian Journal of Public Health Research and Development 2023;14(3).

Abstract

Objectives: The objective of this study was to estimate the costs and expenses incurred by patients for the management of non-communicable diseases (NCDs).

Methods: The study was carried out in 7 Basic Health Centers (BHCs) distributed all over Greater Tunis and was conducted using a new tool: the COPAQ.

Results: According to the survey, the direct medical cost was estimated at 127 ± 204.4 TND, while the indirect cost was estimated at 21.58 ± 39.07 TND and the patient spend a total cost of about 149.1 ± 212.2 TND. Compared to the guaranteed interprofessional minimum salary, which is set at 378.560 TND, and to the monthly income of the interviewed patients, which varies between 300-600 TND, the total cost of chronic diseases seemed to be enormous and not affordable for most patients.

Conclusions: The Tunisian state should take into consideration the incurred expenses and move towards preventive strategies to decrease the spread of these diseases and thus reduce their costs.

Keywords: Direct costs, indirect costs, non-communicable diseases, COPAQ

Introduction

During the last decades, the prevalence of NCDs such as cancer, diabetes, hypertension, cardiovascular, neurological and respiratory diseases have been increasing in the world¹. The World Health Organization (WHO) defines chronic diseases as conditions or diseases of long duration that usually progress slowly² and that are not caused by infectious agents³.

According to WHO, the prevalence of NCDs is increasing exponentially with a morbidity rate that

reached 57% in 2020, worldwide. Moreover, the NCDs are the leading cause of death in the world and lead to a deterioration of quality of life, which are associated with serious health complications with a disability that is sometimes a cause of socio-professional integration⁴. In Tunisia, 82% of cases of death are related to NCDs which are due to several factors, such as mainly bad eating habits, smoking, sedentary lifestyle and lack of medical follow-up and non-use of early detection⁵.

NCDs in Tunisia have a significant impact on the public expenditure budget. Between 2005 and 2013

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the total health expenditures have been multiplied by 2.5 to reach 5362.7 million Dinars MTND according to the national health accounts of the Ministry of Health 2013. The dramatic increase in the number of chronically ill people, the deterioration of their quality of life as well as the increase in associated expenses requires a special attention in terms of public health policies⁶.

Assessing the costs of NCDs is an important area of the of health bioeconomics, as this concept takes into account the overall impact of disease on society, which leads to a considerable increase in expenditures on drugs, devices, preventive or curative strategies. In addition, the costs related to consultations, drugs, therapies are increasing every year and are directly linked to inflation⁷. The evaluation of the cost of NCDs becomes a serious socio-economic problem and a proper analysis is necessary if we want to maintain a quality health care system, accessible to all. The treatment of NCDs also generates costs that are sometimes very heavy and constitute a socioeconomic burden for the patients⁷.

Very few studies on the costs of care of chronic diseases of patients have been conducted in developing countries and in the Middle East. In Tunisia, the medico-economic evaluation of therapeutics and medical strategies whose management is costly but whose effectiveness is modest becomes essential in NCDs.

Because of the growing prevalence of NCDs in Tunisia and the lack of data, at least recent, of the cost of these diseases, we conducted this present study which aimed to assess the expenditure of Tunisians on health care for NCDs in health centers in the center of the capital of Tunisia, Tunis.

Patients and Methods

Study design, setting and study participant

We conducted a descriptive cross-sectional study. The research included seven BHCs located in center of Tunis, and was conducted over a period between February 3 and March 25, 2022.

Data collection

348 patients who were aged 19 or more, who had one or more NCDs and who declared their agreement to participate in the study were included in the study.

Evaluation of the costs of care

To evaluate the costs of care of NCDs in our patients, we used the COPAQ questionnaire to measure the costs associated with patients' health status⁸. This tool capture out-of-pocket costs of a condition for patients and their caregivers, standardize the way patient costs are collected. This device provides more information such as the costs associated with informal caregivers and could be used to calculate the cost of health interventions.

Statistical analysis

All the collected data were analyzed using SPSS Data Analysis version 19.0.

Findings

Participants' Characteristics (Table 1)

The results showed that the number of women (n=246) with NCDs appeared to be significantly higher than the number of men (n=102) and the sex ratio is 0.41. In addition the patients aged between 54-74 years (64.60%), were the most affected by NCD. In addition, the majority of the patients were married (73%).

We noted also that the number of women who were illiterate (51.62%) was significantly higher than those with high education level. Similarly for men, their education level was low. In addition, 58% of patients were currently unemployed.

The majority of employed patients have a low monthly income: 14.36% have an income less than 300 DNT and 16.37% have an income between 300 and 600 DNT.

Concerning the NCDs: hypertension (69.54%), diabetes (52.01%), dyslipidemia (23.85%) and osteoarthritis (22.12%) were the most common pathologies.

Population-Based Estimates of Caring for People with NCDs

The findings showed that the most of the patients (45.68%) are members of the National Health Insurance Fund (NHIF) and the National Pension and Social Security Fund (NPSSF) and use a NSSF/NPSSF card (25.86%). However, 20.11% of patients surveyed used a white booklet cards (Table 2).

The expenses related to care (Table 3)

78% of patients surveyed said they spend money on medication. The average cost of purchasing drugs is estimated at 50.28 ± 45.83 TND. 95% of the patients surveyed reported that they were not being reimbursed for the purchase of medicines by the NHIF. The average cost for the purchase of non-reimbursed drugs was estimated at 115.14 ± 83.38 TND.

In addition, 12% of the patients said that they had expenses for home care. The average cost for home care was estimated at 49.29 ± 29.16 TND.

77% of the patients do not spend money on medical devices. The average cost for the purchase of medical devices was estimated at 132.96 ± 206.21 TND.

Table 1: General population characteristics

Characteristics	%		
Sex	Men	29	
	Women	71	
Age (years)	18-34	0.86	
	35-54	22.37	
	55-74	64.6	
	75-and plus	6.89	
	Marital Status	Married	73
	Single	5	
	Divorced/ Widowed	22	
Education	Women	Men	
	Illiterate	51.62	24.61
	Primary / Collegiate/ Secondary degree	43.94	62.73
	Graduate/ Professional degree	4.44	12.48
Employability	Employed	15	
	Retired	27	
	Unemployed	58	

64% of the patients reported that they have no expenses for medical examinations. The average cost of medical examinations was estimated at 131.06 ± 192.02 TND.

According to the current study, the average direct medical costs of patients was 127 ± 204.4 TND, the average indirect medical costs of the patients were 21.58 ± 39.07 TND and the average non-medical costs of the patients were 0.45 ± 1.74 TND.

Concerning the non-medical costs of family caregivers, the average found is 0.028 ± 0.20 TND and the average total cost of care for the patients was 149.1 ± 212.2 TND.

Continue table 1.....

Characteristics	%	
Monthly income	<300 DNT	14.36
	300-600 DNT	16.37
	>600 DNT	11.48
	No income	58
	NCDs	Hypertension
Diabetes		52.01
Dyslipidemia		23.85
Osteoarthritis		22.12
Heart disease		13.21
Other diseases		22.39

Table 2: Population-Based Estimates of Caring for People with NCDs

	%	
Method of payment	NHIF	45.68
	NSSF/NPSSF	25.86
	White booklet cards	20.11
	Other cards	7.16
	Pay the full rate	0.86

Continue

<i>Drug purchasing</i>	
Yes	78
No	22
<i>Reimbursement for the purchase of medications</i>	
Yes	4
No	95
Did not remember	1
<i>Expenses for home care</i>	
Yes	12
No	88
<i>Medical devices</i>	
Yes	23
No	77
<i>Medical examinations</i>	
Yes	36
No	64

NHIF: National Health Insurance Fund

NSSF: National Social Security Fund

NPSSF: National Pension and Social Security Fund

Table 3: The expenses related to care expressed in Tunisian dinars

	Costs
Purchasing drugs	50.28 ± 45.83 TND
Purchasing of non-reimbursed drugs	115.14 ± 83.38 TND
Home care	49.29 ± 29.16 TND
Purchasing of medical devices	132.96 ± 206.21 TND
Medical examinations	131.06 ± 192.02 TND
Direct medical costs of patients	127 ± 204.4 TND
Indirect medical costs of patients	21.58 ± 39.07 TND
Non-medical costs of the patients	0.45 ± 1.74 TND
Non-medical costs of family caregivers	0.45 ± 1.74 TND
Total cost of care for the patients	149.1 ± 212.2 TND

Discussion

The present study was carried out in 348 patients distributed in 7 BHCs, in the greater Tunis area. 71% of them were women versus 29% men, i.e. a sex ratio of 0.41. This suggests that NCDs develop preferentially in women. In the same vein; the study conducted by Miszkurka *et al.*⁹ showed that NCDs affect women more than men. This female predominance can be explained by physiological differences between women and men. In this context, research has shown a link between lack of activity (housewives) and certain NCDs, in particular cardiovascular diseases and cancers. Similarly, a recent study has shown that the significant reduction in sleep time, which affects women more than men, increases the risk of NCDs¹⁰.

The findings of this study showed that patients with an age range between 55 and 74 years are the most affected with a percentage of 64.6%. The same results were highlighted by Zedini *et al.*¹¹. These results could be attributed to the ageing process, which represents a major current event and a worrying phenomenon and is directly correlated with polymorbidity¹². In fact, it has been found that patients aged 85 years or more are concerned by chronic pluripathologies¹³.

A high number of our patients were illiterate or with a low level of education. In addition, the population was characterized by a high proportion of "no occupation" (58%). In fact, the reduced level of education may be an important causal factor in the occurrence of NCDs, due to lack of prevention. Indeed, the education awareness with a preventive purpose decreases the risk of NCDs and improves the diagnosis¹³.

In terms of diagnosed morbidity, the study showed that hypertension (69.54%), diabetes (52.01%), osteoarticular diseases (22.12%), dyslipidemia (23.85%) and cardiopathies (13.21%) led the list. Indeed, arterial hypertension is a common disease encountered in the first line. Several studies have noted a prevalence of hypertension ranging from 12% to 50%^{14, 15}. This high prevalence could be explained by the ageing of the arterial wall or atherosclerosis, which is characterized by the replacement of elastic fibers by collagen. This structural modification leads to an increase in the stiffness of the arteries and results in an increase in systolic blood pressure and

a decrease in diastolic blood pressure. In this same investigation framework, Zedini *et al.*¹¹ reported a predominance of cardiovascular, respiratory, osteoarticular diseases with a statistically significant difference for the female sex. Similarly, the reports published by Nylenna¹⁶ and Aylin *et al.*¹⁷ have highlighted similar results, namely that these same diseases are among the top five in terms of morbidity.

Regarding the costs spent on NCDs management, the COPAQ model, a comprehensive tool for measuring the direct and indirect costs of a health condition for patients and their families in various outpatient contexts, showed that the total cost recorded in the present study corresponded to 149.1 ± 212.2 TND. As a reminder, the current guaranteed minimum wage in Tunisia (CGMW) is fixed at 378.560 TND; the total cost of NCDs seems enormous, 39.5% of the CGMW. Moreover, most of the interviewed patients (16.37%) who are professionally active stated that their monthly income is between 300-600 TND. Most of the retired persons (14.36%) reported that their pension is less than 300 TND. In the context of these data, the costs generated by chronic diseases seem to be beyond the means of most patients.

Our study is the first which have addressed the direct and indirect costs of NCDs in the greater Tunis area. There are no similar studies in the literature. However, it is known that these diseases generate enormous costs for the patient and the state. Indeed, the high rates of NCDs create cost challenges for public health and health care systems¹⁸. Worldwide, this socio-economic problem concerns both developed and less developed countries that dedicate a significant part of their budget to the treatment of chronic diseases¹⁸.

It has been reported in European Union (EU) countries that the costs of NCDs would weigh heavily on their annual budgets³⁰. These diseases cost the EU states more than 115 billion euro per year, or 0.8% of the gross domestic product (GDP)¹⁸. The economic burden of NCDs is increasing and is expected to be continued in the future, especially in less developed economies and among the poor in middle- and high-income countries¹⁸.

The same report showed that health care expenditure in the EU was estimated at 9.9% of GDP in 2015. Some countries such as Germany, Sweden

and France spend 11% of their GDP on health care, while the Netherlands and Denmark allocate 10.8% and 10.6% respectively. In addition, EU countries spend 3% of their health budget on prevention campaigns¹⁸.

Like other countries, Tunisia incurs considerable costs for the prevention, diagnosis and treatment of NCDs. These health expenditures have increased significantly over the last two decades to cope with NCDs¹⁹. According to the report of the Ministry of Health published in 2016, concerning the period from 2005 to 2013, the total health expenditures have been multiplied by 2.4, which made their cost increase from 2247.3 to 5362.7 MTND. Despite the remarkable progress made in extending the coverage of social protection mechanisms for health, the Tunisian healthcare system is still largely financed by direct payments from patients.

According to the survey, 45.68% of patients are members of the NHIF and use their booklet for care in the CSBs. 25.86% of patients use a NSSF or a NPSSF card. The NHIF ensures the care of patients with NCDs. Considering that these coverages are fully covered by the NHIF; they represent a huge financial burden and a significant challenge for the fund, according to the national health insurance fund report, (2018). In the end, the economic burdens of chronic diseases are heavy for most developed or developing countries¹⁹.

Conclusion

In conclusion, this study allowed us to quantify the direct and indirect costs related to NCDs in Tunisia, in order to have an estimation of the impact of NCDs on the financial and psychological state of the patients. The results of the survey, which confirm the importance of the challenge of prevention, early detection and treatment of disease, could guide the state to health policy decisions.

Source of Funding: Nil.

Conflicts of interest: There are no conflicts of interest.

Ethical Clearance: Ethical clearance of the current study was obtained from Institutional Ethical Committee of the Institute of Nutrition and Food Technology of Tunis.

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