Household catastrophic total cost due to tuberculosis in Egypt: incidence, cost drivers and policy implication

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Abstract

Background: Tuberculosis (TB) is a disease that disproportionately affects the poor. The World Health Organization lists economic factors as one of main barriers to tuberculosis management.

Aims: This study aimed to estimate the household total catastrophic cost of TB and its determinants among newly diagnosed Egyptian tuberculous patients.

Methods: This was a cohort prospective study covering 257 TB patients registered in 2019. The patients were followed up bi-monthly until the end of the treatment regimen (4 visits). A standardized questionnaire published by the poverty sub-working group of the Stop TB Partnership was used after minor modification. The following costs were measured: pre-diagnosis, direct and indirect, guardian and coping, as well as annual household income. Catastrophic cost (direct plus indirect) was considered if the total cost of TB treatment exceeded 20% of the household's annual income. Sensitivity analyses were conducted using different thresholds.

Results: The incidence of household total catastrophic cost was 24.1%. The mean total cost of TB treatment was US$ 198. Over 50% of the total direct cost was incurred during the pre-diagnosis period. After adjustment for other determinant variables using multivariable logistic regression, we found that age < 30 years, living in a house with crowding index > 2, poverty and coping were more likely to cause higher total catastrophic cost.

Conclusions: Catastrophic cost was experienced by 1 out of every 4 new TB patients. As the main cost drivers were poverty and coping, the Ministry of Health and Population should be collaborated with Ministry of Finance and NGOs to put a plan of social protection system for poor families with TB patients.

Key words: catastrophic cost, tuberculosis, economic burden, cohort study, Egypt

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Introduction

Tuberculosis (TB) is a disease that disproportionately affects the poor. Therefore, TB programmes need to ensure that economically and socially disadvantaged patients do not face barriers that keep them from seeking treatment. By addressing barriers and the reasons for delay to timely diagnosis and treatment in the National TB Programme (NTP), costs to TB patients, particularly among the poor, can be effectively reduced (*1*).

Poor people have longer pathways to care, and costs of accessing care are generally higher before than after diagnosis; on average, costs incurred before treatment represented at least 50% of the total cost of the TB episode (*2*). Out-of-pocket costs for public and private health care services may lie at the beginning of a spiral into poverty for many families and exacerbate poverty among the already-poor. Universal access to care and reducing the socioeconomic burden associated with TB are key objectives of the current WHO Stop-TB strategy. The WHO lists economic factors as one of 4 barriers to TB care (*3*).

Loss of income and direct expenses trigger a downward spiral whereby the patient is less able to complete treatment, more likely to have repeat episodes, and more likely to develop drug resistance resulting in more expensive and laborious treatment (*4,5*).

Many studies have been conducted in Africa and Asia to assess the catastrophic cost of TB for patients and households. The incidence of total catastrophic cost of TB in Uganda was 53.1% (*6*) and in Zimbabwe 80% (*7*). In Asia, the reported catastrophic incidence in Indonesia was 36% (*8*), while in China catastrophic health care expenditure (CHE) was 66.8% (*9*) and the household catastrophic total cost was 33.6% (*10*). There is a difference between catastrophic total cost of TB and CHE. According to the WHO definition, catastrophic total costs (direct and indirect combined) incurred during illness and treatment exceed a given threshold (e.g. 20%) of the household's annual income, while CHE is defined as out-of-pocket payments for health care (for all conditions) exceeding a given fraction of a household's total consumption (non-food). The CHE for TB is defined as out-of-pocket medical expenses for TB care exceeding a specific proportion of household income or capacity to pay (*11*).

Egypt is ranked among the mid-level incidence countries. According to a WHO estimation of the TB burden in 2019, the incidence of TB was 12 per 100 000 inhabitants. The estimated proportion of TB cases with multidrug resistance/rifampicin resistance was 1.4% among new cases and 23.0% among previously treated patients (*12*). In Egypt, there have been no published studies estimating the catastrophic total costs or CHE for TB at the national level. Accordingly, conducting such a study could be of value in assessing the impact of economic constraints and impoverishment among TB patients and their households.

The main objectives of this study were to measure the incidence of total household catastrophic cost of TB and identify the risk factors associated with it.

Methods

Study design

We used a cohort prospective study to achieve the study objectives. The study cohort included a sample of newly diagnosed TB patients who had been on treatment for at least 2 weeks since starting the intensive phase. All patients were registered in the National TB Programme during the first quarter of 2019. Study patients were followed up bi-monthly (4 interviews for each patient) until the end of the treatment regimen.

Study setting

According to the General Organization of Physical Planning, Egypt is divided into 7 regions (27 governorates): Greater Cairo, Alexandria Region, Delta Region, Suez Canal Region, North Upper, Central Upper and Southern Upper. For simplicity of selection, we combined the regions into 3 sectors: Greater Cairo (3 governorates), North (Alexandria and Delta = 12 governorates) and South (all 3 Upper regions = 10 governorates). We excluded North and South Sinai for security reasons. From the North and South sectors, 4 governorates were randomly selected. From the Middle sector, Cairo was randomly selected. Out of 44 TB management units (TBMUs) in the selected governorates, 24 were randomly selected. A weighted proportional allocated sample from each governorate was calculated depending on the registered number of TB patients in 2018.

Some patients were considered ineligible: those who refused to sign the informed consent, children under 15 years without their guardian's consent or for whom the guardian refused to give consent, and re-treated patients. Multidrug resistant patients were excluded because they need a longer time for follow-up and in some selected centres the number of these patients was very low.

Sampling method and sample size

This was a cluster sample considering the TBMU as a cluster. As there are 24 clusters in the 5 selected governorates, we retrieved around 10–20 patients per cluster. Consecutive consenting eligible patients were interviewed at each study site until the required sample size was reached. The sample size calculated for this study was 276 TB patients using *EpiInfo*, version 7. The assumptions used for calculation were: estimated household catastrophic cost rate 30% (22–38%), 95% confidence level, design effect of 2.0, and dropout rate of 10%. The assumption of catastrophic cost rate was based on preliminary results of unpublished work done recently in 2 TBMUs in Cairo.

Data collection

A standardized questionnaire from the poverty sub-working group of the Stop TB Partnership, the "Tool to estimate (TB) patient's costs", was used (*13*). The questionnaire was translated into Arabic and rechecked for proper translation by a public health expert. Then both face and content validity of the questionnaire were evaluated as a routine step in the process of evaluation of the protocol by the Institutional Review Board of the Faculty of Medicine, Ain Shams University. After approval of the protocol, the questionnaire was piloted on 20 TB patients from some TBMUs not included in the study; no changes were made to the questionnaire. Interviews were carried out by trained health care workers with previous experience in interviewing TB patients. The questionnaire covered socioeconomic and demographic variables such as age, sex, marital status, education, employment, household monthly income, place of residence, family size and number of rooms. Other variables were included in the questionnaire such as type of TB and diagnostic delay.

Operational definitions: according to WHO tuberculosis patient cost surveys (11,13)

- Catastrophic total costs due to TB comprised total costs of TB (direct and indirect combined) incurred by household during illness and treatment that exceeded 20% of the pre-disease annual household's income.
- Direct costs were out-of-pocket costs linked to seeking diagnosis and treatment, including medical expenses, fees, transport, accommodation, food expenditures and other costs, net of any reimbursement.
- Indirect costs were self-reported household income loss (net effect of income change before as compared to during TB episode).
- Guardian cost was the costs incurred by family members looking after the patient during care. For each guardian, both direct and indirect costs were considered.
- Costs incurred by patients who attempted to cope with the costs of TB care included borrowing money or selling their assets to finance care.
- Annual income was estimated from the average monthly income reported by the patient. This was calculated from the monthly income before TB symptoms, after diagnosis and at the end of treatment. To assess and value patient's time cost, we used the output-based approach.

- Poor status was considered if the household earnings were below 1000 Egyptian pounds per month (those in the first quintile of the monthly income).

Regarding monthly income and all costs incurred by the patients, we collected the data in Egyptian pounds then converted to US$ (US$ 1 = 16.5 Egyptian pounds).

Data analysis

We used *SPSS*, version 21, for statistical analysis. Descriptive statistics included mean, standard deviation, median, interquartile range, frequency, percentage and 95% CI. Analytical statistics was performed in 2 steps. First, bivariate analysis using the chi-squared test was applied to identify variables associated with catastrophic cost. Crude odds ratios (cORs) with 95% confidence interval were calculated. In the second step, multivariable logistic regression models were constructed and adjusted odds ratios (adj. ORs) were calculated. All variables in the bivariate analyses that expressed *P*-value < 0.25 and were of clinical importance (*8*) were entered into the models. *P*-value < 0.05 was considered significant.

Ethical approval

This study was approved by the Research Ethics Committee of the Ministry of Health and Population (FWA00016183).

Results

Out of the 276 new TB patients interviewed, only 257 had complete records. The characteristics of the study cohort are shown in Table 1. The mean age was 38.3 [standard deviation (SD) 14.8] years and around one quarter of patients were ≥ 50 years old. This cohort included more males (61.9%) than females; 58.8% of participants were married and 22.6% were illiterate. One quarter of the study sample was affiliated to government organizations with a regular monthly income, 55.3% were freelancers or working in the private sector and around one fifth were unemployed.

The majority of the participants lived in urban governorates, 66.5% had pulmonary TB and the crowding index for 78.6% of the patients was 1–2 persons/room (Table 1). Around 25% of the participants were poor and 11.3% adopted coping strategies by borrowing money or selling their assets.

The mean value of the total cost during the TB episode was US$ 198 (median US$ 122) (Table 2). The mean value (US$ 109) of the total indirect costs amounted to 55% of the total costs (direct and indirect). The proportion of direct to indirect cost was 89/109 = 0.82. However, the median value of the total direct costs was similar to the total indirect costs (US$ 61). The mean value of the pre-diagnosis direct cost (US$ 56) was 2.5 times greater than that of the indirect costs (US$ 21). In comparison, in the intensive and continuation phases the indirect costs were much higher than the direct costs.

Household total catastrophic cost (ICC) rate was considered at different cut-off points (Figure 1). At 20% threshold, the incidence of the total ICC among the study sample was 20.1%. At a threshold exceeding 10%, the incidence of ICC increased to 59.9%; at a threshold exceeding 30% of the annual household income it was only 6.6%.

The ICC was analysed across study variables using a threshold exceeding 20% (Table 3). The younger age

Table 1 Characteristics of study participants (*n* = 257), tuberculosis patients in Egypt, 2019

Characteristic	No.	%
Age (years)		
< 30	83	32.3
30–49	109	42.4
≥ 50	65	25.3
Sex		
Male	159	61.9
Female	98	38.1
Current marital status		
Single	89	34.6
Married	151	58.8
Divorced/Widow	17	6.6
Education level		
Illiterate	58	22.6
Primary-Secondary	158	61.5
University	41	16.0
Employment		
Governmental	63	24.5
Freelance/private	142	55.3
Jobless	52	20.2
Crowding index		
1–2 persons/room	202	78.6
> 2 persons/room	55	21.4
Place of residence		
Urban governorate	212	82.5
Urban/rural governorate	45	17.5
Income (poverty status)		
Poor ($US < 61/month)	63	24.5
Non-poor	194	75.5
Breadwinner		
Patient	215	83.7
Other family member	42	16.3
Type of TB		
Pulmonary	171	66.5
Extrapulmonary	86	33.5
Diagnostic delay (weeks)		
≤ 4	74	18.3
> 4	183	81.7
Coping		
No	228	88.7
Yes	29	11.3

$US = 16.5 Egyptian pounds (2019 average).

Table 2 Total household/patients' costs incurred by tuberculosis patients during the pre-diagnosis, intensive and continuation phases, Egypt, 2019

Period/type of cost	Cost ($US)		IQR (US$)	
	Mean	Median	25th	75th
Pre-diagnostic period				
Direct costs	56	34	12	72
Indirect costs	21	0	0	30
Intensive phase period				
Direct costs	14	3	2	8
Indirect costs	27	13	0	36
Continuation phase				
Direct costs	19	13	6	22
Indirect costs	61	36	0	85
Total direct costs to HH (pre-diagnosis, post diagnosis)	89	61	29	106
Total indirect costs to HH (pre- plus post-diagnosis)	109	61	0	148
Total cost to HH (direct + indirect)	198	122	67	239

IQR = interquartile range.

groups, < 30 years, showed a higher significant ICC than those aged ≥ 50 years (cOR 2.37, 95%CI: 1.05–5.39). There were insignificant differences between males and females and between current marital status, education level, place of residence, diagnostic delay and type of TB.

Compared with the ICC among patients affiliated to governmental organizations with a stable monthly income, patients working as freelancers experienced higher ICC (cOR 2.72, 95% CI: 1.03–5.04). Crowding index was significantly associated with ICC as patients living in houses with crowding index > 2 persons/room showed an ICC of 36.4% compared with 20.8% for those with a crowding index of 1–2 persons/room.

Poor patients experienced a higher ICC (33.3%) than non-poor patients (21.1%). Where the main breadwinner was a patient, the incidence of ICC (26.5%) was significantly higher than that reported when family members were the main breadwinner (11.9%).

The highest ICC was reported among patients who adopted coping strategies (55.2%) compared with those who did not (20.2%) (Table 3).

To identify the determinant variables associated with higher ICC, we used a multivariable logistic regression model (Table 4). Variables retained in the final step of the model that significantly predicted high ICC were: younger age < 30 years (adj. OR 2.69, 95% CI: 1.10–6.61), those living with crowding index of > 2 persons/room (adj. OR 2.32, 95% CI: 1.18–4.58), poor patients (adj. OR 2.06, 95% CI: 1.06–3.98) and TB patients who adopted coping strategies (adj. OR 5.13, 95% CI: 2.26–11.68).

Sensitivity analyses using different thresholds for catastrophic cost were analysed (Table 5). For each threshold level, both bivariate and multivariable analyses were evaluated in a similar way to that used with the > 20% threshold. In the multivariable logistic regression, coping strategy was a common determinant (predictor) for ICC for all 4 catastrophic thresholds, while being poor was retained as a predictor in 3 threshold levels (10%, 25% and 30%). Crowding index was retained in the models that used 25% and 30% thresholds. Age groups and place of residence were retained in 1 scenario only (10%).

Discussion

This is the first study conducted in Egypt to assess the economic burden of TB diagnosis and treatment. The incidence of catastrophic cost in this study was 24.1% although services (diagnosis, laboratory investigations and drugs) provided by the Ministry of Health and Population

Figure 1 Thresholds of catastrophic total cost of tuberculosis, Egypt, 2019

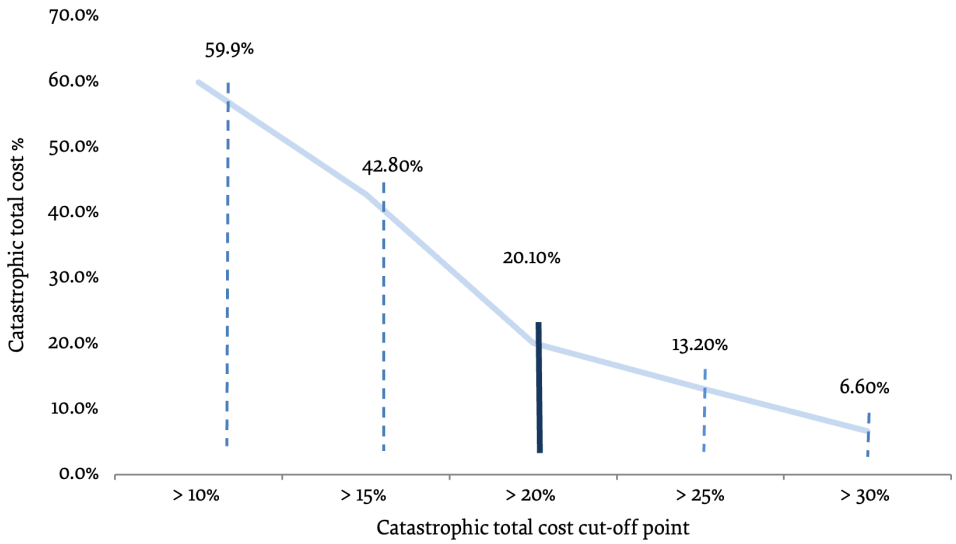

Table 3 Distribution of total catastrophic household costs among tuberculosis patients, Egypt, 2019

Category	Total catastrophic HH cost		*P*-value	ᶜOR	95% CI
	Yes	%			
Age (years)					
< 30 (*n* = 83)	25	30.1	0.039	2.37	1.05–5.39
30–49 (*n*109)	27	24.8	0.147	1.81	0.81–4.04
≥ 50 (*n* = 65)	10	15.4	–	–	–
Sex					
Male (*n* = 159)	43	27.0	0.163	0.65	0.35–1.20
Female (*n* = 98)	19	19.4			
Current marital status					
Single (*n* = 89)	23	25.8	0.642	1.16	0.63–2.12
Married (*n* = 151)	35	23.2	–	–	–
Divorced/widow (*n* = 17)	4	23.5	0.974	1.02	0.31–1.33
Education level					
Illiterate (*n* = 58)	14	24.1	0.800	1.13	0.44–2.94
Primary/secondary (*n* = 158)	39	24.7	0.716	1.17	0.51–2.65
University (*n* = 41)	9	22.0	–	–	–
Employment					
Governmental (*n* = 63)	9	14.3	–	–	–
Freelance/private (*n* = 142)	39	27.5	0.043	2.72	1.03–5.04
Jobless (*n* = 52)	14	26.9	0.096	2.21	0.87–5.63
Crowding index					
1–2 persons/room (*n* = 202)	42	20.8			
> 2 persons/room (*n* = 55)	20	36.4	0.017	2.18	1.14–4.15
Residence					
Urban governorate (*n* = 212)	48	22.6			
Urban/rural governorate (*n* = 45)	14	31.1	0.228	1.54	0.76–3.13
Type of TB					
Pulmonary (*n* = 171)	41	24.0			
Extrapulmonary (*n* = 86)	21	24.4	0.936	1.02	0.56–1.88
Breadwinner					
Patient (*n* = 215)	57	26.5			
Other family member (*n* = 42)	5	11.9	0.043	2.67	1.00–7.13
Diagnostic delay					
≤ 4 weeks®	17	23.0			
> 4 weeks	45	24.6	0.784	1.09	0.58–2.07
Income (poverty status)					
Non-poor (*n* = 194) ®	41	21.1			
Poor (*n* = 63) (US$ < 61/month)	21	33.3	0.049	1.87	1.00–3.49
Coping					
No (*n* = 228)	46	20.2			
Yes (*n* = 29)	16	55.2	< 0.001	4.87	3.19–10.84

ᶜ*OR = crude odds ratio*

was free. Comparing with studies that used similar methodology, a similar incidence (27–28%) of catastrophic cost was reported in Kenya (*14*) and South Africa (*15*) while a higher ICC (41%) was reported in Brazil (*16*). However, our finding was much lower than the corresponding figures reported in some African countries, e.g. Uganda (53.1%) and Zimbabwe (80%) (*6,7*), as well as in some Asian countries, e.g. China (33.6%) and Myanmar (60%) (*10,17*). In all these studies, including ours, the total catastrophic costs are considered high and pose a high economic burden on TB patients and their families as most TB patients in developing countries are poor.

Table 4 Predictor factors associated with high catastrophic total household costs among tuberculosis patients using multivariable logistic regression (final model)

Category	Multivariable logistic regression analysis		
	P-value	Adjusted OR	95% CI
Age			
< 30 years	0.030	2.96	1.10–6.61
30–49 years	0.369	1.49	0.62–3.58
≥ 50 years	–	–	–
Crowding index			
1–2 persons/room			
> 2 persons/room	0.015	2.32	1.18–4.58
Income (poverty status)			
Non-poor			
Poor (US$ < 61/month)	0.032	2.06	1.06–3.98
Coping strategy			
No			
Yes	< 0.001	5.13	2.26–11.68

Variables entered at the beginning of the model were age group, sex, employment, place of residence, crowding index, breadwinner, poverty status and coping.
OR = odds ratio; CI = confidence interval.

In this study, ≥ 50% of the total direct cost was incurred during the period between onset of symptoms and time of diagnosis. This is in agreement with the findings of other studies in Africa and Asia (*9, 18–21*). The longer the pre-diagnosis period, the higher the cost incurred by TB patients before treatment. Lack of public awareness about the symptoms is one of the reasons for the long delay before diagnosis and increased household impoverishment. In our study, direct cost was much higher than indirect cost incurred for TB in the pre-diagnosis period, while the reverse was true during the intensive and continuation phases. In contrast, higher indirect cost, in either the pre-diagnosis period or the post-diagnosis, was reported in Nigeria (*18*). Low percentage of indirect cost was reported in Delhi, India, which may be accounted for by the availability of TBMUs near the workplace or residence of the patients (*22*). The presence of DOTS (directly observed treatment, short course) centres near the homes and workplaces of TB patients has a positive impact on travel by decreasing both time and non-medical costs (*22*). There were marked variations between different studies regarding the ratio of direct to indirect costs. These differences may be attributed to the method used to calculate the indirect costs, financial and welfare policies in regard to TB management and the role of nongovernmental organizations in supporting poor patients.

Table 5 Sensitivity analyses to identify determinants of catastrophic total cost using different thresholds of the household income

Catastrophic threshold (%)	Significant variables (bivariate analysis)	Significant determinant variables (multivariable logistic regression analysis)
10	Age group Coping Place of residence	Age group Poor status Coping Place of residence
15	Coping Employment	Coping
25	Crowding index Poor status Coping	Crowding index Poor status Coping
30	Crowding index Poor status Coping	Crowding index Poor status Coping

Analysing the determinants of high catastrophic cost showed that patients aged < 30 years incurred more than double catastrophic total cost than the older group. A similar result was found in Nigeria (*18*) and India (*20*), while studies in China, Benin and Nigeria reported a greater cost among elderly people (*9,23,24*). Other studies, however, have reported no association between age and catastrophic cost (*6–8,14,15,22*). Younger TB patients are more likely to be affected financially and economically due to the long duration of the TB episode, which results in reducing the income of patients, particularly those working in the private sector or as freelancers with low monthly income.

In this study, males experienced greater catastrophic costs but after adjustment for other factors this association disappeared. A number of studies have reported nonsignificant high cost among males (*6–9,14,15,23*) while others have reported significant high catastrophic cost incurred among males (*17,18,22,24*).

Consistent with previous reports, our findings revealed no association between education level and catastrophic cost (*6–8,10,14,16*). There was no consensus in the studies that analysed the association between education level and catastrophic cost, as some studies reported higher costs among educated patients (*18,22–24*) while others reported the opposite (*9,10*).

Employment status was not found to be a determinant for catastrophic cost in our study, which is in agreement with studies conducted in Indonesia and India (*8,22*), however, other studies have reported significant higher catastrophic cost among the unemployed (*9,10,15,16*).

Patients living in houses with a crowding index > 2 were more likely to incur greater household total catastrophic cost. Poor families with TB patients are characterized by having large family sizes, which adds a further economic burden and most likely exposes them to high catastrophic cost. However, studies in China and rural areas of South Africa and India have reported that large families were less likely to be exposed to high catastrophic cost, which may result from the family having more earners (*9,15,22*).

Our findings emphasize the importance of coping as a determinant factor behind high catastrophic cost. Those using coping strategies were 5 times more likely

to experience catastrophic cost. Coping strategies are associated with poverty, which is considered one of the main deterministic factors associated with catastrophic cost. Similar findings have been reported in almost all studies.

This study has some limitations. It included only new TB patients and excluded re-treated, multidrug resistant patients and children. Recall bias is one of the characteristics of studies concerned with income and cost of treatment. However, we tried to minimize this by conducting a prospective cohort study and interviewed TB patients at short intervals.

Egypt started implementing the universal health care in 2019 in a few governorates. The determinants identified in this study should be considered by the Ministry of Health and Population when implementing universal health care coverage by engaging the various ministries concerned, e.g. social and finance, to mitigate the economic and financial burden of families affected by TB.

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Competing interests: None declared.

Coût total des dépenses catastrophiques des ménages liées à la tuberculose en Égypte : incidence, facteurs de coût et implications politiques

Résumé

Contexte : La tuberculose est une maladie qui touche les pauvres de manière disproportionnée. En effet, l'Organisation mondiale de la Santé a classé les facteurs économiques parmi les principaux obstacles à la prise en charge de la tuberculose.

Objectifs : La présente étude estime le coût total des dépenses catastrophiques des ménages liées à la tuberculose et ses déterminants parmi les patients tuberculeux égyptiens nouvellement diagnostiqués.

Méthodes : Il s'agissait d'une étude de cohorte prospective couvrant 257 patients atteints de tuberculose enregistrés en 2019. Les patients ont été suivis deux fois par mois jusqu'à la fin de leur protocole thérapeutique (quatre visites). Un questionnaire standardisé publié par le sous-groupe de travail sur la pauvreté du Partenariat Halte à la tuberculose a été utilisé après quelques modifications mineures. Les coûts suivants ont été mesurés : coûts avant le diagnostic, coûts directs et indirects, coûts pour les personnes qui s'occupent des malades et coûts de l'adaptation à la situation financière ainsi que le revenu annuel du ménage. Les coûts (directs et indirects) étaient considérés comme étant catastrophiques si le coût total du traitement de la tuberculose dépassait 20 % du revenu annuel du ménage. Des analyses de sensibilité ont été effectuées en utilisant différents seuils.

Résultats : L'incidence du coût total des dépenses catastrophiques pour les ménages était de 24,1 %. Le coût total moyen du traitement de la tuberculose était de 198 dollars des États-Unis. Plus de 50 % du coût direct total a été engagé pendant la phase précédant le diagnostic. Après ajustement pour d'autres variables déterminantes à l'aide d'une régression logistique multivariable, nous avons constaté que le fait d'être âgé de moins de 30 ans, de vivre dans une maison dont l'indice de surpeuplement est supérieur à deux, la pauvreté et l'adaptation à la situation financière étaient plus susceptibles de causer un coût catastrophique total plus élevé.

Conclusions : Un nouveau patient tuberculeux sur quatre a subi un coût catastrophique. Les principaux facteurs de coût étant la pauvreté et l'adaptation à la situation financière, le ministère de la Santé et de la Population devrait collaborer avec le ministère des Finances et les organisations non gouvernementales (ONG) pour mettre en place un système de protection sociale destiné aux familles pauvres comptant des patients tuberculeux.

التكلفة الإجمالية الباهظة للأسر بسبب السل في مصر: معدل التكلفة الباهظة، ومسببات التكلفة، والآثار المترتبة على السياسات

محسن جاد الله، وجدي أمين، ميرفت راضي

الخلاصة

الخلفية: السل مرض يؤثر على الفقراء بدرجة متفاوتة. وترى منظمة الصحة العالمية أن العوامل الاقتصادية أحد العوائق الرئيسية أمام معالجة السل.

الأهداف: هدفت هذه الدراسة إلى تقدير التكلفة الإجمالية الباهظة للسل التي تتكبدها الأسرة، والعوامل المحددة لها بين المرضى المصريين المصابين بالسل الذين شخِّصت حالاتهم حديثًا.

طرق البحث: كانت هذه دراسة استباقية أترابية شملت 257 مريضًا بالسل مُسجَّلًا في عام 2019. وجرت متابعة المرضى كل شهرين حتى نهاية نظام المعالجة (4 زيارات). واستُخدم استبيان موحد نشره الفريق العامل الفرعي المعني بالفقر التابع لشراكة دحر السل، بعد تعديل طفيف. وقد قيسَت التكاليف التالية: تكاليف ما قبل التشخيص، والتكاليف المباشرة وغير المباشرة، وتكاليف الوصي والتكيف، فضلًا عن الدخل السنوي لِلأسرة المعيشية. وتُعد التكلفة (المباشرة وغير المباشرة) باهظة إذا تجاوزت التكلفة الإجمالية لعلاج السل 20٪ من الدخل السنوي للأسرة. وقد أجريت تحليلات الحساسية باستخدام عتبات مختلفة.

النتائج: بلغت نسبة تحمل الأسرة لتكلفة باهظة 24.1٪. وبلغ متوسط التكلفة الإجمالية لعلاج السل 198 دولارًا أمريكيًّا. ويُدفَع أكثر من 50٪ من إجمالي التكاليف المباشرة خلال فترة ما قبل التشخيص. وبعد تعديل المتغيرات المحددة الأخرى باستخدام الانحدار اللوجستي المتعدد المتغيرات، وجدنا أن العمر أقل من 30 عامًا، والعيش في منزل ذي مؤشر ازدحام أكثر من 2، والفقر والتكيف كان أكثر عرضة لتحمل تكلفة باهظة أعلى.

الاستنتاجات : عانى مريض واحد من كل 4 مرضى جدد من مرض السل من تكلفة باهظة. نظرًا لأن العوامل الرئيسية للتكلفة كانت الفقر والتكيف ، يجب أن تتعاون وزارة الصحة والسكان مع وزارة المالية والمنظمات غير الحكومية لوضع خطة لنظام الحماية الاجتماعية للأسر الفقيرة مع مرضى السل.

References

1. World Health Organization. Addressing poverty in TB control. WHO report 2005. WHO/HTM/TB/2005.352. Geneva, Switzerland: WHO, 2005 (http://whqlibdoc.who.int/hq/2005/ WHO_HTM_TB_2005.352.pdf, accessed 1 May 2018).
2. Tanimura T, Jaramillo E, Weil D, Raviglione M and Lo¨nnroth K. Financial burden for tuberculosis patients in low- and middle-income countries: a systematic review. Eur Respir J. 2014 Jun;43(6):1763–75. doi:10.1183/09031936.00193413
3. Whitehead M, Dahlgren G. Concepts and principles for tackling social inequities in health. Copenhagen: World Health Organization Regional Office for Europe; 2006 (http://www.euro.who.int/document/e89383.pdf, accessed 1 May 2018).
4. Russell S. The economic burden of illness for households in developing countries: a review of studies focusing on malaria, tuberculosis, and human immunodeficiency virus/acquired immunodeficiency syndrome. Am J Trop Med Hyg.2004;71(2 Suppl.):147–55. PMID: 15331831
5. Ukwaja KN, Modebe O, Igwenyi C, Alobu I. The economic burden of tuberculosis care for patients and households in Africa: a systematic review. Int J Tuberc Lung Dis. 2012 Jun;16(6):733–9. doi:10.5588/ijtld.11.0193
6. Muttamba1 W, Tumwebaze R, Mugenyi L, Batte C, Sekibira R, Nkolo A, et al. Households experiencing catastrophic costs due to tuberculosis in Uganda: magnitudeand cost drivers. BMC Public Health. 2020 Sep 16;20(1):1409. doi:10.1186/s12889-020-09524-5
7. Timire C, Ngwenya M, Chirenda J, Metcalfe JZ, Kranzer K, Debora Pedrazzoli et al. Catastrophic costs among tuberculosis-affected households in Zimbabwe: a national health facility-based survey. Trop Med Int Health. 2021;00:1–8. doi:10.1111/tmi.13647
8. Fuady A, Houweling T A J, Mansyur M, Richardus J H. Catastrophic total costs in tuberculosis-affected households and their determinants since Indonesia's implementation of universal health coverage. Infect Dis Poverty. 2018 Jan 12;7(1):3. doi:10.1186/s40249-017-0382-3
9. Zhou C, Long Q, Chen J, Xiang L, Li Q, Tang S, et al. Factors that determine catastrophic expenditure for tuberculosis care: a patient survey in China. Infect Dis Poverty. 2016 Jan 25;5:6. doi:10.1186/s40249-016-0100-6
10. Yang T, Chen T, Che Y, Chen, Bo D. Factors associated with catastrophic total costs due to tuberculosis under a designated hospital service model: a cross-sectional study in China. BMC Public Health. 2020 Jun 26;20(1):1009. doi:10.1186/s12889-020-09136-z
11. Lönnroth K, Garcia Baena I, Siroka A. Measuring patient costs to monitor progress towards the target to eliminate catastrophic costs and help design social protection and UHC. Geneva: World Health Organization, Global Tuberculosis Programme; 2016 (https://cdn.who.int/media/docs/default-source/hq-tuberculosis/global-task-force-on-tb-impact-measurement/meetings/2016-05/tf6_p10_patient_cost_surveys.pdf, accessed 27 May 2022).
12. Tuberculosis data. Global tuberculosis report. Geneva: World Health Organization; 2021 (https://www.who.int/teams/global-tuberculosis-programme/data, accessed 26 August 2021).
13. Protocol for survey to determine direct and indirect costs due to TB and to estimate proportion of TB-affected households experiencing catastrophic total costs due to TB. Geneva: World Health Organization; 2015 (https://www.who.int/publications/m/item/protocol-for-survey-to-determine-direct-and-indirect-costs-due-to-tb-and-to-estimate-proportion-of-tb-affected-households-experiencing-catastrophic-total-costs-due-to-tb, accessed 27 May 2022).
14. KirubiB, Ong'ango J, Nguhiu P, Lonnroth K, Rono A, Sidney-Annerstedt K. Determinants of household catastrophic costs for drug sensitive tuberculosis patients in Kenya. Infect Dis Poverty. 2021 Jul 5;10(1):95. doi:10.1186/s40249-021-00879-4
15. Stracker N, Hanrahan C, Mmolawa L, Nonyane B, Tampi R, Tucker A, et al. Risk factors for catastrophic costs associated with tuberculosis in rural South Africa. Int J Tuberc Lung Dis. 2019 Jun 1;23(6):756–63. doi:10.5588/ijtld.18.0519

16. Guidoni LM, Negri LSA, Carlesso GF, Zandonade E, Maciel ELN. Custos catastróficos em pacientes com tuberculose no Brasil: estudo em cinco capitais [Catastrophic costs in tuberculosis patients in Brazil: a study in five capitals] 9IN Portugese). Esc Anna Nery. 2021;25(5):e20200546. doi:https://doi.org/10.1590/2177-9465-EAN-2020-0546

17. First Kenya tuberculosis patient cost survey. Nairobi: Republic of Kenya Ministry of Health; 2017 (https://www.chskenya.org/wp-content/uploads/2018/07/TB-Patient-Cost-Survey-2018.pdf, accessed 27 May 2022).

18. Ukwaja KN, Alobu I, Lgwenyi C, Hopewell PC. The high cost of free tuberculosis services: patient and household costs associated with tuberculosis care in Ebonyi State, Nigeria. PLoS One. 2013 Aug 27;8(8):e73134. doi:10.1371/journal.pone.0073134

19. Foster N, Vasall A, Cleary S, Cunnama L, Churchyard G. Sinanovis E. The economic burden of TB diagnosis and treatment in South Africa. Soc Sci Med. 2015 Apr;130:42–50. doi:10.1016/j.socscimed.2015.01.046

20. Prasanna T, Jeyashree K, Chinnakali P, Bahurupi Y, Vasudevan K, Das M. Catastrophic costs of tuberculosis care: a mixed methods study from Puducherry, India. Glob Health Action. 2018;11(1):1477493. doi:10.1080/16549716.2018.1477493

21. Nhung NV, Hoa NB, Anh NT, Anh LTN, Siroka A, Lönnroth K, et al. Measuring catastrophic costs due to tuberculosis in Viet Nam. Int J Tuberc Lung Dis. 2018 Sep 1;22(9):983–90. doi:10.5588/ijtld.17.0859

22. Sarin R, Vohra V, Singla N, Thomas B, Krishnan R, Muniyandi M. Identifying costs contributing to catastrophic expenditure among TB patients registered under RNTCP in Delhi metro city in India. Indian J Tuberc. 2019 Jan;66(1):150–7. doi:10.1016/j.ijtb.2018.10.009

23. Laokri S, Dramaix-Wilmet M, Kassa F, Anagonou S, Dujardin B. Assessing the economic burden of illness for tuberculosis patients in Benin: determinants and consequences of catastrophic health expenditures and inequities. Trop Med Int Health. 2014 Oct;19(10):1249–58. doi:10.1111/tmi.12365

24. Ukwaja KN, Alobu I, Abimbola S, Hopewell PC. Household catastrophic payments for tuberculosis care in Nigeria: incidence, determinants, and policy implications for universal health coverage. Infect Dis Poverty. 2013 Sep 17;2(1):21. doi:10.1186/2049-9957-2-21