

Estimating the magnitude and pattern of catastrophic health expenditure in Egypt

Ahmed Samir Gomaa

Faculty of Graduate Studies for Statistical Research,
Department of Biostatistics and Demography, Cairo
University, Egypt
ahsamir@uni-bremen.de

Sarah Assem Ibrahim

Assistant Professor at Faculty of Graduate Studies
for Statistical Research, Department of Biostatistics
and Demography, Cairo University, Egypt
sassem@cu.edu.eg

Abstract:

One of the goals Egypt seeks to accomplish within the following years is universal health coverage to ensure that everyone will have access to quality health services. However, the healthcare system relies mainly on non-uniform out-of-pocket payments (more than 60%). This paper aims to investigate the incidence and intensity of catastrophic health payments for the population using the Xu (2005) method and estimate the pattern of catastrophic health expenditure within specific subgroups. The data used in this study is from the Egyptian Household Income, Expenditure, and Consumption Survey (HIECS 2017/2018). The study results indicate that vulnerable groups such as low-income families, the elderly, and families in rural are in the greatest need; they still can't afford adequate health services. Finally, even if universal health insurance did not work or was further delayed, specific programs should be tailored for such groups to socially protect them and accomplish the intention of "health for all".

Introduction:

Empowered by its political leadership, Egypt is aiming for several sustainable development goals to be executed through its "Egypt 2030" vision. One of which is universal health coverage, which ensures that its residents will have access to fair quality health services. Owing to the prevalence and complexity of the current healthcare system, which relies mainly on non-uniform out-of-pocket payments (more than 60%), it is now crucial more than time to look into that objective. Consequently, the state successfully started to proceed with the plan's first phase, beginning with the Port-Said governorate in mid-2019. Based on the plan proposed then, it was projected that universal health insurance would continue its geographical expansion until it reaches full implementation in 2032 (Mathauer, I., Khalifa, A. Y., & Mataria, 2019).

Egypt introduced "Law No. 2 of 2018 promulgating the Health Insurance System", which indicates that phase I of the project will start with five governorates; Port-Said, Ismailiya, Suez, South Sinai, and North Sinai, and will span a timeframe of two years between 2018 and 2020. In addition to the above point, five further governorates should have already started implementing the program by the end of 2023 (SIS, 2019). However, to date, three governorates have almost reached the full establishment; Port-Said, Luxor and Ismailiya, while Aswan, South Sinai, and Suez are currently under process (SIS, 2022). More than 5 million residents are covered under the new system, representing nearly 5% of the Egyptian population in 5 years (SIS, 2022), and it is questionable whether Egypt will be able to proceed with its prosperous ambitions. Furthermore, with the present limited resources, external international pressures, and the uprising cost burden for medical services primarily for the impoverished, Egypt must think of other scenarios to try to maintain the health of all in case the program is delayed or does not work. For example, if needed, we can derive an alternative plan or scenario for the proposed comprehensive health insurance or even address some questions regarding its current policy. However, to be able to focus those resources in the right place, we first need to understand how deep the problem is by analyzing how much the population spends on health.

National attempts, though, were fruitful to assess the degree of inequality in the distribution of health expenditure in Egypt upon investigating the national health and expenditure survey back in 1994. An investigation by Rannan-Eliya et al. concluded that the social insurance programs and cost recovery in some public sectors contributed to greater inequality in access to healthcare resources (Rannan-Eliya, Blanco-Vidal, & Nandakumar, 2000). Using the data from the Household & Income Expenditure 2015/2016 of Egypt, Abdel-Rahman et al. (2021) developed the already existent method by redefining subsistence spending and setting more meaningful thresholds for catastrophic expenditures.

Their findings concluded that the incidence of catastrophic payments was higher among the elderly, uneducated, females, chronic illness, and the unemployed (Abdel-Rahman & Abonazel, 2021). In this paper, using the data of Household Income, Expenditure, and Consumption Survey 2017/2018, we need to gain insight into the catastrophic payment on health. Therefore, this paper aims to investigate the incidence and intensity of catastrophic health payments for the population using three distinctive indicators.

Data and Methodology:

The data used in this study is from the Egypt, Arab Rep. - Household Income, Expenditure, and Consumption Survey, HIECS 2017/2018 – 2017. Additionally, we analyzed the data of 12485 households representing the whole of Egypt (OAMDI, 2021).

The assessment of the magnitude and intensity of the catastrophic health expenditure through three indicators (Xu, 2005): (1) **Catastrophic Head Count (HC)**: It is an estimation of the share of households in the population whose total health care costs are expressed as a proportion of income exceeds a certain fraction, (2) **Catastrophic Payment Overshoot**: It is the average level by which payments, as a proportion of income, exceed the threshold "Z". (3) **Mean Positive Gap**: measures the payments in excess of the threshold average over all households.

Step1: Determine the Household Health Expenditure (HHE_i), which is the total amount of money spent by a Household on the different aspects of health as previously mentioned. It is measured in L.E (Egyptian pound).

Step 2: Determine the Total Expenditure on non-food and durables for each household, denoted by (NFE_i) or non-food expenditure, measured in L.E as well.

Step3: Calculate the share of health care expenditure R_i in non-food expenditure for each household as follows:

$$R_i = \frac{(HHE)_i}{(NFE)_i} \times 100 \quad (1)$$

Step 4: Determining the count of the household suffering from a catastrophic expenditure, denoted by (E_i). The count occurs if the R_i exceeds a pre-set value of Z , which can be defined as the pre-set value or fraction, which, when exceeded, the family endures a catastrophic health expenditure.

$$E_i = \begin{cases} 1, & R_i > Z \\ 0, & R_i < Z \end{cases} \quad (2)$$

Step5: Calculate our first indicator, **HC**, as follows:

$$HC = \frac{1}{n} \sum_{i=1}^n E_i \quad (3)$$

Step6: Calculate the second indicator, **O** as follow:

$$O = \frac{1}{n} \sum_{i=1}^n O_i \quad (4)$$

Where O_i can be calculated as follows:

$$O_i = E_i(R_i - Z) \quad (5)$$

Step7: Calculate the mean positive gap (MPG):

$$MPG = \frac{O}{HC} \quad (6)$$

Results:

Upon using the above method, we were able to determine the catastrophic out-of-pocket payment for the total number of households in the survey, using several levels for the Z values (thresholds). By investigating the three indicators through different Z values for total Egypt, we can notice that more than half of the sampled population pays greater than 10% of their non-subsistence needs on health. As expected, the value of HC decreases as we increase the cut-off till it reaches a value of 9.87% with a Z-value of 40%. The average overshoot follows a similar trend, ranging from 9.5% to 1.31% at the largest Z-Value. The mean positive gap decreased slightly from 16.52% to 13.29% (see Table 1).

TABLE 1. Catastrophic payment measures for the total sample using four Z values.

Catastrophic payment measures	Z value Threshold			
	10	20	30	40
Head count (HC)	57.54%	32.42%	18%	9.87%
Overshoot (O)	9.5%	5.12%	2.67%	1.31%
Mean positive Gap (MPG)	16.52%	15.8%	14.86%	13.29%

Next, by fixing a specific Z value (at 20%), we could evaluate the three indicators for the disparate income groups. In Table 2, upon investigating the relationship between the catastrophic headcount and the expenditure group, we notice that it takes a downward figure at a fixed value of Z-20. We can also observe that the highest percentage of people encountering a catastrophic OOPP (more than 70%) lies among the people spending 10,00 yearly or less in the 2017/2018 survey. This percentage keeps falling until it nearly flattens, starting from the expenditure group between 40k to 50k yearly. After that, a slight increase is noticed in the expenditure group 90-100k. Eventually, it starts falling again till the catastrophic headcount percentage reaches its lowest at a value of 17% with the people who spend 200k or more in the year (See Table 2).

TABLE 2. Catastrophic payments for different income groups at fixed Z value (Z = 20%).

Catastrophic payment measure	HC	O	MPG
Expenditure group			
10000 or less	75.00 %	20.05 %	26.73 %
10,000-	50.66 %	8.34 %	16.46 %
20,000-	41.22 %	6.89 %	16.72 %
30,000-	32.80 %	4.96 %	15.11 %
40,000-	29.54 %	3.95 %	13.37 %
50,000-	29.56 %	4.30 %	14.53 %
60,000-	29.42 %	4.63 %	15.73 %
70,000-	32.62 %	5.31 %	16.28 %
80,000-	31.09 %	5.81 %	18.68 %
90,000-	34.21 %	8.17 %	23.89 %
100,000-120,000	32.49 %	6.87 %	21.15 %
120,000-150,000	25.00 %	5.27 %	21.06 %
150,000-200,000	24.27 %	6.63 %	27.33 %
More than 200,000	17.05 %	5.80 %	34.02%

By observing the catastrophic payments for the households at a fixed Z value (20%), our results showed that the incidence and intensity of catastrophic OOPP increase as the number of elderly people within the household increase. Interestingly, Households with no people above 65 years old had to pay an extra 3.5% above the threshold, with nearly a quarter of the total families enduring a catastrophic payment. On the other hand, the presence of only one elderly within the family means that the family had to pay 9.7% more for medical services than the previous group. Additionally, the catastrophic head counts nearly doubled within the same subgroup. Finally, the presence of two or

more elderlies resulted in the highest catastrophic head counts, average overshoot, and mean positive gap (See Table 3).

Table 3. Catastrophic payments for households with different numbers of elderlies at fixed Z value (Z = 20%).

Catastrophic payment measure	HC	O	MPG
Number of elderlies in HH			
0	25.74 %	3.50 %	13.63 %
1	53.02%	9.73 %	18.35 %
2 or more	67.62 %	15.10 %	22.34 %

Table 4 clearly demonstrates how the sex of the household head affects the health OOPP. Not only families with female household heads had to pay an extra 8% on average above the pre-set Z-value, but also, their HC outclassed those of the males. However, the MPG for both of them remains comparable (15.09% vs 17.98%, respectively).

Table 4. Catastrophic payments for male vs female household head at fixed Z value (Z = 20%).

Catastrophic payment measure	HC	O	MPG
Sex of Household Head			
Male	29.78%	4.94%	15.09%
Female	44.33%	7.97%	17.98%

Additionally, the disparities between Urban and Rural Egypt have yielded that although the HC is of a higher percentage in the Rural areas, the Average overshoot in both regions remains nearly the same. However, the MPG is slightly higher in urban areas compared to rural areas since many families endure catastrophic payments (See Table 5).

Table 5. Catastrophic payments for Urban vs Rural household heads at fixed Z value (Z = 20%).

Catastrophic payment measure	HC	O	MPG
Region			
Urban	30.2%	5.03%	16.68%
Rural	34.26%	5.2%	15.17%

Discussion and conclusion:

Our results, based on the HIECS 2017/2018, indicate that Egyptian Households endure the larger proportion of their total healthcare needs. This pattern did not seem to change through the years, as the National Health Accounts (NHA) in 2011 had quite relevant conclusions regarding the families' OOPP contributed to two-thirds of the total health expenditure in Egypt (Nakhimovsky, Glandon, Rafeh, & Hassan, 2011). In addition to the above point, our indicators showed that poorer families, with annual expenditures of less than 40k EGP per year, had to contribute the highest percentages of their non-food expenditure on health. However, this contrasts with the findings of Rizk et al. (2016), where the authors concluded that poor households are less likely to incur catastrophic health expenditures than non-poor households (Rizk & Abou-Ali, 2016).

In the highlight of the above, we can also touch on the fact that we witness gender inequality in health spending. This aligns with the study conducted by Central Agency for Public Mobilization and Statistics (CAPMAS) in 2020, using the HIECS 2017/2018. However, those findings disapprove of the findings of Rasahd et al. (2015) (Rashad & M. Sharaf, 2015).

The disparities between the urban and rural spending on health can be attributed to the fact that the average household spending on health is 5393.5 EGP for urban areas in contrast to 4842.4 EGP for rural areas based on HIECS

2017/2018 data (CAPMAS, 2020). However, our results show that even though health spending per household is lower in rural areas, the number of households that endured catastrophic health payments is greater than in the urban by 4% while having nearly equal average overshoot, which agrees with Awwad et al. (2021) (Awwad, Abdel-Rahman, & Abonazel, 2021). Besides, the presence of only one member of age greater than 65 nearly doubled all of our indicators, which is consistent with existing literature (Rizk & Abou-Ali, 2016).

In conclusion, it is advisable that more research should be conducted to assess both the factors and outcomes of catastrophic health expenditure. Furthermore, while vulnerable groups such as low-income families, the elderly, and families in rural are in the greatest need, they still can't afford adequate health services. Finally, even if universal health insurance did not work or was further delayed, specific programs should be tailored for such groups to socially protect them and accomplish the goal of health for all.

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