

How catastrophic are the payments for outpatients care in Tanzania: evidence from the Tanzanian National Panel Survey 2014–2016

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Abstract

Purpose – This paper aims to measure and decompose indicators of catastrophic health expenditure (CHE) among outpatients in Tanzania.

Design/methodology/approach – The dataset used in this cross-sectional study came from wave 4 of the Tanzanian National Panel Survey 2014–16 implemented by the National Bureau of Statistics of Tanzania. A total of 3,352 households were analysed. A threshold of 10% of total expenditure was used to establish how catastrophic the healthcare payments for outpatient care in Tanzania were.

Findings – At a 10% threshold, the out-of-pocket payments are catastrophic. 16.7% of households are exposed to CHE. In line with income groups, 35.2, 15.8, 16.6, 9.5 and 6.7% of households in the 1st, 2nd, 3rd, 4th and 5th quintiles, respectively, spent more than 10% of total expenditure on healthcare. Furthermore, the study found that households spent 25% of their total expenditure budget on healthcare. Additionally, concentration index values -0.318 , -0.299 and -0.292 at thresholds 10, 15 and 25%, respectively, show that poor households suffer more than their counterparts in the highest quintiles. The design of the forthcoming universal health insurance scheme needs to consider households in the lowest quintile when setting premiums.

Research limitations/implications – The study was confined to the United Republic of Tanzania; hence, its findings might not be extended to generalise households' behaviour in another country. The nature of the questionnaire and the dataset available for our study did not provide room for us to extend the study and examine the contribution of transport costs and the possibility of incurring informal payments during hospital visits as well as the role of remittance and intrahousehold transfer in reducing CHE. A future study to capture data not present in the current design of the Tanzania NPS questionnaire is highly recommended.

Practical implications – The suggestion proposed in this research calls for re-engineering healthcare financing procedures in the country to cater to healthcare needs among the poor population by increasing public spending on health while considering the involvement of key stakeholders such as development partners and the private sector to achieve UHC progressively.

Originality/value – This study informs the status of catastrophic out-of-pocket costs for outpatient care. It serves as the baseline for assessing the implementation and performance of the forthcoming universal health insurance scheme in offsetting the challenge of out-of-pocket payments in Tanzania.

Keywords Out-of-pocket, Healthcare, Catastrophic, Tanzania, Outpatients, Total expenditure, National Panel Survey

Paper type Research paper

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In the interest of transparency, data sharing, and reproducibility, the author(s) of this article have made the data underlying their research openly available. It can be accessed by following the link here:

The data set are available upon request from: <https://microdata.worldbank.org/index.php/catalog/3455>.



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1. Background of the study

One of the main objectives of the healthcare system is to ensure and promote equity among healthcare users where individuals and households are protected against catastrophic health expenditures (CHE) (Tomini *et al.*, 2013; WHO, 2000). CHE occurs when households or individuals spend more than 40% of net food or more than 10% of total expenditure on healthcare (Rezaei *et al.*, 2019b; WHO, 2000). CHE creates an impact on individuals or households from different angles, with the majority of the cases reported in the literature pushing individuals into poverty (The World Bank and WHO, 2017) or compelling people, especially in middle-income countries, to use alternatives like borrowing, selling assets, and using loans to finance unforeseen medical expenditures (Alam and Mahal, 2014; Rezaei *et al.*, 2019a). The main driver for CHE to occur is the use of out-of-pocket to finance inpatients and outpatients' care. The out-of-pocket payment mechanism is the main source of healthcare financing in most low- and middle-income economies (Dwivedi and Pradhan, 2020). In Tanzania, 30% of the resources used to finance healthcare come from out-of-pocket payments (World Bank, 2020).

Limited information is available regarding how much of the population is exposed to CHE in Tanzania. Several studies were conducted on equity and fairness in healthcare financing in the literature, which informed on issues related to out-of-pocket payments and CHE in Tanzania. However, many investigations focus on selected issues related to out-of-pocket and CHE and do not specifically explore matters relating to outpatient care. In line with this observation, notable studies in the area include Mushi (2014), who discussed the consequences of user fees on healthcare utilisation; Kaijage *et al.* (2023), who examined the effects of out-of-pocket in healthcare utilisations in rural-urban Tanzania; Manzi *et al.* (2005) who studied the determinants of out-of-pocket payments for under-five healthcare in rural southern Tanzania; Brinda *et al.* (2014) who examined the association between various choices of healthcare use and out-of-pocket payments; Garcia-Diaz *et al.* (2024) who checked for persistency of CHE in three countries: Tanzania, Malawi and Uganda and Kagaigai *et al.* (2023) who compared incidence of catastrophic health expenditures and healthcare utilisation among members and non-members of the improved community health fund (iCHF), to mention a few.

The studies did not specifically focus on outpatients, which adds to and supports the argument that studies on how catastrophic the payments for outpatient care in Tanzania are have received little attention. As such, this study used data from the Tanzania National Panel Survey 2014–2016 and focused on outpatients' healthcare transactions to investigate and fill the gap in the literature. It addressed the following questions: What percentage of households are exposed to CHE? On average, how much are the households spending on healthcare? Which income groups are at risk of CHE in the country?

Measuring changes in indicators of CHE for outpatient care in Tanzania is crucial, and the reasons for this study are twofold: firstly, it monitors progress towards the achievement of Target 3.8 of the SDGs, which aims at achieving universal health coverage (UHC) by 2030 (United Nations, 2024). Secondly, it sets up a baseline for assessing the implementation and performance of the forthcoming universal health insurance scheme in Tanzania.

This paper is organised into several sections. Section 2 describes Tanzania's existing healthcare system, while Section 3 reviews relevant literature. Section 4 illustrates the methodology, data, and variables. Results are presented in Section 5, while a discussion of the major results, policy implications, limitations, and future research is completed in Sections 5 and 6, respectively.

2. Typology of the healthcare system in Tanzania

The healthcare system in Mainland Tanzania is composed of three pillars. The first pillar is the public healthcare services in which the government funds the arrangements in cooperation with development partners.

The second one is the social insurance arrangement with three subcomponents, which include (1) The National Health Insurance Fund (NHIF) covering 8.1% of the population (NHIF, 2022); (2) the Social Health Insurance Benefit (SHIB) under the National Social

Security Fund (NSSF). NSSF is for the private sector, foreigners employed in the country, and the self-employed (URT, 2018). Availability of data regarding registration under this subcomponent is limited. Currently, NSSF has 1,039,183 registered contributing members (NSSF, 2022); and (3) the improved Community Health Fund (iCHF) introduced in 2001 which, as of 2016/2017, covered approximately 21.1% of the country's population (12.6 million beneficiaries) (Lee *et al.*, 2018). However, the fund's operation has yet to be replaced by the Universal Health Insurance Scheme in Mainland Tanzania (URT, 2023).

The third pillar is the out-of-pocket mechanism for households to meet cost-sharing (co-payments), prescriptions of medicines, or finance cases not in the health insurance package. This component contributes about 30% of the total health expenditure in the country (World Bank, 2020) and marked a reduction in out-of-pocket spending from 47% in 2000 (UNICEF, 2018). Parallel to out-of-pocket, private insurance covers about 1% of the population in Tanzania (Kitole *et al.*, 2023).

3. Review of literature

Since the 1990s, researchers have been investigating issues related to equity in healthcare financing (Ahmed *et al.*, 2021; O'Donnell *et al.*, 2007). In the period before the 1990s, many researchers focused on operational cost issues and the system's performance in controlling cost (O'Donnell *et al.*, 2007). Today, many local and international players are concerned with healthcare financing fairness as the key to healthcare systems achieving the goal of better health for the population (WHO, 2000).

In most developing countries, healthcare financing is mainly attained using out-of-pocket due to limited health insurance (Dwivedi and Pradhan, 2020; O'Donnell *et al.*, 2007). As such, around 3.5 Billion people in different countries are prevented from accessing healthcare, and 100 million people are pushed into extreme poverty each year due to out-of-pocket healthcare payments (The World Bank and WHO, 2017).

Much of the work published on matters relating to CHE differs regarding cut-off points between a household's catastrophic expenditure on health and the one that is not. Some researchers stand between 10 and 25% of the household's total expenditure, which is further described by Nguyen *et al.* (2023) as a budget share approach. As such, CHE occurs when the out-of-pocket healthcare payments share crosses the line, while for some researchers, CHE takes place when the spending on healthcare is at least 40% of the non-food consumption expenditure (capacity to pay) (O'Donnell *et al.*, 2007; Tin *et al.*, 2006; Xu *et al.*, 2003; Wagstaff, 2008). However, both approaches have weaknesses as they do not capture details related to individuals who failed to transact on healthcare due to an inability to pay. It only recognises those with catastrophic spending (O'Donnell *et al.*, 2007). An approach that measures exposure to catastrophic payments (Pradhan and Prescott, 2002), rather than focusing on those spent more than the thresholds, could be more appealing and informative for effective policy interventions.

Two indicators are common when measuring the impact of CHE. The first one includes CHE, which may force households to postpone spending on other discretionary spending to serve for healthcare, and the second one is impoverishing health expenditures that drive the respective households into poverty as a result of having to pay for healthcare using out-of-pocket (Hsu *et al.*, 2018). Studies on this indicator come from different research directions, such as Das *et al.* (2020), who checked the effect of remittance in protecting households from CHE in India; Tomini *et al.* (2013), who examined the effect of CHE on poverty in Albania, and Salari *et al.* (2019), who examined the same in Kenya. The size and magnitude of these two indicators are affected by the choice of threshold used. Hsu *et al.* (2018) examined the challenges associated with the methodological choices, and noted that the capacity to pay does not consider that some food expenditure is discretionary. This limitation is also narrated by Nguyen *et al.* (2023), who further described that the approach treats the impact similarly to households with different socioeconomic status. The capacity-to-pay approach sets the threshold at 40% of the non-food expenditure. In contrast, with the budget share, the line is set

between 10 and 25% (Hsu *et al.*, 2018; O'Donnell *et al.*, 2007). This methodological challenge calls for researchers to avoid pushing users of the findings by imposing their conclusive views. They should instead allow readers to decide on the threshold they prefer (O'Donnell *et al.*, 2007). With the same view, this study employed the budget share approach, where the threshold is set between 10 and 25% of the total expenditure to allow for freedom in interpreting the results to align with policy choices.

Few researchers have focused on the CHE topic in Tanzania from different perspectives. Examples include Kaijage *et al.* (2023), who examined the effect of out-of-pocket expenditure on health utilisation in rural-urban Tanzania and found that female-headed households had a higher burden cost than male-headed households. Others include Gulamhussein *et al.* (2023), who examined the impact of out-of-pocket costs for medical care of injured patients and found that 85.3% of the respondents experienced CHE, 13.8% borrowed money to finance their healthcare bill, and 12.3% sold their personal belongings to meet the expenditure. However, these studies have not explicitly addressed the extent of CHE among outpatients.

In comparing issues related to CHE among three countries, Tanzania, Uganda, and Malawi, Garcia-Diaz *et al.* (2024) checked for the persistency of CHE. They found that 27% of the sampled population was likely to re-enter the grey area and experience CHE. It used different reference periods: 2008, 2010, and 2012 for Tanzania; 2010, 2013, and 2016 for Malawi; and 2009, 2010, 2011, and 2015 for Uganda. Manzi *et al.* (2005) explored the determinants of variation and level of out-of-pocket payments for childcare in rural Tanzania, while Brinda *et al.* (2014) examined the correlation between out-of-pocket payments and CHE and established factors that increased out-of-pocket expenditure. Mwinuka and Anam Mwemutsi (2024) used panel data surveys 2008–09, 2010–11 and 2012–13 to check and measure the determinants of CHE in urban and rural areas in Tanzania. In a cross-sectional study using National Budget Survey data from 2017/2018, Binyaruka *et al.* (2021) assessed equity in healthcare financing and benefits distribution in Tanzania. However, these studies lack an in-depth analysis of CHE, specifically among the outpatients.

Generally, the existing body of literature in Tanzania does not adequately investigate CHE and its associated challenges among the outpatients, leaving a gap in understanding CHE and its distribution among the income groups in Tanzania. Outpatient services are the main driver of CHE (Salari *et al.*, 2019), and they contribute up to 40% of the three largest functional expenditure items of total spending on health across countries: inpatient, outpatient and medicine and supplies (Xu *et al.*, 2018). This paper looks into the above-unexplored area and reveals how catastrophic the payments for outpatient care are. It differs from the previous works in terms of focus on the unit of analysis by targeting out-patients' care, sample, the data set used, and the methodology.

4. Methodology

4.1 Data and sample size

The data set is from wave 4 of the National Panel Survey (NPS) implemented by Tanzania's National Bureau of Statistics (NBS). NPS 4 is based on a stratified, multi-stage cluster sample design. Four strata: Dar es Salaam, urban areas in Mainland Tanzania, rural areas, and Tanzania Zanzibar, and 419 clusters were recognised. In the sample, 3,352 households were interviewed during the process (NBS Tanzania, 2016). The whole country was well represented in the sample. Having been prepared jointly by NBS Tanzania and the World Bank, NPS 4 contains a robust quality assurance and data management system (NBS Tanzania, 2016). However, the main challenge observed during the study came from the nature of the data set used. Our study had to rely on the nature and structure of the collected data and faced limitations, which are quite common for secondary survey data, including but not limited to the structure of the questionnaire, recalling bias, reliability, and validity (Aregbeshola and Khan, 2018). The study inherited such characteristics from the design of the data set (Weston *et al.*, 2019).

4.2 Description of variables

The analysis's main target was out-of-pocket expenditures relative to total expenditures. Based on the questionnaire, out-of-pocket was defined as an amount spent on (1) prescription of medicines, laboratory tests, consultations, (2) preventive healthcare, pre-natal visits and check-ups, and (3) non-prescribed medicines. The choices of the components and definition of out-of-pocket payments were limited to the design and scope of Section D of the questionnaire. As the target of our study was the expenses incurred by outpatients, data for inpatients was dropped. The second variable is total non-food expenditure constructed from the expenditure incurred by households for non-food items within one month preceding the survey. The 3rd variable included expenditures incurred for food within the households but in the week preceding the survey. To align with out-of-pocket and total expenditures, the data for food spending was pulled to one month. The household size was established using data for individuals. Household weight was adopted straight from the design of the data set. We did not encounter the challenge of missing values for selected variables extracted from the questionnaire. The list of variables extracted from the household questionnaire is indicated in [Table A1](#) of [Appendix](#). Descriptive statistics for the continuous variables used in the analysis are summarised in [Table 1](#), which shows that, on average, the budget share for food is almost 1.5 times the spending on non-food items. The average out-of-pocket spending is Tanzanian shillings 27,495.3 (US\$ 10.2 as of 11th April, 2025).

4.3 Reference and benchmarks

In defining households with CHE, this paper set and used three points of reference: 10, 15, and 25%. Although multiple benchmarks are used in the computation, the primary focus of this paper is 10%, which acts as a basis for presenting and discussing the results. The reasons for the choice are twofold: firstly, there is no agreement among researchers regarding the point of reference that is truly effective for indicating whether the transactions in healthcare are catastrophic ([Hsu et al., 2018](#)). Secondly, when total expenditure is used, the widely used benchmark is 10% ([O'Donnell et al., 2007](#); [Pradhan and Prescott, 2002](#); [Wagstaff and van Doorslaer, 2003](#)). 15 and 25% were added in the line to provide a wide scope of interpretation given the absence of a rule of thumb ([Hsu et al., 2018](#)) and allow for a degree of freedom for users to choose a point of reference tailored to specific needs ([O'Donnell et al., 2007](#)). Based on this argument, the three thresholds are presented throughout this paper.

4.4 Statistical analysis

A concentration curve and index were adopted in our cross-sectional study to calculate the results. In the process, the concentration index was based on the concentration curve for catastrophic health spending and ranked the households according to socioeconomic status on the x-axis and the households facing CHE on the y-axis ([O'Donnell et al., 2007](#); [Rezaei et al., 2019a](#)). For headcount, the incidence and intensity of catastrophic payments were computed using the approach adopted by [O'Donnell et al. \(2007\)](#). In the approach, the incidence of CHE

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Minimum	Maximum
Household size	3,352	4.858294	2.848596	1	33
Total non-food expenditure	3,352	74191.73	400762.1	0	2.25E+07
Out-of-pocket	3,352	27495.3	293133.2	0	1.60E+07
Total food expenditure	3,352	109981.2	1,172,533	0	6.41E+07
Total expenditure	3,352	211668.3	1,561,300	0	8.03E+07

Source(s): Authors' construction using STATA 18

is obtained by calculating the fraction of total expenditure in line with the defined threshold, considering the binary equals 1 if the value test is yes for CHE and 0 otherwise. STATA 18 was used to prepare the data set, variables, and initial calculations to complete the computational and analysis processes. The final results, graphs, figures, and tables were generated using ADePT software version 6.1.

In this case, therefore, the following equations were employed:

For the incidence of catastrophic payments, the calculation was completed using:

$$H = \frac{1}{N} \sum_{i=1}^N E_i \text{ (O'Donnell et al. 2007)}$$

Where N is the sample size, and E is for counting by assigning 1 for values exceeding the threshold and 0 for otherwise.

For the intensity of catastrophic payments, household overshoot was defined as:

$$O_i = E_i ((T_i/X_i) - Z) ..$$

Where: E is for yes or no in the counting process, and Z is the defined threshold.

The calculation for overshoot was done using:

$$O = \frac{1}{N} \sum_{i=1}^N O_i \text{ (O'Donnell et al. 2007)} ..$$

For mean positive overshoot (MPO), the computation was completed using:

$$MPO = \frac{O}{H}$$

MPO allowed the process to establish the intensity of the problem for households with spending above the line.

The distribution of catastrophic payments among the income groups was computed using concentration indices and communicated using a concentration curve in the following manner:

As adopted from [O'Donnell et al. \(2007\)](#), the incidence and intensity of catastrophic payment were modified to consider the distribution of the impact among the income groups as:

$$H^w = H * (1 - C_E) \text{ for headcount, and}$$

$$O^w = O * (1 - C_E) \text{ for overshoot.}$$

H^w and O^w stand for weighted measures for headcount and overshoot, respectively. C_E stands for concentration index computed by ADePT 6.1 software using the covariance method ([Kakwani, 1980](#); [O'Donnell et al., 2007](#)) as:

$$C = \frac{2}{\mu} cov(h, r)$$

Where h is the health variable, μ is for mean, $r = i/N$ is the fractional in the ranking of individual i , where $i = 1$ for the poorest and $i = N$ for the richest.

5. Results

As described in the analysis section, testing whether the healthcare payments made by households in Tanzania are catastrophic was completed using a total expenditure approach in which the threshold set was between 10 and 25%. Our computational process led to the following:

5.1 Households exposed to CHE

As presented in Table 2, we found that, at 10% threshold, 35.2% of the households in the lowest quintile spent more than 10% of the total consumption expenditure on healthcare. Accordingly, the second poorest group's headcount ratio decreases to 15.8%. In the same threshold, 6.7% of the households in the richest group in the highest quintile crossed the line following health expenditures incurred, which is above 10% of the total expenditure. Additionally, 16.7% of all income groups in the sample suffered from CHE. A similar phenomenon is also observed when moving to the right side. At 25% threshold, 12.3% of households in the first poorest group were exposed to CHE after spending more than 25% of the total expenditure on healthcare. As for the 10% threshold, only 2.4% of the households in their counterpart in the highest quintile group were exposed to CHE after spending more than 25% of their total expenditure on healthcare.

5.2 Average households' catastrophic healthcare spending

Another interesting finding is presented in Table 2; this is the average amount households with CHE spend on healthcare (mean positive overshoot). From this area of analysis, and using a 10% threshold, we found that, on average, households with CHE spent 25% (15% + 10%) of the total expenditure on healthcare. The average increased to the right to 32 and 41.8% when the threshold changed to 15 and 25%, respectively.

Table 2. Incidence and intensity of catastrophic health payments using total expenditure approach

	Threshold budget share 10%	15%	25%
<i>Headcount (H)</i>			
Lowest quintile	35.2	22.0	12.3
2	15.8	9.4	5.6
3	16.6	11.6	6.7
4	9.5	6.9	3.8
Highest quintile	6.7	4.4	2.4
Total	16.7	10.9	6.1
<i>Overshoot (O)</i>			
Lowest quintile	5.3	3.9	2.3
2	2.0	1.4	0.7
3	2.7	2.0	1.1
4	1.4	1.0	0.5
Highest quintile	1.2	0.9	0.6
Total	2.5	1.8	1.0
<i>Mean positive overshoot (MPO)</i>			
Lowest quintile	15.1	17.9	18.7
2	12.5	14.6	11.9
3	16.1	17.0	16.3
4	15.2	15.0	13.9
Highest quintile	18.0	21.0	24.0
Total	15.0	17.0	16.8

Source(s): Authors' construction using STATA 18 and ADePT 6.1

5.3 Income groups at risk of facing CHE

Using concentration indices, Table 3 below indicates findings regarding the distribution of CHE among the income groups in the sample. We computed the concentration index for headcount as well as for overshoot. For headcount, the indices are negative for all thresholds from 10 to 25% of the total expenditure, indicating that the payment burden is concentrated among poor households. Similarly, the indices for overshooting in all thresholds reflect behaviour similar to that of the negative values.

Figure 1 demonstrates how the healthcare payments are regressive among poor households. From the illustration, the curve for out-of-pocket payments lies above the expenditure (Lorenz curve) to indicate that the poor are suffering the most from the arrangement that compels them to use out-of-pocket to pay for their healthcare. This is consistent with the concentration indices computed and presented in Table 3.

Table 3. Distribution-sensitive catastrophic payments measures using the total expenditure approach

	Threshold budget share		
	10%	15%	25%
Concentration index, C_E	−0.318	−0.299	−0.292
Rank-weighted headcount, H_W	22.063	14.101	7.942
Concentration index, C_O	−0.289	−0.283	−0.279
Rank-weighted overshoot, O_W	3.247	2.372	1.317

Source(s): Authors’ construction using STATA 18 and ADePT 6.1

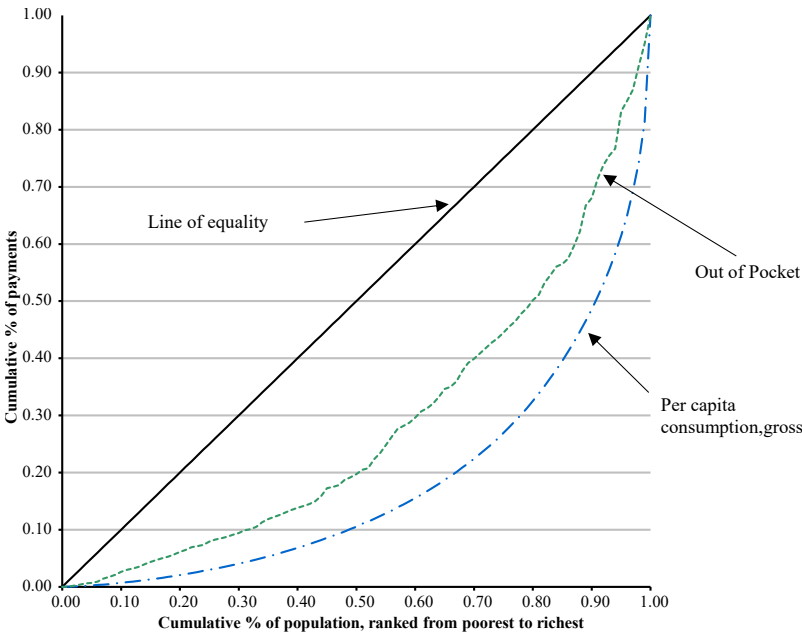


Figure 1. Concentration curves for health payments (out-of-pocket) using total expenditure approach. Source: Authors’ construction using STATA 18 and ADePT 6.1

6. Discussion of major results

Our observation in this study is alarming, as for 35.2% of the households in the 1st poorest group, the healthcare expenditures incurred are catastrophic when a 10% threshold is used. A substantial inequality is observed compared with the budget share allocated for health expenditure in the highest quantile. Only 6.7% of the households in the richest group experienced CHE. Overall, 16.7% of households were exposed to CHE in 2016.

Despite the difference in methods and objectives, the incidence of CHE revealed in our study is close to that of [Brinda et al. \(2014\)](#), who found the incidence of CHE (18%) in low-income groups. It also reflects a pattern which aligns with the findings in Togo when [Sanoussi et al. \(2023\)](#) found the incidence of CHE at 33, 21, 16 and 13% at 10, 15, 20 and 25% thresholds respectively and that of [Salari et al. \(2019\)](#) who found the incidence of CHE more challenging for the poor households in rural areas in Kenya with outpatients' care being the main driver of costs.

Inefficiencies in health insurance coverage are one of the reasons households are exposed to out-of-pocket payments, eventually incurring CHE. Another factor could be the practice common in developing countries where households engage in self-medication and spending on unprescribed medicines ([Hertz et al., 2019](#)), which calls for government control to rescue poor households. The challenge among the poorest group is five times compared to their counterpart in the 5th quintile. With this challenge, a lot can be associated with what is being experienced by the households. In the literature, evidence shows that the poor tend to suffer the most to the extent that some postpone using healthcare services ([Ahmed et al., 2021](#); [O'Donnell et al., 2007](#)). They are sometimes forced to look for casual labour opportunities in farming to earn income to meet medical expenses ([Kaijage et al., 2023](#)).

Likewise, reported cases show that households exposed to out-of-pocket expenditures tend to decrease food consumption to trade with healthcare payments when household members get sick ([Singh et al., 2023](#)). Another groundwork to align with the findings in this aspect comes from [Kord et al. \(2023\)](#), who revealed inequities in out-of-pocket expenditure and utilisation of laboratory tests in Iran and poor households that did not manage to pay for the tests, which is the case for many countries that are dominated by out-of-pocket expenditure reported by [Kaijage et al. \(2023\)](#) on untreated morbidity and [Binyaruka and Mtenga \(2023\)](#) on the increased financial hardship for among households with type 2 diabetes cases due to CHE in Tanzania.

Another notable finding is the average amount the poor spend on healthcare. Households allocate a large share of their total expenditure to healthcare. On average, 25% of the total expenditure is allocated for healthcare when 10% is used as the threshold. This spending structure is challenging for the poor, as they normally suffer the most compared with households in the richest group. As healthcare costs increase, the poor are more constrained in their budget limit ([Rezaei et al., 2019a](#)). Results from the concentration indices confirm this, as the negative values -0.318 , -0.299 , and -0.292 at thresholds of 10, 15, and 25%, respectively, indicate that the burden of healthcare payments is heavy among poor households. The results are also similar to the observation made by [Oburota and Olaniyan \(2020\)](#), who examined and underlined the effect of out-of-pocket spending on accelerating inequities due to out-of-pocket financing procedures in Nigeria. It is also found in another similar work and findings from [Al-Hanawi \(2021\)](#).

7. Conclusion and policy implication

Our findings in all three key areas of interest, incidence, intensity, and distribution of catastrophic out-of-pocket payments, revealed a challenge regarding how Tanzania's healthcare system works to protect the population against inequities and inequalities in healthcare financing. Incidence is high, especially among the poor, and the average share of the budget allocated for healthcare is alarming.

Several measures are already in place to improve access to affordable and quality healthcare in Tanzania. For instance, the NHIF designed a set of special benefit packages for

non-public sector employees and special groups such as students in higher learning institutions and pupils registered in primary schools to promote the uptake of health insurance services. Parallel to NHIF initiatives, the operational structure of the improved Community Health Fund (iCHF) was reengineered to adopt the 2016–2026 health financing strategy to improve financial risk protection for individuals in the informal sector (Binyaruka *et al.*, 2023). However, the operation of this scheme has yet to be replaced by the new law for the Universal Health Insurance scheme.

Concerning increasing supply and lowering the cost of medicines for households to afford and achieve financial risk protection, the government introduced and continued to update the standard treatment guidelines and essential drug list (URT, 2021). Spending on medicines is the main driver of out-of-pocket expenditure among households (Selvaraj *et al.*, 2018). As such, the government initiatives intend to enhance financial risk protection. Despite the measures, many households are uninsured and exposed to CHE.

One of the strategies for reducing consequences caused by reliance on out-of-pocket payments is achieving universal health coverage (UHC). UHC is defined by Xu *et al.* (2018) as all people having access to the health services they need without financial hardship. Policymakers need to consider increasing public spending on health to facilitate access to healthcare, equity, and financial protection and eventually achieve UHC. CHE declines as public spending on health relative to the total health expenditures of a country increases (Xu *et al.*, 2018). Healthcare systems around the world managed to advance towards UHC by increasing the share of domestic general government health expenditure (GGHE-D) (Grigorakis *et al.*, 2022). Specifically, some of the suggested measures to address challenges related to CHE are described below.

First, apart from investing in health system stewardship, which functions to develop and implement legislation and effective monitoring of schemes (Jalali *et al.*, 2021), policymakers should consider subsidisation to neutralise the possible effect of the planned health insurance contributions among poor households for the forthcoming Universal Health Insurance scheme. Subsidies in healthcare transactions reduced the healthcare cost in Iran through the health system evolution plan (Tabari-Khomeiran *et al.*, 2019). Linking the operation of the Tanzania Social Action Fund (TASAF) may work productively in identifying poor households for subsidies or exemption from incurring health insurance premiums.

Second, collaboration with international organisations may address CHE's challenges through sharing international experience. The partnership may benefit the process in fourfold: (1) providing technical assistance to improve the supply of drugs through innovation in supply chain management, which in turn influences the availability and reduction of the cost of drugs; (2) funding to supplement government initiatives to increase the budget for drugs and supplies, especially in rural and isolated areas, to reduce CHE as a result of the reduction of the cost of buying drugs in private pharmacies (Binyaruka *et al.*, 2021). It also goes in line with philanthropic activities for funding pharmacy and the development of pharmacy in community settings, to mention a few. (3) Capacity building for technocrats involved in designing and implementing the policies for the reduction of CHE, in turn, will facilitate the development of health financing strategies for pooling resources and arranging for healthcare providers to meet UHC goals and targets (Khan *et al.*, 2024). (4) Supporting a feasibility study for Tanzania to reduce reliance on out-of-pocket expenditure progressively. Recently, GIZ supported the development of a health financing strategy and universal health insurance scheme for Tanzania-Zanzibar as part of collaborative initiatives toward achieving UHC (GIZ, 2024). A similar initiative is suggested for mainland Tanzania.

Third, it is essential to have measures that promote synergy between government and private sector for cooperative health facilities to increase for the benefit of the low-income groups. Cooperative healthcare hospitals have effectively served the poor in India, as they normally work in a "not for profit model" (Dalwai *et al.*, 2023; Singh and Mishra, 2023). They are also promoted by Thadani and Patnaik (2023) as an inspiring healthcare model for developing countries.

8. Limitations and future research

Apart from being a cross-sectional study and therefore missing characteristics of the sampled households for different periods, the study was confined to the United Republic of Tanzania; hence, its findings might not be extended to generalise households' behaviour in another country. The nature of the questionnaire and the data set available for our study did not provide room for us to extend the study and examine the contribution of transport costs and the possibility of incurring informal payments during hospital visits, as well as the role of remittance and intrahousehold transfer in reducing CHE. These limitations are common for secondary data and do not invalidate results (Aregbeshola and Khan, 2018). Information related to these elements is crucial since they add details and reveal the taste experienced by the poor out-patients. A future study to capture data not present in the current design of the Tanzania NPS questionnaire is highly recommended.

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Table A1. Extract list of variables

Description of variables from the household questionnaire-NPS Wave 4 2014–2016

<i>Section D</i>	<i>Health-one-week call</i>
hh_d4_02	Has [NAME] visited a health care provider in the last 4 weeks?
hh_d4_01	How was the 1st treatment financed?
hh_d4_02	How was the 2nd treatment financed?
hh_d5_01	How much did [NAME] spend visiting the 1st health provider?
hh_d5_02	How much did [NAME] spend visiting the 2nd health provider?
hh_d07	How much in total did the household spend on [NAME] in the past 4 weeks for all illnesses and injuries, including for prescription medicine, tests, consultation, and in-patient fees, if any?
hh_d08	How much in total did the household spend on [NAME] in the past 4 weeks for medical care not related to an illness, including preventive health care, pre-natal visits, check-ups, etc., if any?
hh_d09	How much in total did the household spend on [NAME] in the past 4 weeks for non-prescription medicines, including Panadol, Fansidar, cough syrup, etc.?
<i>Section J</i>	<i>Consumption of food-one-week call</i>
hh_j02	How much in total did your household consume in the past 7 days
hh_j03	How much came from purchases during the past 7 days?
hh_j04	How much did you spend?
<i>Section K</i>	<i>Non-food expenditure-one-month call</i>
hh_k01	Over the past 30 days, did you purchase or pay for any [. . .]?
hh_k02	How much did you pay in total?

Source(s): NBS Tanzania: NPS 4 2014–2016

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