Iran J Public Health, Vol. 54, No.6, Jun 2025, pp.1291-1299

Original Article

Assessing Catastrophic Health Expenditure among Iraqi Households: A Cross-Sectional Study

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(Received 10 Oct 2024; accepted 15 Jan 2025)

Abstract

Background: Catastrophic health expenditures can lead to severe household financial burdens, exacerbating poverty and limiting access to necessary health services. This study examined the prevalence and determinants of catastrophic health expenditures among households in six provinces of Iraq.

Methods: A cross-sectional design was employed, gathering data from 2,400 households in Baghdad, Wasit, Karbala, An-Najaf, Babil, and Maysan in 2023. A two-stage cluster sampling method was utilized, selecting 400 households from each province. Data were collected using WHO "World Health Survey" questionnaire, focusing on health expenditures and household income. Catastrophic health expenditures as defined as out-of-pocket costs exceeding 40% of a household's capacity to pay. Statistical analyses, including logistic regression with calculating adjusted odds ratio, were performed using STATA14 software.

Results: Overall, 246 households (12.6%) faced Catastrophic health expenditures, with a higher prevalence among female heads of households (13.1%) compared to males (12.6%). The multivariate logistic regression analysis indicated that households with 4 to 6 members had 1.52 times higher odds of facing catastrophic health expenditures (AOR=1.52, CI: 1.06 to 2.20). Furthermore, the poorest households had an AOR of 95.28 for experiencing catastrophic health expenditures (OR=95.28, CI: 13.12 to 691.49).

Conclusion: This study underscores the urgent need for tailored policies to reduce the impact of CHE on Iraqi households. By improving access to healthcare and promoting equitable health insurance enrollment, policymakers can alleviate financial strain and support the health and well-being of vulnerable communities.

Keywords: Catastrophic health expenditures (CHE); Health system; Iraq

Introduction

World Health Organization (WHO) states fair healthcare contributions are a health system goal. "Generally, healthcare consumes a significant portion of household income, ranging from $491 in Afghanistan to $10,623 in the United States in

2018. This may indicate the financial burden that society faces related to healthcare" (1). Considerable attention has been directed towards enhancing households' financial protection to mitigate catastrophic health expenditures (CHE) and poverty that may arise from excessive medical costs (2-4). The adverse organizing of healthcare finances and a wide range of socioeconomic factors can significantly elevate the risk of catastrophic health payments (5). Catastrophic illnesses can financially devastate families, leading to significant out-of-pocket (OOP) expenses (6). Financing the health system through direct payments can be inefficient and unjust, leading to significant expenses (7, 8). The WHO defines CHE as those exceeding 40% of a household's capacity to pay, determined by the income remaining after fulfilling basic needs (9, 10). As per the guidelines set forth by the WHO, CHE occurs when healthcare systems do not adequately shield individuals from the financial repercussions of utilizing healthcare services (11). It has become a priority for governments to safeguard the less fortunate from CHE, as financial burdens have been unequally distributed in numerous nations, causing significant apprehension (12).

The United Nations added CHE incidence as a crucial indicator of progress towards Universal health coverage (UHC) in 2015 (SD) Sustainable Development Goals (3.8.1) (2, 3, 13, 14). WHO reports that around 2 billion people face financial difficulties due to health costs. Out of these 2 billion, 1 billion are experiencing CHE (SDG indicator 3.8.2), and 344 million people are falling into extreme poverty as a result (14, 15). Over time, high OOP healthcare costs can cause financial hardship and negatively impact living standards. Healthcare expenses paid OOP have become a pressing policy concern for several reasons. Such expenditures may plunge households into poverty or exacerbate their financial difficulties.

Moreover, families burdened with these healthcare costs may have to cut back on other essential household expenses, such as food and clothing. Finally, households may refrain from seeking necessary healthcare services to avoid the severe financial ramifications (16). The OOP has further widened the gap between those with access to resources and those without, particularly affecting poor and rural communities (17). In low- and middle-income countries (LMICs), socioeconomic inequalities in healthcare utilization are more prevalent (18). As per the WHO, Iraq has the region's lowest per capita health expenditure, at $154 in 2015. This has led to inadequate healthcare facilities, resulting in increased financial strain on the people of Iraq. On average, Iraqi citizens pay 70% of their healthcare expenses out of their pockets, which is significantly higher than the recommended 30% ratio suggested by WHO to prevent patients from slipping into poverty (19). According to the 2021 Legatum Prosperity Index, the country's health pillar rating, which measures the population's overall health and access to healthcare, saw a modest rise from 63.8 in 2011 to 65.5 in 2021. However, the country's rank slipped from 108 to 113 out of 167 nations.

Moreover, Iraq secured the 18th position out of 19 nations in the Middle East and North Africa (MENA) region (20). Due to insufficient healthcare resources, inadequate funding, a shortage of physicians, and limited access to medication, healthcare accessibility in Iraq is restricted, and significant disparities exist across different geographic regions. Iraq currently has 9.7 doctors and 23.8 nurses and midwives per 10,000 individuals, both of which fall below the WHO's recommended minimum (21).

According to WHO, nearly 100 million people are pushed into poverty each year due to healthcare expenses (22), yet there is limited evidence on household health expenditures in Iraq. Despite the various challenges and hurdles faced by the healthcare system in Iraq, disparities exist amongst households residing in the six provinces of Baghdad, Wasit, Karbala, Al-Najaf al-Ashraf, Babil, and Maysan. This article aimed to analyze the financial contributions made by families in these provinces, focusing on the demographic and contextual factors that influenced household health expenditures in 2023. This study highlighted the critical need for public health policies that prioritized financial protection and equitable access to healthcare to reduce CHE's burden. Strengthening

health insurance systems and improving healthcare availability, especially in underserved regions, could have helped mitigate the financial strain caused by OOP costs. Addressing socioeconomic disparities in healthcare access, particularly among the poorest and larger households, was essential for advancing health equity in Iraq. Policymakers had to prioritize these strategies to prevent healthcare expenses from pushing vulnerable populations further into poverty, ultimately contributing to better public health outcomes and social stability.

Materials and Methods

Study Design and Sampling Method

This cross-sectional, descriptive-analytical study was conducted in 2023 among households in six provinces of Iraq: Baghdad, Wasit, Karbala, Al-Najaf al-Ashraf, Babil, and Maysan. A two-stage cluster sampling method was utilized for sample selection. Within each province, 40 sampling points were established, comprising 20 points in rural areas and 20 points in urban areas. At each sampling point, 10 households were randomly selected. The heads of households were identified using the WASH subscription number to ensure accurate representation. After obtaining the household's address, an enumerator visited the home in person. Starting from the door of the first household (the cluster head), the enumerator moved in a predetermined direction until the required number of households in the cluster was reached. If access to a household was impossible or a household declined to participate, an alternative household was approached. Within each household, the first eligible informant—an individual aged 18 or older willing and able to respond—was asked to complete the questionnaire.

Data Collection

The World Health Survey (WHS) is a reliable and valid tool created by the WHO to help countries assess their health system performance. This questionnaire included several modules, such as the 'household roster,' 'health intervention coverage,' 'health insurance,' 'health expenditure,' 'indicators of permanent income,' and 'occupation'. The 'household roster' module collects demographic information about all household members, including age, gender, and relationship to the head of the household. The 'health intervention coverage' module assesses the availability and uptake of essential health services and interventions. The 'health insurance' module gathers information on the type, extent, and impact of health insurance coverage among individuals. The 'health expenditure' module examines information on total expenditures broken down into food, housing, and health care. Additionally, the 'indicators of permanent income' module captures data on household assets and income sources, which can help understand respondents' socioeconomic status. Finally, the 'occupation' module details the employment status and types of occupations held by household members, contributing to a broader understanding of the relationship between employment and health outcomes. These modules provide a comprehensive framework for analyzing health system performance and informing policy decisions (8). Trained enumerators administered the questionnaire to ensure consistency and accuracy in data collection.

Informed consent was obtained from all participants before the data collection began. In this study, we utilized two recall periods for expenditure inquiries: respondents were asked to report their total household and healthcare expenditures for the past 30 days, outpatient expenditures were recalled for the last 30 days, and inpatient expenditures for the previous 12 months.

Measurement of CHE

CHE was assessed based on OOP healthcare costs exceeding 40% of a household's capacity to pay. Capacity to pay was calculated as the effective income of the household minus living costs, determined using the food poverty line method. Thresholds for defining CHE were established based on international guidelines, adjusting to the Iraqi context.

Statistical Analysis

We employed logistic regression analysis to evaluate the impact of various determining factors on CHE, including age, education (academic/ nonacademic), location (rural/ city), occupation status (daily wage/ government employees/ students, housewife insurance status (yes/no), gender of the household head (male/ female), household size, the presence of a member over 65 yr old (yes/ no), a member under 5 yr old(yes/ no), and economic level (five categories based on income). First, the relationship between the independent variables and the CHE was assessed by calculating the Odds Ratio (OR) using univariate logistic regression. When reaching a *P*-value <0.2 in the univariate logistic, the variables were entered into the adjusted logistic model, and their adjusted odds ratio (AOR) was calculated. All analyses were performed in STATA-14.

Ethical consideration

This study was approved by the Ethics Committee of the Research Administration of Islamic Azad University, Sanandaj branch (Approval number IR.IAU.SDJ.REC.1402.034). Data collection was conducted following the acquisition of ethical approval. Initially, the study objectives were explained to the household heads, and they were assured that their information would remain confidential and that the questionnaires would be completely anonymous. After obtaining both verbal and written consent, the interviews and data collection commenced.

Results

The analysis included data from 1946 households, representing 81.1% of the total sample. The majority of household heads (85%, n=1671) were men. Only 168 households (8.6%) had health insurance. Moreover, 913 households (46.9%) had at least one member aged 60 and over, and 1211 households (62.2%) had at least one member younger than 5 yr old (Table 1).

In total, 246 households (12.6%) reported facing CHE. The data revealed interesting trends across various demographic factors. The prevalence of CHE was slightly higher among female heads of households (13.1%) compared to their male counterparts (12.6%). The gender of participants also influenced CHE rates, with males experiencing a higher incidence (14.4%) than females (11.5%). Age group analysis indicated that younger households (under 40) reported the highest CHE rate at 14.6%, while those aged 40 to 60 had a lower rate of 11.1%. Marital status did not show significant differences, with married individuals facing a 12.4% incidence compared to 14.1% among those not married. Member size analysis indicated that households with 4 to 6 members reported the highest catastrophic health expenditures (CHE) rate at 14.5%. In contrast, households with fewer than 4 members had a lower CHE rate of 10.0%. Importantly, economic status emerged as a strong determinant of CHE prevalence. The data showed that the poorest households (economic level 1) faced a staggering 40.1% prevalence of CHE, highlighting the considerable impact of economic factors on health expenditures (Table 1).

The mean (SD) of "total monthly household income minus food expenditure" was 1082459.9 (740956.1) Iraqi dinars (IRQ), indicating a relatively wide variation in income levels within the households surveyed. Additionally, the mean (SD) of "total monthly household expenditure on health services" was 121828.2 (113349.8) IRQ, suggesting that households allocated a considerable portion of their income to healthcare expenses (Table 2).

Table 1: Demographic Characteristics and Households Facing Catastrophic Expenditures (N=1946)

Variable	Number	Per-cent	Face with CHE
			Yes: N (%)
Gender of the Head of Household			
Male	1,671	85.9	210 (12.6)
Female	275	14.1	36 (13.1)
Gender of participant			
Male	764	39.3	110 (14.4)
Female	1,182	60.7	136 (11.5)
Age group			
Less than 40	686	35.3	100 (14.6)
40 to 60	1,035	53.2	115 (11.1)
More than 60	225	28.4	31 (13.8)
Marital status			
Married	1,641	84.3	203 (12.4)
Not married	305	15.7	43 (14.1)
Health insurance			
Yes	168	8.6	18 (10.7)
No	1,778	91.4	228 (12.8)
Member under 5 yr old			
Yes	1,211	62.2	156 (12.9)
No	735	37.8	90 (12.2)
Member over 60 yr old			
Yes	913	46.9	122 (13.4)
No	1,033	53.1	124 (12.0)
Location			
City	1,073	55.1	141 (13.1)
Rural	873	44.9	105 (12.0)
Occupation			
Daily wager or earner	327	16.8	42 (12.8)
Government employees	925	47.5	124 (13.4)
students	186	9.6	22 (11.8)
Housewife	508	26.1	58 (11.4)
Education			
Non-academic	1,343	69.0	174 (13.0)
Academic	603	31.0	72 (11.9)
Member size			
Less than 4	627	35.3	63 (10.0)
4 to 6	766	39.4	111 (14.5)
More than 6	553	28.4	72 (13.0)
Economic level			
1 (poorest)	274	14.1	110 (40.1)
2 (poor)	246	17.8	96 (27.7)
3 (moderate)	408	21.0	29 (7.1)
4 (rich)	774	39.8	10 (4.1)
5 (richest)	144	7.4	1 (0.7)
Total	1,946	100	246 (12.6)

Table 2: The Mean of Total Monthly Household income and Expenditure on health services (in Iraqi Dinar= IQD) in 2023

Variables	Mean	Standard deviation (SD)
Mean of total monthly household income minus food expenditure	1,082,459.9	740,956.1
Mean of total monthly household expenditure on health services	121,828.2	113,349.8

The multivariate logistic regression analysis revealed several significant associations between household characteristics and the likelihood of facing CHE. Specifically, households with a member size between 4 and 6 were 1.52 times more likely to experience CHE than households with smaller members (AOR=1.52, CI: 1.06 to 2.20). Moreover, households classified as having a lower level of economic status, including those categorized as the poorest (AOR=95.28, CI: 13.12 to 691.49) and poor (AOR=55.02, CI: 7.58 to 399.03), were significantly more predisposed to facing CHE. These findings highlight the importance of household size and economic status as determinants of healthcare expenditure burdens (Table 3).

Table 3: Result from Logistic regression models for Households Facing CHE

Variable	Univariate		Multivariate	
	OR (95%CI)*	P-value	AOR (95% CI) **	*P*-value
Gender				
Male	1.29 (0.98,1.69)	0.061	1.13 (0.84,1.53)	0.404
Female	1		1	
Age group				
Less than 40	1.06 (0.69,1.64)	0.767	1.00 (0.55,1.72)	0.552
40 to 60	0.78 (0.51,1.19)	0.258	0.82 (0.54,1.09)	0.320
More than 60	1		1	
Marital status				
Married	1		1	
Not married	1.16 (0.85,1.65)	0.405	1.12 (0.80,1.69)	0.391
Gender of head of household				
Male	1		1	
Female	1.04 (0.71,1.53)	0.809	1.00 (0.68,1.44)	0.790
health insurance				
Yes	1		1	
No	0.81 (0.49,1.35)	0.432	0.90 (0.53,1.54)	0.175
Member size				
Less than 4	1		1	
4 to 6	1.51 (1.09,2.10)	0.013	1.33 (0.99,2.04)	0.093
More than 6	1.34 (0.93,1.91)	0.110	1.15 (0.94,1.89)	0.109
Member over 60 yr old				
Yes	1.13 (0.86,1.47)	0.368	1.10 (0.91,1.55)	0.283
No	1		1	
Location				
City	1.10 (0.84,1.44)	0.462	1.00 (0.99,1.32)	0.390
Rural	1		1	
Occupation				
Daily wager or earner	1		1	
Government employees	1.05 (0.72,1.52)	0.797	1.00 (0.77,1.82)	0.651
students	0.91 (0.52,1.57)	0.738	0.90 (0.59,1.90)	0.620
Housewife	0.87 (0.57,1.33)	0.536	0.88 (0.64,1.53)	0.439
Education				
Nonacademic	0.91 (0.67,1.22)	0.533	1.00 (0.73,1.87)	0.403
Academic	1		1	
Member under 5 yr old				
Yes	1.06 (0.80,1.39)	0.682	1.00 (0.92,1.42)	0.601
No	1		1	
Economic level				
1 (poorest)	95.90 (13.22,695.71)	0.001	95.28 (13.12,691.49)	0.001
2 (poor)	54.90 (7.57,391.00)	0.001	55.02 (7.58,399.03)	0.001
3 (moderate)	10.94 (1.47,81.07)	0.019	10.90 (1.47,80.84)	0.019
4 (rich)	1.87 (0.23,14.73)	0.552	1.88 (0.23,14.81)	0.548
5 (richest)	1		1	

* OR= Odd Ratio
** AOR= Adjusted Odd Ratio

Discussion

This study aimed to assess the prevalence of CHE in Iraq. Results showed higher CHE rates among males, individuals under 40, and unmarried individuals. Economic status was a key factor, with poorer households experiencing higher CHE rates. To reduce financial barriers, healthcare financing systems that limit OOP payments and promote prepayment mechanisms, like health insurance or tax-based funding, can improve financial protection and equitable access to healthcare (4, 8, 23-25). OOP payments during illness significantly reduce disposable income and are widely regarded as one of the least efficient financial mechanisms for healthcare. Such payments frequently lead to burdensome healthcare expenses, disproportionately affecting vulnerable households. The financial strain caused by healthcare costs is a critical global indicator used to evaluate and monitor the adequacy of financial protection provided by healthcare systems. This indicator is typically defined when direct payments for health services exceed a specified percentage of a household's remaining income after covering basic needs, often called "payment capacity." Strengthening financial protection mechanisms is essential to address these challenges effectively. Different calculation methods exist for assessing households' confrontation with healthcare cost burdens (4, 23, 24, 26, 27). The WHO defines catastrophic health expenditure as healthcare costs consuming 40% or more of a household's income after meeting essential needs. The World Bank uses a threshold of 20% of total household expenditures to indicate catastrophic health expenses (4, 28-32).

The study found that 12.6% of Iraq's population faced catastrophic health expenses, highlighting the need for healthcare reforms to reduce financial barriers. It recommends adopting prepayment mechanisms over direct OOP payments to improve access and quality of care, reducing disease incidence and related expenses. Developing comprehensive health insurance systems is crucial, as Iraq's current coverage is underdeveloped. Inclusive health insurance can provide financial protection and alleviate burdens during medical crises. The study also emphasizes employment-oriented policies and economic development to boost household income and reduce healthcare costs. Public awareness campaigns on health, disease prevention, and timely medical intervention can further decrease costly treatments. Targeted government policies for vulnerable populations are vital to addressing inequitable healthcare cost burdens and ensuring equitable access. Finally, regular monitoring and evaluation of implemented strategies are essential to align actions with national health goals, driving sustainable cost reductions and improving health equity.

This study has several limitations. The data were self-reported and constrained by pre-specified questions, personal preferences, and recall bias, which may lead to measurement errors. Given the study's duration, there is a possibility of recall bias concerning total household expenditures, bottom-up costing, a 12-month history of illness, and a 5-year history of hospitalization that were analyzed. In the costing analysis, we considered direct medical and non-medical costs, provider-side costs, as well as indirect costs associated with health services, such as lost wages and lost productivity due to chronic illness, disability, or death.

Furthermore, the survey's pre-specified questions limited the availability of measurement determinants for catastrophic health expenditure (CHE). Notably, the study did not account for households that did not seek treatment or gave up care due to financial constraints, nor did it consider the indirect opportunity costs associated with seeking care. This may result in an underestimation of the incidence and inequality of CHE.

Conclusion

This study highlights the substantial impact of catastrophic health expenses on households across various provinces in Iraq. The findings reveal a significant prevalence of such burdens, particularly among vulnerable populations and those with limited access to insurance and healthcare services.

The implications of these findings extend beyond financial strain, potentially leading to poverty and compromising essential needs such as food security. Addressing these challenges requires a multifaceted approach, including the development of tailored policies and guidelines aimed at improving access to healthcare services and enhancing community-based health insurance enrollment, particularly for marginalized groups. By prioritizing the financial protection of households and promoting equitable access to healthcare, policymakers, and stakeholders can work towards mitigating the adverse effects of catastrophic health expenses and fostering a healthier and more resilient population.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgements

This study was part of a doctoral dissertation funded by the Research Administration of the Islamic Azad University, Research, and Science branch. We are grateful for the support and cooperation of our colleagues, peers, and institutional staff at the Islamic Azad University Sanandaj Branch and the Kurdistan University of Medical Sciences. Their encouragement was essential for the completion of this study. Additionally, we would like to express our sincere gratitude to the households that participated and shared their experiences; their insights were crucial to the findings of this research.

Conflict of interest

The authors declare that there is no conflict of interests.

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