



Original Article

Catastrophic Health Expenditure and its Determinants Among Older Adults in Tehran, Iran



Hossein Mobaraki¹, Aziz Rezapour², Ramin Rahimnia³,
Heshmatollah Asadi⁴, Zohreh Ghavamiyazad⁵, Yaser Jouyani^{6*}

¹Department of Rehabilitation Management, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran

² Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, Iran

³ Department of Medical Nanotechnology, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences, Tehran, Iran

⁴ Department of Public Health, School of Health and Nutrition, Lorestan University of Medical Sciences, Khorramabad, Iran

⁵ Emam Khomeyni Hospital, Tehran University of medical Sciences, Tehran, Iran

⁶ School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran

* Corresponding author: Yaser Jouyani

Email: yasserjouyani@yahoo.com

ABSTRACT

Background: The phenomenon of aging is among the important evolution currently happening in Iran. The rise in older adults population presents health policy-makers with new challenges and highlight the need for the evidence of providing and funding services to deal with this phenomenon.

Methods: The present cross-sectional study was performed on 550 randomly selected older adults from 22 districts of Tehran, Iran in 2017. Data were collected using the household healthcare expenditure questionnaire. The catastrophic health expenditures (CHEs) were defined as health expenditure exceeding 40% of the capacity to pay. The relationship between household characteristics and catastrophic expenditures was determined using multivariate logistic regression model in Stata version 14.

Results: The findings showed that 11.1% of older adults were burdened with. The highest frequency of catastrophic expenditures was observed in the first and second income quintiles household size of five and higher, the unemployed, and those with no supplementary insurance. According to the multivariate model, household income was an independent predictor for CHEs. Compared to the first quintiles of income, being at the third quintile decreased the odds of encountering CHEs by 42% and the forth quintiles and higher decreased the odds of CHEs by 78%.

Conclusion: This study revealed an obvious prevalence of CHEs among older adults. Lower household income was associated with higher probability of suffering from CHEs.

Keywords: health expenditures, older adults, Iran

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Introduction

Protecting households against the occurrence and the burden of the catastrophic health expenditures (CHEs) is one of the concepts of equity in the services provided by health systems (1). Because of the current advances in rehabilitation technologies and providing sustainable health, paying for these services is one of the biggest social, political, and economic problems of human societies.

These expenses have turned into a nightmare for many families and individuals for years. Many political developments in developed and developing countries are somehow associated with the health expenditures and their interaction with household expenditures. Besides the provision and promotion of health and its equitable distribution, the community expects the health system to be properly, punctually and equally responsive to the community and ultimately properly protect the public against the huge burden of expenses (2).

In practical terms, differences and inequities is associated with serious social problems. Practical experiences suggest that eliminating health inequities in social groups requires fundamental reconstruction to reduce their undesirable effects on health. The issue of financing and direct out-of-pocket payments by the health service recipients is considered as one of the fundamental issues for establishing optimal health (3). Households facing CHEs are exposed to the risk of poverty and long-term debt (4). According to the world health organization (WHO), households spending over 40% of their capacity to pay on health expenditures will face serious problems in providing for a decent standard of living (5). Spending a great proportion of the household resources on health services can threaten long and short-term standard of life, such that in the short-term, the household should ignore the current use of other goods and services, and in the long-term, consequences such as auctioning off assets, using up savings or accumulating debts will be inevitable (6).

Identifying demographic changes and their consequences for the society provides the context for planning to promote public health. Aging is one of the main changes that is happening in Iran. The rise in older adult population presents policy-makers in health with new challenges and doubles the need for the evidence of providing and funding services to deal with this phenomenon (7).

Geriatrics suffer from numerous chronic diseases such as hypertension, heart diseases, stroke, diabetes, cancer, respiratory diseases, urinary incontinence, reduced visual acuity and hearing loss, musculoskeletal, and psychiatric disorders that are among factors affecting the massive burden of diseases in the old-age; therefore, the old-age health expenditures are found to be heavy (8). Households' protection against the catastrophic expenditures of health services is among the agreed goal of health system policies all around the world (9).

Various studies have shown that families with old members are at significantly greater risk for facing with the catastrophic expenditures. previous study showed that the likelihood of households facing catastrophic health expenditures increases with increasing number of over 65-year-old people in the household (10). In another study, Bagheri found that one of the variables affecting the

likelihood of households facing catastrophic health expenditures is the presence of over 60-year-old members in the household (11). Despite many studies conducted on health services and their expenses, the policy-makers still have little knowledge of a health system with desirable features that protects households against the catastrophic health expenditures, and this still requires more scientific studies (12). Health and medical cares provided for older adults have their own specific features, and comprehensive knowledge of the characteristics of households and current status of older adults in terms of the service utilization pattern, burden of diseases, medical expenses can have a major role in older adults' health policy-making. So, the present study aimed to determine the percentage and characteristics of older adults facing with the catastrophic health expenditures in Tehran, Iran.

Methods

Study design and sampling

The present cross-sectional study was conducted in Tehran, in 2017. The sample size was determined based on an expected prevalence of 10%, an accepted error of 2%, and 95% confidence level giving a required size of 553 samples. Tehran is geographically divided into 22 districts. These districts were divided into five clusters, including north, south, east, west, and center. Then, one district was randomly selected from each cluster. Since the selected districts had approximately equal populations, an equal number of subjects were considered for each district. The ultimate samples were selected using systematic sampling method with a sampling interval equal to the ratio of districts' population to pre-specified samples in each cluster.

Measurement tools

Data were collected using world health survey questionnaire adapted from WHO (13) which was translated into Persian and its content validity was previously confirmed by Kavoosi et al. (14). This questionnaire contained the following dimensions: household questionnaire, household income, and household's health care expenditures.

Study variables

In the present study, the catastrophic expenditures was defined according to the WHO as health expenditure (HE) exceeding 40% of the capacity to pay (13). The household health expenditures include payments for health insurance or participation in health, private insurance, and direct out-of-pocket payments for outpatient and admission services. Given the non-disclosure of income by some households, the gross household expenditure (GE) including food and non-food expenditures, and health and non-health expenditures was considered as their effective income. The household capacity to pay (CTP) was determined according to the effective income minus expenditure on food. Food expenditure consists of total household expenditure on food plus the monetary value of the food prepared and consumed. The cost of food taken outside (in hotels and restaurants) and money spent on cigarettes, tobacco, alcohol, etc. are not included in calculations.

Next, household gross expenditure was divided into income quintiles, and frequency and percentage of the households in these quintiles facing CHEs were obtained. The first quintile included the lowest income households, and the fifth quintile

consisted of households with the highest income.

Statistical analysis

The quantitative variables were described as mean and standard deviation, and qualitative variables as absolute and relative frequency. Univariate comparison was carried out using Chi-square test. The adjusted odds ratio associated with household variables for facing CHEs and their 95% confidence intervals were determined using logistic regression model. A significance level of less than 0.1 in the univariate model was

considered for entering the multivariate model. All analyses were performed in Stata version 14.

Results

A total of 550 older adults with mean age of 70.6 years old (SD = 5.32) participated in the present study. Of total, 11.1% (61 people) were facing CHEs. Table 1 shows the status of facing CHEs according to the household and personal characteristics of older adults.

Table 1. Frequency of Facing with CHEs according to Household and Individual Characteristics of Older Adults

Characteristics	Catastrophic health expenditure				P-value
	Yes N = 61		No N = 489		
	Frequency	Percent	Frequency	Percent	
Household Income quintile					
First	32	13	217	87	0.001
Second	24	11.5	184	88.5	
Third	4	7.5	50	92.5	
Fourth and fifth	1	2.6	38	97.4	
Gender					
Male	48	10	447	90	0.06
Female	13	24	42	76	
Age in years					
65-70	30	11	234	89	0.67
70-75	11	12	82	88	
75 and older	14	11	118	89	
NA	6	10	55	90	
Home ownership					
Owner	35	10	306	90	0.08
Tenant	18	12.5	125	87.5	
NA	8	12	58	88	
Household size					
1-2	17	10	146	88	0.02
3-4	30	11	235	89	
5 and more	14	12	106	88	
Disabled family member					
Yes	10	15	56	85	0.18
No	47	10	399	90	
NA	4	10	34	90	
Elderl marital status					
Married	40	11	334	89	0.07
Divorced	15	13	101	87	
NA	6	10	54	90	
Education level					
Illiterate	7	16	37	84	0.06
High school diploma	47	11	389	89	
University	7	10	63	90	
Employment status					
Unemployed	11	22	40	78	0.001
Self-employed	15	15	84	85	
Employed	4	12	29	88	
Retired	31	8	336	92	
Supplementary insurance					
Yes	23	8	274	92	0.04
No	38	15	215	85	
Insurance					
Public	51	10.5	433	91.5	0.09
Private	6	14	38	86	
None	4	18	18	82	
Site of receiving services					
Public	28	11	225	89	0.55
Private	17	11	143	89	
Both	16	12	121	88	

Abbreviation: CHEs, catastrophic health expenditures; NA, not answered

In cases that some of the respondents did not answer certain questions, NA (not answered) is shown in Table 1. In terms of income, the highest frequency of CHEs was observed in the first (13%) and second (11.5%) quintile households. CHEs were twice as high in households with a female elderly compared to those with a male elderly. CHEs for illiterate older adults were 1.6 times higher compared to university educated older adults. The frequency of CHEs was 22% for unemployed older adults and only 8% for retired older adults. The univariate estimation results showed that lack of a supplementary insurance almost doubles the frequency of CHEs.

The multivariate regression model was performed using the variables with significance level of 0.1 in univariate analysis. The Disabled family member was also included in the multivariate regression model because of high importance. Table 2 shows the result of logistic model assessing the relationship between predictor variables and exposure to CHEs (dependent variable). The McFadden index (R^2) in the multivariate model was 0.675. The VIF statistic for assessing the collinearity of independent variables was 1.325, indicating poor collinearity of the study variables. The results showed that household income was the only independent predictor of facing with CHEs. The third quintile of household income had an adjusted odds ratio of 0.58 (95% CI:0.44-0.72) for facing CHEs compared to the first quintile showing 42% decreases in the odds of CHEs. The associated odds ratio for the fourth and fifth CHEs was 0.22 (95% CI: 0.11-0.36) for facing with CHEs.

Discussion

According to the results, older adults' exposure to CHEs was 11.1%. Household exposure to CHEs has been reported differently in previous studies conducted in various health systems. The reported prevalence of facing with CHEs in older adults in the current study was in accordance with Kavooosi et al as 11.8% (14) and higher than prevalence reported by Bagheri et al as 3.8% (11) and Su et al as 8.66%

(15). In a study by Emamgholipour on cardiovascular patients in Ahvaz Teaching Hospital, 55% of patients were faced with CHEs (16). Another study by Ghanbari in city of Hamedan reported that 20.7% of families with patients referring to hospitals has been faced with CHEs (17).

The present study results showed that the frequency of facing with CHEs increased with increasing household size from 1-2 people to 5 or more. It can be argued that with increasing household size, the consumption expenditure for housing, clothing, food, transportation, etc. claims a bigger share of the household income and consequently reduces the capacity to pay, which gives rise to the possibility of being faced with CHEs. As the results obtained by Yardima et al. in Turkey showed that addition of one person to the household size increases the household expenditure by 2%, and also increases the likelihood of facing CHEs by 0.4% (18). Ghiasvand reported that the household size is among variables that have a significant and positive relationship with CHEs (19). In Burkina Faso, household size reported as one of the factors related to CHEs that increased the probability of CHEs by 5% (15). The results obtained by some previous studies reported the positive association between household size and occurrence of CHEs (20-24). But, In accordance with Kavooosi et al. (14) we found no significant relationship between household size and CHEs in the multivariate model. It seems that some other variables such as household income has more important role on CHEs and may confounds the association between household size and CHEs. In the present study, the household income had significant association with CHEs both in univariate and multivariate model. The probability of facing with CHEs reduced significantly with changing income quintile from the first to higher quintiles. The results obtained by Emamgholipour et al. clearly showed the negative association of income on patients' CHEs, such that the odds of CHEs decreased with increasing income level (16). Ghiasvand et al. concluded that higher household income level increases their capacity to pay, and the household is less likely to face CHEs (19).

Table 2. Estimates of the Association between Household Variables and CHEs Using Logistic Regression Model

Variable	Odds ratio	95% confidence interval	P-value
Income quintile			
First	1		
Second	0.90	0.78-1.07	0.074
Third	0.58	0.44-0.72	0.001
Fourth and Fifth	0.22	0.11-0.36	0.033
Home ownership			
Owner	1		
Tenant	0.69	0.1-35.23	0.621
Household size			
1-2	1		
3-4	0.89	0.74-1.66	0.352
5 and more	2.11	0.98-4.29	0.084
Disabled family member			
Yes	1		
No	0.75	0.62-0.89	0.221
Supplementary insurance			
Yes	1		
No	3.12	0.91-8.72	0.186
Insurance status			
None	1		
Private	0.82	0.69-1.06	0.214
Public	1.12	0.1-81.58	0.164

Abbreviation: CHEs, catastrophic health expenditure

In the present study, the unemployed older had the highest frequency of CHEs followed by self-employed. This finding is in accordance with the results obtained by Emamgholipour et al. who showed that employment status had a positive and significant association with CHEs (16). The results obtained by Ghanbari et al. showed that employment of the head of the household reduces the odds of facing CHEs (17). The results of Daivadanam et al. study showed that being employed reduces the probability of exposure to CHEs in a specific group of patients receiving health care services (25). Sabermahani et al. showed that unemployment of the household head increases the odds for facing CHEs (10). Choi et al. showed that employment of the household head has a significant effect on exposure to CHEs (26).

In our study in the multivariate model, having insurance either as primary or supplementary had no association with CHEs after adjusting for household income. This finding remarks that economic status of the household have greater impact on household facing with health expenditure and public and social intervention should more focus on economic conditions of the households. Furthermore, the package of health insurance benefits is limited and does not cover a wide range of services, and new medications and technologies may take a long time to be included in the package of benefits due to prolonged administrative-legal process and political issues. To solve this problem, factors associated with administrative management that hinder the approval and implementation of insurance programs should be identified, and solved through further studies; greater care is required in the definition of the scope of services included in the package of benefits of health insurance; and the economic principle of selecting the most cost-effective service should be included more carefully in the benefits package design according to economic, social, epidemiological, and demographic conditions. In fact, given the increasing elderly population, this issue should be considered as a demographic condition in designing the package of benefit.

Conclusion

This study revealed that a significant proportion of elders residing in the capital city of Iran are suffering from catastrophic health expenditures and the household income was the most important predictor of CHEs.

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Ethical consideration

The present article has been derived from a research project entitled "The catastrophic health expenditure and factors affecting it in older adults in Tehran" and approved by Iran University of Medical Sciences with the ethics code of IR.IUMS.REC. 1395.29923, and the code of 95-04-163-29923.

Conflicts of interests

Authors declared no conflict of interest.

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