

Catastrophic Health Expenditures and Coping Strategies in Households with Cancer Patients in Shiraz Namazi Hospital

Zahra Kavosi*, Hengameh Delavari**, Ali Keshtkaran*,
Fatemeh Setoudehzadeh**

*School of Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran

**School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Background: Performance of a health system is of great importance since it is the major means for improving health. Until now, various methods have been proposed for assessing the performance of the health system. The method proposed by World Health Organization is based on three major goals of the health system: health improvement, accountability, and equity in financial contribution. Equity of a household's financial contribution in the health system can be determined through the measurement of catastrophic health expenditures. Therefore, the present study aims to determine the percentage of households with cancer patients that face catastrophic health expenditures.

Methods: This descriptive-analytical study was conducted in a cross-sectional manner. The statistical community of this research included all households with cancer patients who referred to the chemotherapy and radiotherapy wards of Namazi Hospital, Shiraz, Iran. The study participants were selected by simple random sampling. We used the expenditure part of World Health Organization's Health Survey Questionnaire to gather data related to the 245 study participants. Data analysis was conducted by SPSS statistical software and the chi-square test.

Results: According to the results, 67.9% of households with cancer patients faced catastrophic health expenditures. There was a significant relationship between facing these costs and type of insurance, residence, use of outpatient services, type of treatment and other family members who refrained from using healthcare services.

Conclusion: The high percentage of households with cancer patients who face catastrophic health expenditures can direct policy makers to develop support policies for these patients and, at the same time, aim at reducing their treatment expenses. Paying special attention to cancer patients, considering cancer as a specific disease, revising the country's insurance system, and reconsidering the provided services can be the priorities of the health system.

Keywords: Catastrophic health expenditure, Cancer, Household

♦Corresponding Author:

Hengameh Delavari, MD
School of Management and
Medical Informatics, Shiraz
University of Medical Sciences,
Shiraz, Iran
Tel: +98-711-2340774
Email: hdelavari110@gmail.com



Introduction

In order to improve and restore their health, people have to use and purchase healthcare services.¹ Therefore, a part of each household's income is spent on health-related expenses. The amount of the households' contribution to health-related expenses and its distribution in different societies show that the financial burden of health is imposed on societies. According to the type of health system, using healthcare services imposes different degrees of financial pressure on individuals from different societies.

In general the economic costs of diseases can be classified into two major categories, costs of disease diagnosis and treatment and reduction of income resulting from the patients' loss of efficiency and working capacity.² Consequently, today the expenses of the health system have attracted the attention of both policy makers and the academics of a large number of countries.³ Because the World Health Organization (WHO) emphasizes equity, therefore the framework of evaluating the performance of the health system must also emphasize this issue.⁴ The equity in developing goals as well as the analytical framework of health systems can be explained by strategies such as "Health for all by the year 2000", which shows a commitment to equity. In addition, evidence shows that equity is a high priority for individuals who reside in different societies.⁵ According to the WHO, protecting the people against the costs of diseases is one of the three main goals of a health system.¹ WHO has given a 25% weight to this index and, at the same time, considers the index of fair contribution in health financial resources as one of the major variables in evaluating the efficiency as well as the performance of a health system.²

A fair system is defined as a system in which the households participate in providing the health and treatment expenses according to their financial ability.⁶ In economic analyses on the exchange of goods and services, it is quite fair to pay for what you would like to have or use. In terms of healthcare services, rather, this concept does not seem to be fair.⁷ The answers provided for the

questions "Who pays for the expenses of the health system?" and "How much do the households contribute to health expenses" show equity in financial provision for the health system and, at the same time, determine the achievement of equity in financial contribution.⁸ A household's financial contribution in the health system is defined as the ratio of the household's payment for the health system to its capacity to pay (CTP). Capacity to pay shows the financial burden imposed on the household due to the payment to the health system and, ideally, should be assessed over a one-year period.²

The outcome of the households' financial contribution to the health system can be analyzed regarding either an income or financial burden. In the income approach, changes in income distribution are investigated based on the household's payment to the health system and evaluated based on the change in the number of the households which have been driven below the poverty line due to health expenses. In the second approach, the health expenses are investigated based on their distressing effects on the households. Measuring the index of equity in financial contribution and the percentage of the households that face catastrophic health expenditures are examples of the second approach.²

Catastrophic health expenditure is at the core of the issue of equity in financial provision.⁹ In order for a catastrophic payment to occur, three factors must be met: 1. healthcare services which are required to be paid out of pocket, 2. household's low CTP, and 3. lack of a prepayment system for risk accumulation.¹⁰ Therefore, catastrophic health expenditure occurs in case the cost of healthcare services is more than the households' financial ability, drives the households into poverty, or prevents the household from getting out of poverty.⁷ According to a 2005 WHO report, almost 44 million households or more than 150 million individuals worldwide are faced with catastrophic health expenditures each year. In addition, nearly 25 million households or more than 100 million individuals are annually driven

to poverty because of paying for healthcare services.¹¹ A study conducted in Tehran has shown that 10%-15% and 9.7%-14% of the households have faced catastrophic health expenditures in 2003 and 2007, respectively. Most of these households consisted of 3-6 members.¹²

Currently, the lack of financial protection in health is considered to be a major problem in the health systems. For instance, households with cancer patients not only suffer from a disease burden, but they also suffer from the burden of catastrophic health expenditures.¹³ The economic damages associated with cancer were almost 895 million dollars which equaled 1.5% of the gross domestic production of the world's countries.

Cancer can be defined as paralysis in life as well as the patients' loss of several years of their lives. In 2008, cancer killed 7.6 million individuals. Annually, 12.4 million individuals are diagnosed with cancer. According to the American cancer association report, more than 2 percent of a country GDP was spent on death and disabilities caused by cancer. And a global economical cost of \$895 billion/year was caused by cancer.¹⁴ Groot et al. (2006) showed that treatment of stage I patients were the most cost-effective interventions and the least cost-effective one was stage IV treatment.¹⁵

Therefore, timely diagnosis of cancer, assessing and monitoring the expenses imposed on the health system due to this disease, and having knowledge about the factors which put a household at high risk of facing these costs can help the health system's policy makers in developing appropriate policies for this disease.

Currently, cancer is widespread throughout the world. According to WHO statistics, by 2020, almost 20 million individuals will have cancer, 60% of whom reside in developing countries. Furthermore, this group has a high contribution to the financial provision for the health system¹⁶ which, consequently, puts them at a high risk for experiencing catastrophic health expenditures. Therefore, considering the fact that no studies have been conducted on the numbers of households with cancer patients who face

catastrophic health expenditures in Iran, the present study aims to determine the percentage of households with cancer patients that face catastrophic health expenditures who have referred to Namazi Hospital, Shiraz, Iran. In addition, the affecting factors have been investigated.

Materials and Methods

This was a cross-sectional study. This study aimed to determine the catastrophic health expenditures of households with cancer patients; therefore, the research environment consisted of specialized treatment centers for cancer patients, such as chemotherapy and radiotherapy wards. We chose Namazi Hospital as the research environment because it is one of the main centers that provides chemotherapy and radiotherapy services. Namazi Hospital is affiliated with Shiraz University of Medical Sciences. In addition, the statistical community of the study has included households with cancer patients who referred to the Chemotherapy Ward, Radiotherapy Ward, and Clinic for Cancer Patients during July, 2011.

Until now, there has been no similar research conducted on patients who suffer from cancer or other diseases in Iran. Therefore, in order to determine the sample size, we gathered data related to 180 households. Then, the data were analyzed by SPSS statistical software (v. 16). The results revealed that 20% of the households faced catastrophic health expenditures. We considered that $P=0.2$, $q=0.8$, $\alpha=0.05$, and an error of 5% to derive a sample size of 245 households for the present study.

In this study the samples were selected through simple random sampling. After referring to the intended wards, the researcher randomly interviewed patients who met the study's inclusion criteria and were interested in participating in the study. The data related to 245 households were collected. In case the data of the households were incomplete, the researcher contacted the households for a total of five times and if they did not respond, they were excluded from the study and replaced by another household. This study is approved by Shiraz University of medical sciences

ethics committee and the participant signed an informed consent form.

Research instruments

In the present study we used the World Health Survey (WHS) questionnaire for data collection. This questionnaire was designed by WHO in 2003 according to the three goals of health systems for assessing their performance. The WHS is the first survey program which emphasizes comparability in addition to reliability and validity. This questionnaire has been translated, revised, and pretested by six researchers who undertook a survey study in the 17th district of Tehran. The first version of the translated questionnaire included 80 pages which was decreased to 53 pages after being revised for six times. The reliability and the validity of the questionnaire have been confirmed.¹³ The WHS consists of two sections of household and individual questionnaires. Considering the aims of the present study, portions of the household questionnaire have been revised by the researcher and presented in two pages.

The questionnaire included the following: i. different sections of written consent completed by the interviewer; ii. information regarding the sampling such as the patient's file number, respondent, type of cancer, time since diagnosis, residence and phone number; iii. Information about further contacts that included the date of the contact, type of contact and number of contact; iv. information regarding the family size, age, sex, level of education, marital status, insurance status, type of insurance, and type of treatment; v. information regarding the household's monthly expenses, such as total household expenditure (EXP), food expenses, and health and treatment costs; and vi. information about healthcare expenses that included hospitalization, outpatient services, chemotherapy, radiotherapy, drugs, radiology, and laboratory analyses. In the next section of the questionnaire, the following question was posed: "How has the existence of a cancer patient in the family led the other family members to refrain from using healthcare services?".

Assessment of catastrophic health expenditures

Following WHO's approach, we measured catastrophic health expenditures by using the following data: EXP, household food expenses, and family size to determine the equivalent family size, per-capita food expenditure, subsistence expenditure (SE), CTP, and the ratio of health costs to payment costs for each household. At first, family size and food expenses were converted into the equivalent family size and per-capita food expenditure, respectively. In order to obtain the household's equivalent size, the real family size was powered by $\beta[0.56]$,¹⁷ while in order to obtain the household's per-capita food expenditure, the food expenses of the household was divided by the equivalent family size. Then, the ratio of food expenses to EXP was measured by dividing the food expenses by EXP and the households were ordered based on the obtained numbers. This number was considered to be the food poverty line in the research community. By taking this poverty line into account, each household's SE was measured according to the following formula:

$SE = \text{Equivalent family size} \times \text{measured poverty line}$

In order to determine whether a household was below or above the poverty line, the household's SE was compared to its EXP. Households with EXP values lower than SE were considered to be located below the poverty line.

In addition, each household's CTP was measured by the following formula:

$$CTP = SE - EXP$$

In case a household's SE was more than its food expenses, we replaced SE with food expenses in the above formula.

Then, the ratio of each household's health expenditure to its CTP was calculated. If the obtained number was more than 40%, the household was considered to have catastrophic health expenditures.¹²

We determined which households faced catastrophic health expenditures and measured the central indexes as well as their distributions and percentages, after which the chi-square test was used to determine the relationship between the

Table 1. Demographic characteristics of the study population.

Variable		Head of the household		Patient	
		Number	Percent	Number	Percent
Level of education	Illiterate	59	24.6	59	24.6
	Primary school	57	23.8	62	25.8
	Middle school	43	17.9	36	15
	High school	46	19.2	48	20
	University	34	14.2	34	14.2
Marital status	Single	3	1.3	27	11.3
	Married	207	86.3	186	77.5
	Divorced	5	1.2	3	1.3
	Widowed	24	10	24	10
Sex	Female	23	9.6	153	63.8
	Male	217	90.4	87	36.3
Mean age		53.9 years		49.4 years	
Median age		54 years		50 years	

study variables. A *P*-value of 5% was considered to be the significance level.

Results

Characteristics of households that faced catastrophic health expenditures

According to the results, 67.9% of the households with cancer patients had catastrophic health expenditures. As seen in Table 1, most of these households (71.7%) were comprised of 3-6 members. Most households were in the first economic quintile (87.9%), suffered from breast cancer (38.3%), were undergoing chemotherapy (65.8%), and lived in one of the cities of Fars Province other than Shiraz (44.6%).

The relationship between catastrophic health expenditures and study variables is presented in Table 2. The results revealed that the majority of households who did not faced with catastrophic expenditure use their current income (32%), receive insurance compensation (21%) and use their savings (12%) in order to cover the expenditure but households facing catastrophic health expenditure except using their current income (32%), adopt multiple strategies to provide money for the health services including borrowing money (22%) and receive insurance compensation (15%) selling properties (9%). These strategies were significantly different between households who faced catastrophic health expenditures and others.

Discussion

According to assessments based on the WHO proposed method and the threshold of 40% CTP, there were 163 (67.9%) out of 245 households with cancer patients who referred to the chemotherapy and radiotherapy wards of Namazi Hospital who had evidence of catastrophic health expenditures. This result has indicated that contrary to the assumption of the majority of the population and despite the high expenses of cancer patients' treatment, cancer is not considered a specific disease. Hence, cancer patients themselves are responsible for the expenses of long-term treatment of their disease.

The high costs of a cancer diagnosis and treatment can be one of the potential causes for catastrophic health expenditures in a high percentage of households. Another reason, however, may be the lack of sufficient information as well as statistics regarding the health expenses of special groups of patients. Policy makers' who lack knowledge about these groups may not consider them when making health-related policies. This study finding has differed from the results obtained by other studies conducted in Iran. In the national study⁶ and the studies performed in the 17th district of Tehran,¹² Tehran,¹⁸ and Kermanshah,¹⁹ the percentage of the households facing the catastrophic health expenditures was reported as 2.3%, 11.8%, 2.5%,

Table 2. The relationship between the presence of catastrophic health expenditures and study variables.

Variable	Faced with catastrophic health expenditures				P-value	
	Yes		No			
	Number	Percent	Number	Percent		
Head of household	Male	145	66.8	72	32.2	0.26
	Female	18	11	5	21.7	
Economic status	1 st quintile	143	67.8	68	32.2	0.72
	2 nd quintile	7	58.3	5	41.7	
	3 rd quintile	7	70	3	30	
	4 th quintile	3	100	0	0	
	5 th quintile	3	75	25	3	
Family size	1-2 members	46	28.2	29	38.7	0.12
	3-6 members	85	52	40	32	
	>7 members	32	19.6	8	20	
Insurance status	Covered by insurance	161	98.8	77	2.2	0.32
	Not covered by insurance	2	1.2	0	0	
Type of insurance	Social security insurance	53	62.4	32	37.6	0.04
	Medical services insurance	89	76.1	28	23.9	
	Relief committee insurance	4	80	1	20	
	Armed forces insurance	8	47.1	9	52.9	
	Other	8	53.3	7	46.7	
Type of cancer	Breast cancer	56	60.9	36	39.1	0.26
	Gastrointestinal cancer	33	75	11	25	
	Liver cancer	8	80	2	20	
	Other	66	70.2	28	29.8	
Type of treatment	Chemotherapy	117	74.1	41	25.9	0.01
	Radiotherapy	30	54.5	25	45.5	
	Both	16	59.3	11	40.7	
Using outpatient services		161	67	68	33	0.028
Refraining from using healthcare services	Too much	70	78.7	19	21.3	0.05
	Much	33	68.8	15	31.3	
	Average	18	62.1	11	37.9	
	A little	11	64.7	6	35.3	
	Too little	31	55.4	25	44.6	
Residence	Shiraz	57	63.3	33	36.7	0.04
	Other cities of Fars Province	81	57.7	26	24.3	
	Other provinces	24	57.1	187	42.9	

22.2% and 8.3%²⁰ respectively. The variations in these results might be due to differences in the study populations. The research communities of the other studies included all households at either the national or regional level, whereas the research community of the present study included

households that had at least one cancer patient. Therefore, the difference could be explained by taking the high expenses of diagnosis and treatment into account.

The results of the present study has revealed a significant relationship between catastrophic

health expenditures and residence ($P=0.04$). It should be noted that only a limited number of treatment centers provide healthcare services for cancer patients, which reduces the patients' power of choice and, at the same time, imposes large transportation costs on patients who reside in other cities.

According to the results of the study, 63.3% of the households who live in Shiraz and 57.7% of those who live in other cities of Fars Province face catastrophic health expenditures. In the same line, a significant relationship has been found between living in rural areas and catastrophic health expenditures in studies performed by Razavi et al. and Hatt.^{6,9} In 2009, Ghasvand et al. observed a significant relationship between living in Tehran and catastrophic health expenditures.²¹

The findings of the present study showed a significant correlation between the type of treatment and being faced with catastrophic health expenditures ($P=0.01$). Of patients who underwent chemotherapy, 74.1% faced catastrophic health expenditures. Until now, no studies have been conducted on cancer patients that assessed their catastrophic health expenditures, the factors affecting these expenditures, and determining its relationship with the type of treatment.

In the present study, type of insurance and its covered services were a determining factor in facing catastrophic health expenditures ($P=0.04$). If services related to diagnosis and treatments of cancer are not covered by insurance, the household has to devote a higher percentage of its CTP to health services. We observed that 80% of patients covered by Relief Committee insurance were faced with catastrophic health expenditures. It may be because households which covered by Imam relief committee are in lower economic quintile and in other words their ability of pay are less than others.

According to the findings of the present study the use of healthcare services, such as outpatient services, was another determining factor in facing the catastrophic health expenditures ($P=0.028$). The probability of being faced with catastrophic health expenditures was higher in households

which used outpatient services more frequently. Cancer is a chronic disease with a long treatment process for which cancer patients need to be frequently cared for and monitored, therefore these patients have to pay frequent visits to their physicians. In addition to paying regular visits to oncologists, cancer patients have to refer to other specialists and make use of nursing care services because of potential susceptibility to infections since they are physically weak. This imposes enormous costs for households with cancer patients. The results of a study performed by Kavosi et al. have also confirmed the relationship between the use of outpatient services and facing catastrophic health expenditures. They determined that as the number of times patients used these services increased, the probability of being faced with catastrophic health expenditures also increased.¹²

We observed a significant relationship between being faced with catastrophic health expenditures and other family members' refraining from using healthcare services ($P=0.05$). A total of 78.7% of households which had refrained from using healthcare services faced catastrophic health expenditures and 67.9% of those facing with catastrophic health expenditures had refrained from using healthcare services. This can be an alarm that in order to save money for cancer patient, other members of family may reduce using health care services and in turn their quality of life may decrease.

Although 97.1% of the households with cancer patients and 75% of those who faced catastrophic health expenditures were located in the last economic quintile, there was no significant relationship between the household's economic status and being faced with catastrophic health expenditures ($P=0.72$). This finding has supported results of other studies, particularly in developing countries.²³⁻²⁵ As a household's economic status improves, the probability of being faced with catastrophic health expenditures decreases. Bonusekhar et al. have conducted a study in India which showed that all households in the last stratum as well as 99% of those in the second

stratum paid greater than 40% of their CTP for maternal health expenses.²⁶

There was no significant relationship between family size and being faced with catastrophic health expenditures ($P=0.12$), which was consistent with the findings of studies performed in the 17th district of Tehran and Thailand.¹² On the contrary, there was a significant correlation observed between the two variables in the studies performed by Ghiasvand and Mehara.^{18,21} Ahmed conducted a study which confirmed that family size was a major factor in increasing the possibility of being faced with catastrophic health expenditures.²⁷

We observed no significant relationship between the head of the household's gender and facing catastrophic health expenditures ($P=0.26$). However a significant correlation was observed between the two variables in the study performed in the 17th district of Tehran¹² as well as the study conducted by Ghiasvand.²² The findings of Karami's study showed that the heads of 11.9% of the households who faced catastrophic health expenditures were female.¹⁹

Generally, after being faced with incidents that reduce income resources, households make use of coping strategies in order to maintain an appropriate level of consumption. They also follow different methods for using healthcare services and, particularly, paying for catastrophic health expenditures. These strategies can include use of savings, selling family assets such as jewelry, working children and a decrease in purchasing food.²⁸ In the present study 95% of households used different strategies such as savings, receiving indemnification from insurance companies, borrowing money from either acquaintances or strangers and selling their properties in addition to using their current income in order to pay for health expenses. There were a significant number of households who faced catastrophic health expenditures that used supplemental insurance and borrowed money from their acquaintances. These households used the strategy of saving significantly less than other households ($P=0.01$), which might be due to the fact that such

households have no savings to use. In a study conducted by Kavosi et al. in the 17th district of Tehran, the households that faced catastrophic health expenditures used the strategy of borrowing money from others significantly more than other households.¹²

In the present study, the households that faced catastrophic health expenditures used the strategy of borrowing money from their acquaintances more frequently compared to other households ($P=0.006$). Studies conducted in other countries also reported that borrowing money²⁹⁻³¹ and selling properties³²⁻³⁵ were considered the dominant strategies used for consumption smoothing at times health shocks occur. In Karami's study the strategies of borrowing money from the acquaintances (47.6%), selling properties (21.4%), and saving (16.7%) were used by households that faced catastrophic health expenditures in order to cope with these costs.¹⁹ However, some of these strategies have caused households to fall deeper into poverty. For instance, the results of the study conducted in Cambodia showed that households made use of loans with high interests in order to treat their diseases, which caused them to remain indebted for a long period of time.³⁶ In some cases, although the strategies used for coping with health expenses were not quite tangible they had a highly undesirable effect on these households. Those who lacked sufficient properties, savings, or access to social networks for gaining assistance used their current income to pay for health expenses. In doing so, these households used other expenses, such as the expenses of children's education and clothing, to increase their CTP which would have a long-term negative effect on the household's social status. Therefore, the catastrophic health expenditures not only gave instantaneous shocks to the households, but they may also lead them to poverty as a result of the strategies used for coping with these expenses.

Conclusion

The results of the present study showed that the health system has not achieved the goal of

equity with regard to the households' contribution to financial provision for the health system. Evidence showed that although several attempts have been made, they were unsuccessful due to the catastrophic expenditures of treating cancer patients. As a result, a large number of households with cancer patients have financial problems when providing for their treatment expenses. Therefore, the health system must pay special attention to such patients and, at the same time, consider supportive attempts such as fee exemption and special insurance benefit package in order to reduce the patients' contribution in paying for these expenses.

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Conflict of Interest

No conflict of interest is declared.

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