Effects of Health Out-of-Pocket Payment on HouseHolds in Iran; Catastrophic and Impoverishment: Population Based Study in Tehran (2012)

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Abstract: Achieve to fairness financing system, protecting households against the consequences of health expenditures, and finally, ensuring equity in health services utilization are main challenges of health systems .Lack of protecting households with low capacity to pay (CTP) will inflict irreparable damage on them, and may bring their life to the end. The present study aimed to determine the effects of out-of-pocket payment for health care services on households in Tehran (2013). This cross-sectional study was conducted in Tehran in 2013. The studied population comprised 2200 households living in Tehran. Data were gathered through interviews, and questionnaires regarding household health care utilization and the related costs were used as data collection instruments. Catastrophic health expenditure (CHE) approach, and impoverished health expenditure approach were used to determine the effects of Health out-of-pocket payments on the households. Moreover, to measure the inequalities in financing and utilization of health care, concentration indices and curves were applied. In order to estimate the effects of influential factors in catastrophic health expenditures, the logistic model were used. Also we used Excel and Stata11 software to Data analyze. According to the results of the current study, the concentration index for capacity to pay (0.128) and health care payments (0.375) implied inequality. The results also demonstrated that although the need for health care utilization has been concentrated in the poor (-0.297), inequality in receiving and using health care services has been distributed in favor of the rich (-0.250). Impoverished HHs due to health expenditures was calculated to be 4.83% among those households that used health cares and 3.6% for the whole studied households. Different levels of catastrophic health expenditures have occurred in the households using health care services, and also, among all the studied households, in various scenarios. Variables such as education status of household head, household size, and number of the times that outpatient health services had been used appeared to have a positive relationship with the incidence of catastrophic health expenditure, while preschool children living in HHs negatively associated with catastrophic health expenditure occurrence. Furthermore, insurance coverage was no significant correlation with preventing the catastrophic health expenditure. The necessity of developing strategies to guarantee poor the accessibility and provision of health services, and also to protect them against the consequences of health expenditures, is an imperative challenge which must be taken into consideration by health policymakers. Putting into operation comprehensive plans such as family physicians, defining service packages, revision in health insurance, and fixing payment systems, is a necessity.
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Introduction

Health, being one of the fundamental pillars of sustainable development, is considered as an inseparable part of it for improving the quality of life. In every society, every citizen is entitled to be provided with health care, which should not be affected by variables such as their income and wealth (1).World Health Report in 2000 emphasized the goals of providing desirable health, responding to public expectations and financial protection (fairness of financing) from health expenditures should be attained by health systems (2). To this end, health care systems should organize the required services, establish new sources for preparing those services, and guarantee financing of the services (3).

One of the challenges common to all social systems is to achieve equity in financial contribution, and prevent the risk of financial loss. Reaching these goals in the health system is of special importance and has its own problems, due to the unpredictable and catastrophic nature of the expenditures (4).

As one of the most important sectors, health sector plays a significant role in the presence or absence of poverty in society. Due to the high costs of services in this sector, neglecting supportive approach toward individuals covered by the community will, in many critical cases, push family's economy into poverty under financial pressure. This issue will, on the one hand, lead to the departure of healthy workforce from society, and on the other hand increase the number of poor families in country (5).

Today, health system is considered as on of the world's greatest economic sector. According to the World Health Organization report, universal health care Expenditures in 2007 have been more than 5.3 trillion dollars, 35% of which was covered by public government expenditure on health, 25% by social insurance, 18% by private insurance, 18% by out-of-pocket payment, and 4% by others. In addition, the share of out-of-pocket payment for health care in low-income countries is very high, and inequity in financing is highlighted (6).

Paying attention to household out-of-pocket payments, and the subsequent incidence of catastrophic health expenditures are two important factors which must be always given serious consideration while preparing for health service planning and policy-making (7).

Substantial inequality arises when families catastrophically spend a huge portion of their family income on medical care (8). There is no general consensus on the threshold above which health care expenditures are called catastrophic (9). The World Health Organization has explained the 40-percent reduction in family's capacity to pay to be due to paying for catastrophic health care services (10).

In different countries, the proportion of families facing catastrophic health expenditures varies, depending on health care services, and economic status and structure of the country (9, 11). Reports indicate the range of 0.01% for the Czech Republic, to 10.5% for Brazil and Vietnam [10]. Two studies whose data had been reported in the form of smaller nationalities, reported the highest proportion of the families facing catastrophic health expenditure to be in Burkina Faso (6 to 15%) and Brazil (12%) (12, 13).

The issues of poverty and health are closely intertwined. Poverty has tremendous impacts on health outcomes, but more importantly, poverty levels are closely associated with investment in public health; so, public financing of health care is essential to prevent poverty. For example, the health care system in India is one of the world's most private and unfair health care systems, which, all by itself, has led to high levels of poverty in this country. Thus, to improve health care outcomes and equality in access to Health services in this country, it is crucial that the public health expenditures be increased (14). Therefore, social health protection will lead to the improved health indices, guarantee appropriate standards of living, and prevent many people from becoming poor (15). Furthermore, poverty causes fall in the purchasing power of individuals, increased probability of becoming ill as a result of poor and inadequate nutrition, inability to afford medical care, especially in areas where consumer payment is demanded, and frailty and weakness, there by decreased ability to work (16). So, all health and poverty indicators are associated with incomes of individuals (17).

When people anywhere in the world, have no choice but to use the services and where there is no properly functioning financial system, people incur enormous costs which are sometimes catastrophic and can never be compensated for, sell their assets, spend their savings, and become burdened with debt(18).

Discussion around the effect of out-of-pocket payment prices on the health and poverty outcomes was so intense that, in 2005, the Member States of WHO passed a resolution encouraging countries to develop health financing systems aimed at providing comprehensive coverage of primitive, preventive, curative and rehabilitative services at an affordable cost (19).

Considering all this, almost 44 million households, or more than 150 million people are facing catastrophic health expenditures, 25 million households, or 100 million of whom are being pushed toward poverty by paying for health services (20). The famous study of the World Bank on fifty poor countries known as "Voices of The Poor" revealed that lack of health and existence of disease, being a universal pain, are due to poverty and, in particular, the costs for health care. Documents of the article "Voices of The Poor" are based on a 26-year-old Vietnamese man whose daughter develops a serious disease and because of huge cost of medical care, he, although being a man of fortune, turns into a poor man in his community to meet the cost of her daughter's disease (21). It also refers to a 30-year-old Indian mother who is forced to sell her house and land and walk for 10 kilometers daily, carrying woods on her head in order to afford the expenses needed for treating her husband's diabetes (22).

A major challenge in the field of equity and fairness remains to be present in The Islamic Republic

of Iran, despite spending huge amounts of money in the health sector. Review of the domestic studies indicates that the government spending on the public sector has increased approximately more than 172 times over the past two decades, while allocating the health sector funds to current prices has grown by 85 times. Direct out-of-pocket payments comprise a substantial portion of health care financings, and annually make almost 1.8 percent of the society population fall below the poverty line (23). In 2008, health expenditures in The Islamic Republic of Iran accounted for about 5.8 percent of the gross domestic product (GDP). Meanwhile, private sector and government expenditures on health were 61 and 39%, respectively, so that the out-of-pocket payment made up more than 53.6 percent of the total health expenditure. Health expenditureper capita was $290, and the share of government and private sector in financing was 28 and 73%, respectively, in which out-of-pocket payment plays a highlighted role (24). In addition, this suggests lack of financial protection of households against health expenditures, and challenges the issue of equity in using health care services. Furthermore, according to the latest WHO report, The Islamic Republic of Iran is ranked 112 in the world in terms of fair financial contributions (FFC) of households to health expenditures.

Considering the importance of the issue, imperative measures for financial protection of households against unexpected health expenditures, and eliminating inequities in utilization of health care have been taken in the Islamic Republic of Iran during recent years. Expansion of insurance coverage and preparing to execute the family physicians plan are among the key measures. The FFC index, as an indicator of fairness in financial contributions of households to health care financing, was clearly specified higher than 0.9 under article 90 of the Fourth Development Plan Law, to improve equity in health care accessibility and financing. In this regard, the population exposed to catastrophic health expenditures should be less than 1 percent (25). It is also clearly stated in article 34 of the Fifth National Development Plan that in order to achieve equity in health, people's direct expenditure for receiving health care should reach at last 30 percent of the total expenditure and people should be guaranteed equitable access to public health services (26). conducting this study and gather data about health care service financing and utilization can help health planners and policymakers obtain valuable information about proportionality between the financial burden that health expenditures impose on households and their income and financial power, decision-making for financial support and protection of those with low capacity to pay, and desirable health system responsiveness.

Materials and Method

This study was conducted in 2013 in Tehran. In this study, Ordinary households residing in Tehran during 1391 comprised research community. This study was designed as a cross-sectional study using a cluster-stratified sampling method. The sampling unit, here, was defined as urban ordinary household members who had lived in Tehran city for at least one year prior to the data collection date. Early studies showed that the proportion of households facing catastrophic health expenditures in Tehran had been reported to be 13% (27), so, 2200 households were selected to be studied (95% CI). Needed data were gathered through the world health surveys questionnaire for health systems performance assessment (28), and the Statistical Center of Iran household budget questionnaire (29). In this study, recall period was selected 4 weeks for outpatients and 1 year for inpatients.

Data collection was carried out through interviewing head of household, or someone who could supply the researcher with the required information for the research. In case of persons under the age of 18, and disabled or sick people who were not able to provide interviewers with the required information, head of the household (parent) was asked questions about them. When head of a household, or an aware person was not available at the time of the interview, the interviewers would arrange to go there again to gain information, and if the household was not available, or didn't want to cooperate, another household was replaced, instead.

Impoverished health expenditure approach

Here, subsistence spending of households was used to determine the poverty line, as follows:

1) The food expenditure share ($foodexp_h$) for each household is generated by dividing the household's food expenditure by its total expenditure.

$FoodExp_h = Food_h / Exp_h$

2) The equivalent household size for each household is generated as:

$Eqsize_h = hhsize_h^{0/56}$

3) equivalised food expenditures for each household is obtained from the following formula:

$Eqfood_h = food_h / eqsize_h$

4) The studied households are sorted according to thefood expenditure share of the totalhousehold expenditure, and divided into one hundred equal parts. Fiftieth percentile across the whole sample is selected.

5) Calculating mean of the food expenditure in the fiftieth percentile gives the subsistence

expenditure per capita, which is also the poverty line (PL).

6) The subsistence expenditure for each household is, separately, computed as:

$Se_h = pl * eqsize_h$

7) A household is regarded as poor (=1) when its total household expenditure is smaller than its subsistence spending, otherwise, it is considered as comfortable (=0) (30).

If $Exp_h < Se_h \rightarrow Poor_h = 1$

If $Exp_h \geq Se_h \rightarrow Poor_h = 0$

8) At this stage, those households that fall below the poverty line only because of the health expenditures are counted [31].

If $Exp_h \geq Se_h$, $Exp_H - oop_h < Se_h \rightarrow imPoverish_h = 1$

If $Exp_h \geq Se_h$, $Exp_H - oop_h \geq Se_h \rightarrow imPoverish_h = 0$

Catastrophic health expenditure approach

In order to use catastrophic health expenditures approach, it was necessary that the household financial contribution to health be calculated; so, it was generated as:

$$\frac{Total\ household\ health\ payment}{Income\ above\ the\ subsistence\ level,\ or\ capacity\ to\ pay} = \frac{Hex_H}{CTP_H} = \text{HFCH}$$

Where, household health care expenditure (Hex_H) includes prepayments for health care, private voluntary health insurance, and direct out-of-pocket health payments at the time of receiving health care.Moreover, the household's capacity to pay (CTP_H) is defined as the non-subsistence effective income of the household. Since many households refused to provide information about their income, or many others gave incorrect information, total household gross expenditure was applied instead of their income, in this study. Capacity to pay, for the households whose food expenditure is lower than the minimum subsistence spending, is generated by subtracting food expenditure from gross household expenditure (if $food_h < se_H \rightarrow CTP_H = Exp_H - food_h$). For the households who report food expenditure that is larger than the minimum subsistence spending, subtracting subsistence expenditures from their gross expenditure gives the household's capacity to pay (if $food_h \geq se_H \rightarrow CTP_H = Exp_H - se_H$) (30).

Food expenditure includes the total household spending on food, and the monetary value of food prepared and consumed by the household itself; it should be noted thatfood-away-from-home spending (e.g. for food purchased at hotels and restaurants), and expenditures on such cases as cigarettes, tobacco and alcohol are not (2).

Catastrophic heath expenditure occurs when the proportion of a household's health spending to the household's capacity to pay exceeds some threshold, which has been reported more than 5 to 20 % in certain studies [32-34]. Based on the World Health Organization theory, when exceeds 40% of household's capacity to pay, heath expenditures considered "catastrophic" (31, 35).

In the present research, the thresholds were determined as 10, 20, 30, 40 and 60%

Senario 1: if $Exp_H > 0.60\ CTP_H \rightarrow$ catastrophic=1, other=0

Senario 2: if $Exp_H > 0.40\ CTP_H \rightarrow$ catastrophic=1, other=0

Senario 3: if $Exp_H > 0.30\ CTP_H \rightarrow$ catastrophic=1, other=0

Senario 4: if $Exp_H > 0.20\ CTP_H \rightarrow$ catastrophic=1, other=0

The logistic model and Stata 11 software were applied, as indicated below, to estimate the probability and marginal effect of variables that affect on catastrophic health expenditure in households at threshold40%:

$$f(y_i) = \Pi_i^{y_i}(1-\Pi_i)^{1-y_i}$$

Where Y_i, being a dummy variable, can take on the values 1 and 0 (i.e. occurrence and nonoccurrence).

The probability that a household incurs catastrophic expenditure, or faces impoverished health expenditure, in this function, is:

$$p(y_i = 1/x_i) = \Pi_i$$

$$E(y/x) = p(y_i = 1/x_i) = \Pi_i = G(x_i'\beta)$$

$$(x_i'\beta) = \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n$$

$$G(x_i'\beta) = \frac{e^{x_i'\beta}}{1+e^{x_i'\beta}} \Rightarrow \Pi_i = \frac{e^{x_i'\beta}}{1+e^{x_i'\beta}}$$

The current model was estimated using the MLE method (12). In this equation, the procedure to calculate elasticity and marginal effects of the influential factors is as follows:

$$\frac{\partial(\Pi_i)}{\partial x_{1i}} = \frac{\partial G}{\partial x_i'\beta}.\frac{\partial(x_i'\beta)}{\partial x_1} = \frac{\partial G}{\partial x_i'\beta}.\beta_1$$

$$\frac{\partial G}{\partial x_i'\beta} = \frac{e^{x_i'\beta}(1+e^{x_i'\beta}) - e^{x_i'\beta}e^{x_i'\beta}}{(1+e^{x_i'\beta})^2} = \frac{e^{x_i'\beta}}{(1+e^{x_i'\beta})^2} = \frac{e^{x_i'\beta}}{1+e^{x_i'\beta}}.\frac{1}{1+e^{x_i'\beta}} = \Pi_i(1-\Pi_i)$$

$$\frac{\partial(\Pi_i)}{\partial x_{1i}} = \hat{\Pi}_i(1-\hat{\Pi}_i).\hat{\beta}_1$$

This shows what the probability that an individual will choose option 1 is, when the variable x_1 changes.

The following formula will be applied for determining the concentration index and measuring) of inequity, where X_i represents the cumulative proportion of any given variable to determine inequity, and Y_i denotes the cumulative proportion of population ranked by income from poorest to richest(35):

$$Gini=1-\sum_{i=1}^{n}(x_{i+1}+x_i)(y_{i+1}+y_i)$$

Results

Results of the study demonstrated that different levels of catastrophic health expenditure wase occurred among the households with health care utilization, and also among all of the studied households in various scenarios. Intensity of catastrophic health care expenditure is higher among households using health care service compared to the entire households. Number of the households facing catastrophic health expenditure has declined by changing scenarios and raising the thresholds (table 1).

Results also showed that health care expenditures has increased poverty and pushed many households below the poverty line, or some further into poverty. Poverty due to health expenditure (impoverished HHs) was estimated 4.83% for households with health care utilization, and 3.6% for the entire studied households (table 1).

Results indicated that, while considering households with healthcare utilization, the proportion of out-of-pocket payment for receiving health care service to the total household gross expenditure is higher for households contained in the fourth quintile compared to other quintiles. However, the proportion of out-of-pocket payment for receiving health care service to the household's capacity to pay is higher for the households in the first quintile than for those in the other quintiles.

The ratio of out-of-pocket payments for health insurance, or health care prepayment to total household gross costs, and also to the household's capacity to pay was highest in the first quintile. The lowest ratio was associated with the fourth quintile.

The ratio of out-of-Pocket payment for outpatient services to total household costs, and also to total household's capacity to pay was shown to be highest for the first quintile; while the fourth quintile had the highest Out-of-Pocket payment for inpatient services to total household costs, and also to total household's capacity to pay ratio.

The highest percentage for non-health expenditure share oftotal household costs and food expenditure share of total household costs belonged to the fifth and second quintiles, respectively. The highest number of the impoverished households due to health expenditure is concentrated in the first quintile.

The proportion of female to male household head is highest for households in the first quintile, and was lowest for those in the fourth quintile. Education status of household head has improved across the quintiles. Most of the household heads were middle-aged.The smallest proportion of household heads without health insurance coverage is associated with the fourth quintile. According to this study, the proportion of households with informal payments is highest in the first quintiles (table 2).

Although the probability of incurring catastrophic health expenditure decreases as the household level among the economic quintiles rises, and household economic status improves, their correlation is not statistically significant. Furthermore, inpatient health care services utilization and household head's health care insurance coverage were shown to have no significant correlation with occurrence or nonoccurrence of catastrophic health expenditure in households. The variables Education Status of Household Head, Household Size and Number of Outpatient Health Care Utilization appeared to have a positive relationship, at the 5% significance level, with the incidence of catastrophic health expenditure. At the 10% significance level, the variable Member with Chronic Illness in HH revealed a positive correlation with the incidence of catastrophic health expenditure, while the variable Preschool Children Living in HH demonstrated a significant negative relationship with it. Although household overload ratio revealed a positive correlation with household catastrophic health expenditure, this correlation was not significant at the 5% and 10% significance levels (table 3).

The kakwani index in this study was a negative number close to zero, which indicated that household health financing system is a regressive system. Poor people spend a more proportion of their income on health cares compared to rich people (Figure 1).

The concentration index for health care payment (0.375) and capacity to pay (0.128) implies inequality, as well (Figures 2, 3).

Also, Results demonstrated inequality in incurring catastrophic health expenditure (-0.53) and impoverished health expenditure (-0.324) to be detrimental to the poor (Figure 4, 5).

Results of the study also indicated that although the need for receiving or using health care has been concentrated in the poor (-0.297), inequality in

receiving and using health care service has been distributed in favor of the rich (-0.250). Although there exists a horizontal inequality in the use of health care services (0.046) in the studied population, it's not great enough to be discussed.

Discussion

Health care financing is a challenging and complicated issue in health care system and governance, which requires the attention of politicians, planners and health care service providers and users. Since health service users have a share in health care financing throgh out-of-pocket payments, equity in financing, and protecting poor households from the consequences of health expenditure (e.g. catastrophic health expenditure, impoverished health expenditure, borrowing money, getting loans, selling off necessary assets, and etc.) seem vital and of great importance.

Results of this study revealed that catastrophic health expenditure had occurred in various scenarios to different degrees .The incidence of catastrophic health expenditure ranged from 33.8% to 4.2% among households with health care utilization, depending on a threshold set between 10% and 60%. The occurrence of catastrophic health expenditure was calculated to be between 28.2 and 36% in all of the studied households. According to the threshold determined by the WHO, 8.5 percent of the households with health care service utilization, and 6.45 percent of the entire studied households incurred catastrophic health expenditure. One study in Burkina Faso demonstrated that facing catastrophic health expenditure existed in 8.1 to 18.87% of households with illness, and in 6.46 to 15.2% ofthe entire studied households as the catastrophic threshold was set 20 to 60%. According to a formula presented by the World Health Organization, 10.8% of households with disease and 8.66% of the whole studied households faced catastrophic health expenditure (12). Xu et al. found out, in a multi- analysis of countries that the proportion of households facing catastrophic health expenditure due to direct out-of-pocket payments varied considerably between different countries, with the proportion being 0.01% in The Czech Republic and Slovakia, to 10.5% in Vietnam. They declared that there are such developed organizations as social insurance organization and tax-based health systems, in developed countries to protect households from catastrophic health expenditure. Among the developed countries, only Portugal, Greece, Switzerland, and the U.S. had a 0.5-percent (0.5%) or more proportion of households facing catastrophic health expenditure. Catastrophic health expenditure had the highest rates in some of the countries in transition and certain Latin American countries (10, 36 and 41). In one study conducted by Yardim et al., 0.6% of total households in Turkey were facing catastrophic health expenditure. They stated that the same result was expected, because out-of-pocket health payment in Turkey, as a portion of total health expenditure, was approximately low (19.3%) in 2006 ─ three years after running the health systems reform program. It showed that most people in Turkey had benefitted from health insurance risk pools (42). Kavosi et al (43), Karami et al (44), Razavi et al (45), Sun et al (2006) (46), Gotsadze et al (2009) (47), and Limwattanons et al (48) have reported, in other studies, the proportion of households facing catastrophic health expenditure to be 11.8%, 22.2%, between 1.97% in 1992 and 2.32% in 2002, 8.98%, from 2.8% in 1999 to 11.7% in 2007,and finally 8 to 14%, respectively. Although facing catastrophic health expenditure existed to some extend in the mentioned studies, the differences in certain cases are significant. These differences can arise from differences in health care systems in the countries, characteristics and structures of population, socioeconomic status, size of the studied samples, and data collection instruments. Difference in socioeconomic status of households may contribute to these differences. Another important factor could be the validity of data collection instruments and methods. Data collection, as it is done typically for other purposes, may not be sufficient for analyzing health care expenditure. A highly specialized data collection instrument was used in this study, which reflected direct and indirect payments of each of the household members for outpatient and inpatient services of any kind with regard to the frequency of using the servicesand places they had gone to for receiving service. This instrument was of particular precision compared to the instruments used in other studies. What is important about the present study is that there exists a large gap between the results of this study and what is stated in the fourth and fifth development plan for ensuring fair accessibility and utilization of health care. This was quite unexpected and astonishing, because as well as the goals of Iran's fourth and fifth economic, social and cultural development plan for reducing CHE level are clear, Many major initiatives to reduce CHE have been passed throughout these courses, including offering inpatients insurance, and delivering free treatment and cares to those who are injured in accidents. It can be noted that our health system requires massive efforts vis-à-vis the responsibility of household financing and protecting households from health expenditure. Therefore, bringing about fundamental changes in the field of health financing should be high on the agenda of health planners and policymakers in Iran. The important issue that can be mentioned here is the staggering rise in health expenditure as a result of inflation on the one hand and sanctions on the other

hand, which has reinforced the upward trend in health expenditure and out-of-pocket payments. There's a high competition trend in Iran's health sector. Using modern and expensive technologies clearly increases CHE. Hence, policies aimed at reducing inequality in health care expenditures and their consequences should focus on social determinants of health and poverty reduction strategies. Results exhibited that while a huge portion of health service need and utilization is concentrated in households with middle and lower middle socioeconomic status, as indicated by inequality curves in Figure 6, distribution of catastrophic health expenditure and impoverished health expenditure (Figures 4 and 5), in addition to health expenditure share of total household costs and total HH capacity to pay, as shown in table 2, is concentrated in middle class and poor population of the study. In the study carried out by Sue et al. in Burkina Faso, rich households reported more disease and health care utilization compared to the poor, while facing catastrophic health expenditure for all of the chosen thresholds was significant in poor people and lower quintiles compared to the households with better economic status (12). Therefore, it is critical to protect lower middle population in terms of economic status in society, because they are in more need of health service, at more risk of developing diseases, and more likely to suffer dire consequences of out-of-pocket payment. Looking after Protecting the interests of these deprived groups should be considered in political rules to ensure their better access to health care service and higher levels of financial protection against the economic impact of disease. The key influential variables which had been mentioned in other studies were considered in the logistic model to determine the effects of influential factors on households' facing catastrophic health expenditure. However, some of the highly insignificant variables were removed, and finally, the estimation model was introduced as shown in table 3. In the primary model, certain key variables, such as a household member over 60 years, a disabled person living in the household, inpatient service utilization, dental service utilization, and gender of the household head (43, 49, 52, 51, 50, 12), which had been mentioned in other studies to have effect on the likelihood of households' facing catastrophic health expenditure, appeared to have high insignificance levels, and hence, were removed from the model due to having no effect on catastrophic health expenditure. Although household overload ratio played a role in increasing the likelihood of facing catastrophic health expenditure, this was not statistically significant in the final model. Household members over 65 and below 18 years old, and economically inactive people usually overload households financially, because they generally don't earn income and use health service more frequently. Changing the ranking and economic status of the households across the quintiles had a negative effect on facing catastrophic health expenditure, but it was not considered significant. On the contrary, this effect has been clearly evident in certain studies (12), and the positive effect of economic status on facing catastrophic health expenditure has been proven in some other studies (43, 53, and 54).Differences in household needs concentration, health care utilization concentration, capacity to pay among economic and demographic structures, and CHE distribution explain the above inconsistencies. According to the results of current study, there was a significant positive correlation between education status of household head and the likelihood of facing catastrophic health expenditure.Results of the study conducted by O'Donnell et al. in 2010 (55) confirm these findings. Higher education and greater awareness lead to a better understanding of health needs and consequently, serious follow-up to meet them. Tendency toward using advanced health care service, and paying no attention to traditional treatment methods, make many households spend a huge proportion of their capacity to pay on heavy health expenditure. The variable household size was also recognized as one of the key variables affecting the likelihood of facing catastrophic health expenditure. There was found no significant association between HH size and the likelihood of facing CHE in the study carried out by Kavosi et al. (43). However, results of the studies done by Su et al. (12), O'Donnell et al. (55), joglekar (51), and Pal (50) confirm this finding of the present study. It can be declared that rise in household size is likely to make the consequences of health expenditure unpleasant to households, probably by increasing the need to and the tendency toward health care service utilization on the one hand, and weakening household capacity to pay on the other hand.

Having member with chronic illness in household is another influential variable in the likelihood of facing catastrophic health expenditure. This finding is verified by results of the studies conducted by Su et al. (12), Barros (56), Gotsadze et al. (46), Merlis (57), and Water et al. (58). Health shocks exert a great impact on household utilization, and will impair household welfare. A household member with a chronic illness boosts the chance of rise in health expenditure as a result of continuous regular check-ups and taking drugs (medications) continuously. Consequently, the ratio of health expenditure to non-food non-health costs improves, and poverty and catastrophic health expenditure will follow (develop = arise).

One of the other variables which increases the likelihood of facing catastrophic health expenditure is frequency of outpatient health care utilization. Massive household size results in economies of scale for total household consumption and diseconomies of scale for health costs, and increases the frequency of household visits for receiving health care.

Although health insurance has had a significant positive effect on reducing catastrophic health expenditure in other studies (51, 53, 9 and 58), it didn't have a significant effect on reducing CHE in this study.Yet, in certain studies, health insurance is referred to as a factor responsible for facing catastrophic health expenditure and increased out-of-pocket health payment, through supplier-induced or applicant-induced demand (59 and 60). A substantial portion of the population in this study still has no health insurance coverage; insurance undertakings are not solemn and irrevocable enough. Some health care providers, in spite of entering into contract with insurers, do not commit themselves to abiding by the rules and laws. So many services are not contained in commitments of the insurer, yet. Most drugs are growing scarce due to the sanctions, and people are forced to make out-of-pocket payment to buy these drugs from legally-certified centers for offering them. It seems essential to provide a strong comprehensive insurance coverage, and define specific service packages right across the country under careful surveillance and monitoring.

Results of the present study revealed that health expenditure has pushed a considerable percentage (proportion) of households (4.83% of the households with health care utilization, and 3.6% of total studied households) into poverty, and even further into poverty. Wagstaff, A. and E. Doorslaer studied health care payments and poverty in Vietnam during 1993 and 1998. Although the difference between poor population before and after out-of-pocket payment for receiving health care is 3.5%, the difference between poverty gap before and after payment is about 1%. The difference between poor population before payment and after that was 4.4%. Health expenditures concentration index and the negative Kakwani index suggest that the poor spend a higher portion of their income on health compared to the rich, and that's why they fall deeper into poverty in comparison with the rich.

Conclusion

The proportions of households facing catastrophic health expenditure in various scenarios, poor households before health payments, and households facing poverty due to health expenditure were indicated in this study. The study also demonstrated that such variables as education status of household head, having household member with chronic illness, need and utilization concentration in households with low socioeconomic status, and the extent of household size play a key role in household's facing catastrophic health expenditure.The current study showed how the health insurance system doesn't perform well in protecting the poor, and requires immediate successful intervention and planning. The present study revealed some degree of inequality in out-of-pocket payment, health need and utilization, capacity to pay, catastrophic health expenditure, and impoverished health expenditure, along with a regressive financing system. Appropriate policymaking in the field of health financing by those in charge of health of the country, and protecting the people with low capacity to pay are crucially important. Further efforts are needed in the society to diminish medical costs for certain groups of deprived people, especially for the poor.

Competing Interests

The authors declare that there is no conflict of interests.

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Table1: Prevalence of Poor, Catastrophic and impoverishment Health Expenditure

Catastrophic threshold	Households with Health Service utilization (N=1284)	Total Households (N=2200)
≥10٪Of CTP	33.8	28.2
≥20٪Of CTP	19	14.7
≥30٪Of CTP	12.14	9.54
≥40٪Of CTP	8.5	6.45
≥60٪Of CTP	4.2	3.36
Impoverishe	4.83	3.6
Percent of Poor HH In Total Studied Households	Before Out-of-Pocket payment	after Out-of-Pocket payment
	36.72	40.32
Percent of poor Households in Households with healthcare utilization	Before Out-of-Pocket payment for receive care	After Out-of-Pocket payment for receive care
	34.9	39.73

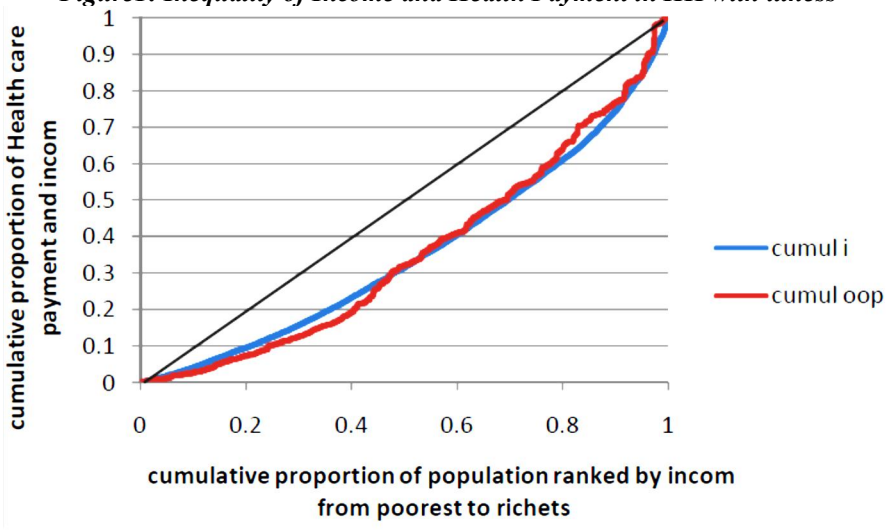
Table2: Distribution of Some Characteristics of Households with Health Care Utilization across the Expenditure Quintiles

Characteristics		**Expenditure Quintiles**				
		Q_1	**Q_2**	**Q_3**	**Q_4**	Q_5
Per capita Expenditure		13969100R	19766530R	38085680R	62515880R	74585360R
Per capita Out-of-Pocket		774950R	1274440R	1953150R	4416180R	1067200R
ratio of total HH Health Out-of-Pocket payment to total HH costs		0.059	0.061	0.055	0.075	0.016
ratio of total HH Health Out-of-Pocket payments to HH CTP		0.12	0. 1	0.079	0.096	0.019
Paying for Health insurance as٪ of total HH Costs		2.83	2.8	2.15	0.24	1.2
Paying for Health insurance as ٪of total HH CTP		5.74	4.67	2.67	0. 33	1.4
Out-of-Pocket payment for outpatient services as ٪ of total HH Costs		0.85	0.61	0.75	0.63	0.08
Out-of-Pocket payment for outpatient services as ٪of total HH CTP		1.75	1	1.08	0.8	0.1
Out-of-Pocket payment for inpatient services as ٪of total HH Costs		2.22	2.73	2.6	6.7	0.35
Out-of-Pocket payment for inpatient services as ٪of total HH CTP		4.58	4.53	3.75	8.47	0.41
٪Non health Expenditures share in HH total costs		94.1	93.8	94.5	92.45	98.4
٪Food Expenditures share in HH total costs		40.3	43.17	30.63	34.22	14.05
No of poor households before Health Out-of-Pocket		430	18	0	0	0
No of poor households after Health Out-of-Pocket		466	36	4	4	0
No of impoverished HHs		36	18	4	4	0
No of Households with Catastrophic:	٪10	258	146	22	8	0
	٪20	162	168	10	4	0
	٪30	110	34	8	4	0
	٪40	76	22	6	4	0
	٪60	36	14	0	4	0
Gender of HH Head	Male	596	442	102	36	18
	Female	58	26	4	0	2
Education status of HH Head	Primary	260	110	30	6	0
	Secondary	222	148	26	16	6
	High	172	210	50	14	14
Age status of HH Head	Under 40	206	86	18	8	2
	40-60	306	312	76	14	4
	more than60	142	70	12	14	14
Health insurance of HH Head	Have	494	384	86	32	16
	Not Have	158	84	20	4	4
Employment status of HH Head:	employ	462	334	78	22	14
	Not employ	192	134	28	14	6
Disable Person in HH	Yes	14	20	2	2	0
	No	640	448	104	34	20
Member with chronic illness in HH	Yes	76	100	16	14	0
	No	578	368	90	22	20
65+ member living in HH	Yes	148	74	12	10	12
	No	506	394	94	26	8
Younger than 14 in HH	Yes	22	132	26	6	4
	No	442	336	80	30	16
Use of GP Service in HH	Yes	184	134	48	12	2
	No	470	334	58	24	18
Use inpatient service in HH	Yes	186	180	46	14	4
	No	468	288	60	22	16
Use of SP service in HH	Yes	310	182	38	14	8
	No	344	286	68	22	12
Used of Dentist service in HH	Yes	92	86	12	2	0
	No	562	382	94	34	20
HH Had Informal payment in Health Care	Have	38	30	4	2	0
	Not Have	616	438	102	34	20
Preschool children living in HH	Yes	90	58	6	4	2
	no	564	410	100	32	18

Table3: Effects of Some Household Characteristics on Catastrophic Health Expenditure (Threshold 40٪)

Variable	coefficient	sig	Marginal Effect
Economic Characteristics:			
HH overload ratio	0.34	1.84	0.92
Quintile			
2	-.492	0.325	-0.71
3	-1.12	0.647	-0.84
4	-2.18	1.00	-1
5(empty)			
Illness and treatment:			
Having Member with chronic illness	0.978	0.071	0.038
Use inpatient Service	0.75	0.43	0.029
Number of outpatient use	0.6	0.01	0.023
Household Characteristics:			
Preschool Children in HH	-1.92	0.72	-0.078
Size of HH:			
1-2member			
3-6member	2	0.00	0.09
More than7	3.03	0.014	0.13
Health insurance of HH Head	-0.43	1.27	-0.56
HH Head Education:			
Primary			
secondary	1.43	0.002	0.051
High	1.1	0.022	0.037

Figure1: Inequality of Income and Health Payment in HH with illness



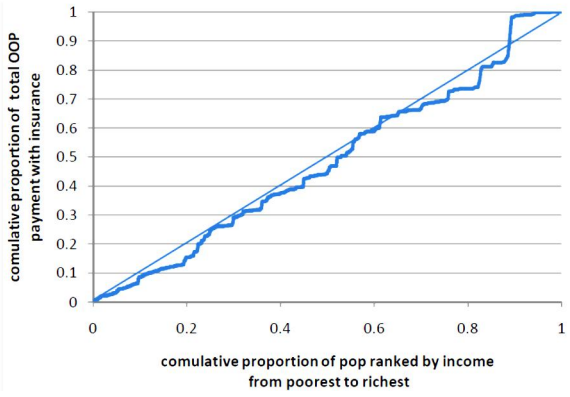


Figure3: Inequality of CTP in HH with illness

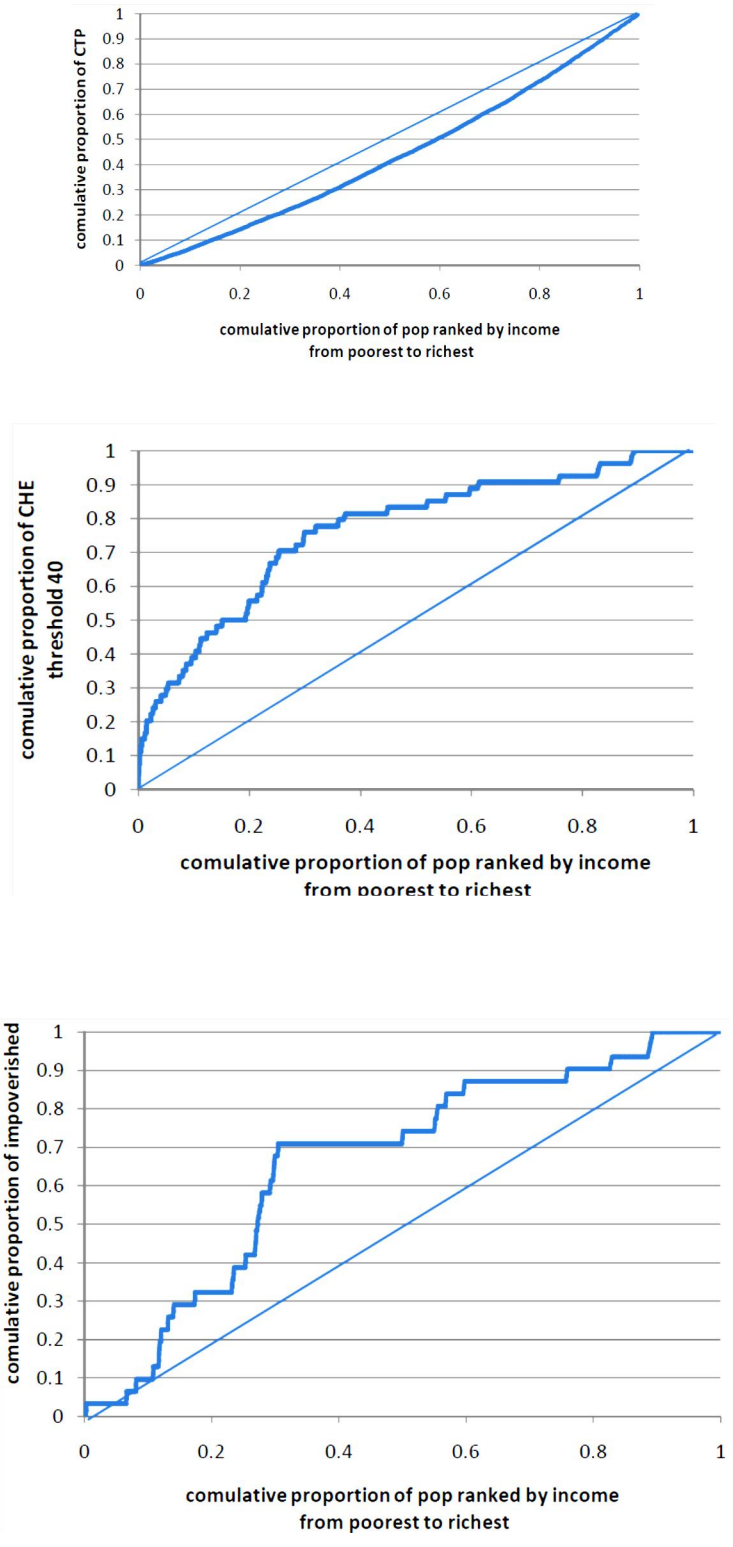
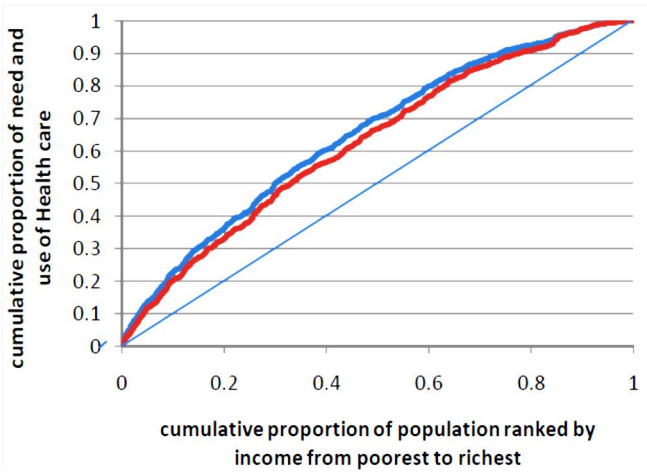


Figure6: Inequality of need and use of Health Services in HHs



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