

Assessing the Catastrophic Health Expenditure and Impoverishment in Iran in 2012 and 2015 (Before and After the Implementation of HTP in Iran)

Ali Maher¹, Zahra Fazel*²

¹Department of Health Policy, school of management and medical education, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran.

²Department of Economic, Alzahra University, Tehran, IR Iran.

*Correspondence: Fazel Z. (z.fazel110@yahoo.com)

Abstract

Introduction: Healthcare in many developing countries is predominantly funded through out-of-pocket spending by households. Providing financial protection from exorbitant out-of-pocket expenses is an important tool for a country's health system to ensure equitable access to care. Although, Iran has made great achievements in Health Sector and health financing after the implementation of Health Transformation Plan, there are still some provinces and expenditure groups which suffered from health payments and pushed them under poverty line. This study aimed to compare the rates of households with CHE and the effect of health spending on national poverty estimates before and after the implementation of HTP in Iran.

Methods: statistical data were acquired from two surveys conducted by Iran statistic Centre (2012 and 2015). Catastrophic health expenditures are defined an excess of out-of-pocket payments for health care at the various thresholds for household total expenditure (capacity to pay). For an estimate of the impoverishment effect, the national poverty line is used.

Results: About 10.476 and 3.122 % of total households suffered from catastrophic health expenditures, when the threshold is 10 % of the total household expenditure in 2012 and 2015, respectively. At the threshold of 40 % of capacity to pay, 1.249 (2012) and 0.283 % (2015) of the total household incurred catastrophic health expenditures. As it is clear, the CHE index decreased dramatically after the implementation of HTP. About 611 and 5895 households were forced into poverty due to paying for health care in 2012 and 2015, respectively. Therefore, impoverishment increased after HTP in Iran, significantly.

Conclusions: Despite the high achievements of HTP in Iran, a significant proportion of the population was forced into poverty due to out-of-pocket payments for health care. The Iranian government should pay more attention to the actual conditions in different provinces, further to make policy decisions according to the local knowledge.

Keyword: Catastrophic health expenditure, Impoverishment, Financial protection, Iran.

Received: 20 August 2019 **Published:** 11 October 2019



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/).



Health Economics Association of Iran

1. Introduction

The fundamental goal of a healthcare system is to ensure that people have access to high-quality care. At the same time, the system should protect households from incurring healthcare expenditures that are high enough in relation to incomes that they adversely affect households' economic well-being. In many low- and middle-income countries, out-of-pocket (OOP) expenditure is the biggest source of healthcare financing (1). In fact, it had estimated that approximately 150 million people globally are facing catastrophic expenditure annually because of high payments for health services (2).

According to the World Health Organization (WHO, 2000), direct OOP payment at point of service is an inequitable way to finance a health system because it burdens social groups unequally, especially the poor and the elderly. In such a health system, the greatest financial burden tends to be placed on the household, and if the cost of healthcare exceeds the ability to pay at time of service, the likely response is to avoid or delay seeking necessary care. Families are often forced to choose between saving members from illness and suffering by purchasing healthcare and satisfying other basic needs such as education, food, and housing (3). Thus, health spending, especially catastrophic expenditure, can be an important additional source of poverty (4, 5, 6).

In fact, good health, protection from diseases and quality medical care are necessary for human personal development and survival. Improved quality of life in any country depends highly on the availability and accessibility to healthcare facilities at affordable costs. In line with Health Transformation Plan (HTP), the 11th government is committed to implementing strategic interventions aimed improve the following areas: notable percentage of uninsured individuals (around 17% in 2010) (7-9), inequitable health financing with a fair financing contribution index (FFCI) of 0.832, OOP payments of more than 50% and around 2.5% catastrophic payments (10-15) and even more pessimistic estimates for FFCI and catastrophic payments in local studies (16,17). Also, there is evidence of high amounts of informal payments (18). Employer-sponsored health insurance systems in Iran were not able to equally protect people

from catastrophic payments (14). On the other hand, previous interventions such as the Urban Inpatient Insurance Scheme (launched in 2000) and the Rural Health Insurance Scheme (launched in 2005) had regressive impacts on the distribution of healthcare financing in Iran (19, 20).

Assessments of catastrophic health expenditures show the impact of these costs on poor households. While some studies consider the share of OOP expenditure in a household, others measure the incidence and extent of OOP health expenditures across countries of different economic status (6, 21-24). Others evaluate both actual and potential incidence of catastrophic expenditure (22). Saksena et al. (2006) brings out the difference between households that seek healthcare and those that do not. These studies conclude that catastrophic health expenditures increase the likelihood of a household to slide into poverty but has not looked at the determinants of catastrophic health expenditures and impoverishment and the distribution at sub national levels. Studies on catastrophic health expenditures and impoverishment done in Iran have not estimated the incidence of catastrophic health expenditure and impoverishment at regional and quintiles' level. This study proposes to fill the identified information gap and do a comparison to the national, regional and quintiles estimates of catastrophic health expenditures and impoverishment.

The study seeks to assess health expenditure taking into account health being a devolved function the country and existence of county variation in socio-economic characteristics. Because of future prospects of growth and development, it is important to provide information to policy makers in programming –health expenditures that are catastrophic leading to poverty.

2. Methods

2.1. Data

Data used in this paper was obtained from two national repeated cross-sectional surveys on annual income and expenditure surveys. These surveys are annually run by Iran Statistics Center (ISC). The survey used a standard questionnaire which consisted of a wide range of questions on household income,

expenditure, consumption as well as health care payments. A total of 18500 households are included in the survey in 2012 and 17649 households in 2015. The detailed household characteristics were described in the ISC reports, as well.

In this study, the household expenditure data is used as a substitute of the actual amount of household income and the calculation domain is not limited to the whole country, but also being investigated for the expenditure quintiles and geographical regions of the Iranian households. Separation by quintiles and regions provides a better understanding of the inequalities in detail.

2.2. Measuring catastrophic health expenditure

Catastrophic health expenditure occurs if OOP payments for health care exceed a particular threshold of a household’s resources: income, expenditure or consumption (6, 25).

However, it is well known that there is a limitation in using total household expenditure as an indicator for household resources, considering that low-income households may have low OOP for health care due to the fact that the vast majority of resources are spent on food and basic survival. Thus, if households are not able to meet catastrophic health payments, we may underestimate the burden of OOP payments for health care. A partial solution is to estimate catastrophic health expenditure if health care costs exceeds the chosen threshold of household non-food expenditure (25). Household non-food expenditures is also known as “non-discretionary expenditure” (6) or “capacity to pay” (26). It is measured as the difference between total household expenditure and household food expenditure. Hereafter, we use the term “capacity to pay”, and in this paper we use both “total household expenditure” and “capacity to pay” as living standard indicators.

If x is the total household expenditure, $nf(x)$ is capacity to pay, T is OOP payments for health care, z is a given threshold, and thus a household incurs catastrophic health expenditure if T/x , or $T/nf(x)$ exceeds z (25).

In the literature commonly used threshold values (z) are 10% for total household expenditure and 40% for capacity to pay (25). However, in this paper we also use additional thresholds in order to investigate

potential consequences and robustness in the interpretations of the results.

2.3. Measuring incidence and intensity of catastrophic payments

The incidence (H) of catastrophic payments can be expressed by head count. It is obtained by the proportion of households that incurred catastrophic payments and is estimated by the formula below (25).

$$H = \frac{1}{N} \sum_{i=1}^N E_i$$

Where N is the sample size. E is an indicator such that $E_i = 1$ if $\frac{T_i}{x_i} > z$, and otherwise zero.

The head count cannot capture the magnitude by which household OOP payments exceed the given threshold. While, the catastrophic payments overshoot, O , denotes the average extent to which health payments exceeds the chosen threshold for households that incurred catastrophic expenditures. The household overshoot is estimated as follows (25):

$$O_i = E_i \left(\left(\frac{T_i}{x_i} \right) - Z \right)$$

Then, the average of the overshoot is simply written as:

$$O = \frac{1}{N} \sum_{i=1}^N O_i$$

Briefly, H refers to the incidence of catastrophic payments, whereas O is the intensity of catastrophic payments. Both measures, H and O , are insensitive to the distribution of catastrophic payments. It is evident that the consequences of catastrophic health expenditures for rich and poor are different. We used concentration indices, CE and CO , for E_i and O_i , respectively, to measure the distribution of catastrophic payments in relation to household expenditures. The concentration indices fall between -1 and $+1$. Positive/negative CE indicates the better-

off/worse-off are more likely to exceed the chosen threshold. Analogously, the overshoot is concentrated among the rich/ poor if CO is positive/negative.

The weighted head count and overshoot measures can easily be estimated as follows (6):

$$\begin{aligned} H^w &= H \cdot (1 - C_e) \\ O^w &= O \cdot (1 - C_o) \end{aligned}$$

The weighted head count and overshoot measures show the impact of OOP when different weights are given to households depending on expenditure level (25). The households with the lowest expenditures are weighted by 2, and the households with the highest expenditures are weighted by 0, and the weight decreases with higher household expenditures.

If the concentration index (C_e) is negative, the weighted head count (H^w) is greater than the head count (H) (25).

All of the measures in terms of capacity to pay were estimated as the replacement of total household expenditure, xi , by capacity to pay, $nf(xi)$, in the above indicated equations.

2.4. Health care payments and poverty

A high OOP payment for health care may push households into poverty. In practice, a number of people who are forced into poverty by the need to pay for health services are not included in the national poverty measurement as poor households.

Impoverishment effect of OOP payments for health care can be obtained by the difference between a poverty level with the gross of OOP payments (before health care payments) and a poverty level with the net of OOP payments (after health care payments). First, we estimated the gross of the health payments poverty ratio (HP^{gross}). This gives the percentage of the population living below the poverty line before health payments (25);

$$HP^{gross} = \frac{\sum_{i=1}^N S_i p_i^{gross}}{\sum_{i=1}^N S_i}$$

Where p_i^{gross} is equal to 1 if the per capita total expenditure of household (yi) is less than the poverty line and otherwise 0. S_i denotes the household size

and N indicates the number of households in the sample.

The next measure is a gross of health payments individual-level poverty gap, which is estimated as follows:

$$g_i^{gross} = p_i^{gross} (PL - y_i)$$

PL refers the poverty line. Based on the equation 7, the mean of poverty gap is simply found as:

$$G^{gross} = \frac{\sum_{i=1}^N S_i g_i^{gross}}{\sum_{i=1}^N S_i}$$

The net of health payments head count can be estimated by replacing p_i^{gross} with p_i^{net} in the equation 6.

Where p_i^{net} is equal to 1 if the per capita total expenditure of the household is less than the poverty line and the net of the health payments poverty gap is estimated as the replacement of g_i^{gross} by g_i^{net} in the equation 8 with

$$g_i^{net} = p_i^{net} (PL - y_i)$$

A normalized poverty gap, which enables us to make international comparisons across countries with different poverty lines and currency units, is estimated as follows:

$$NG^{gross} = G^{gross} / PL$$

2.5. Poverty line

In order to estimate the above-mentioned poverty measures, a poverty line should be set. We used the Iranian national poverty line, which was estimated in our study in every quintiles and regions, separately. This poverty line was estimated based on WHO formula, this is as follows:

Given the economy scale of household consumption, equivalence scale was used instead of actual household size in CTP calculation:

$$eqsize_h = (size_h)^{0.56}$$

Where “size_h” is actual household size and eqsize_h is equivalence size of the household. Based on a similar study on 59 countries, β was considered to be 0.56 (27).

One also needs to calculate poverty line (PL), which is a minimum spending to protect the basic needs (i.e. subsistence spending). The PL was calculated based on households’ food share. For this end, mean of absolute food expenditure was calculated for households whose food share of total household expenditure ranged from 45 to 55%. The PL was separately measured for households as shown below:

$$eqfood_h = \frac{food_h}{eqsize_h}$$

$$Pl = \frac{\sum w_h * eqfood_h}{\sum w_h} \quad food_{45} < food_{exp_h} < food_{55}$$

Where w_h is sampling weight of households and Pl stands for poverty line.

3. Results

3.1. The distribution of OOP

The distribution of OOP health payments (USD) in different regions is shown in Fig.1. According to our findings, out-of-pocket payments had decreased in urban areas after HTP. The average OOP expenditure in urban areas in 2012 of about US \$3001484 was over two times as many as those in 2015 (US \$1135799), the average OOP expenditure per capita was \$604500.2 and \$1541357 in 2015 and 2012, respectively. The out-of-pocket payments had a slight fluctuation among different regions and quintiles but the trend has been downward (Figure 1).

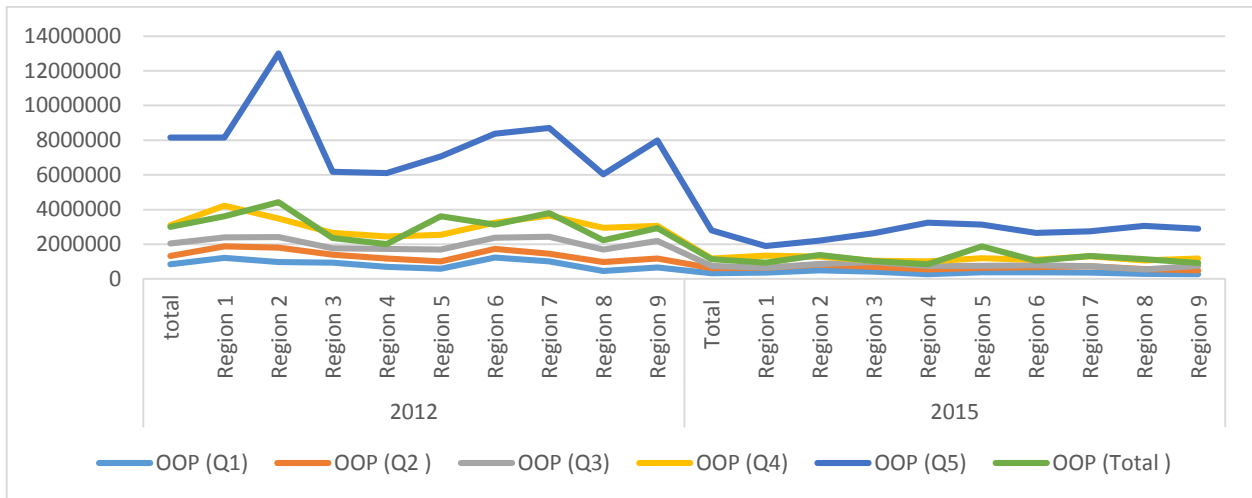


Figure 1. the trend of OOP before and after implementation of HTP in five quintiles and nine regions

3.2. Catastrophic health expenditures

The measures of the incidence of catastrophic payments for health care in Iran is shown in Table 1. We estimated catastrophic payments as a share of the

total household expenditure and capacity to pay, based on several threshold budget shares.

The incidence of catastrophic head count can be explained as follows. When the threshold is 10% of the total expenditure, 10.5% and 3.2% of Iranian

households incurred catastrophic payments for health care in 2012 and 2015, in turn. When we increase the threshold, the incidence falls. For instance, 2.1% in 2012 and 0.6% in 2015 of Iranian households spend in excess of 25% of the total expenditure on health care. Similarly, as the threshold is raised from 15 to 40% of capacity to pay, the incidence of catastrophic head count drops from 9.2 to 1.24% in 2012 and 2.5 to 0.283 % in 2015.

Table 1 provides information on the rank-weighted head counts and concentration index for *Ei*. The results showed that the rank-weighted head counts are smaller than the unweighted head ratio at all levels of thresholds, regardless of whether catastrophic payments is defined by the total expenditure or capacity to pay. It indicates that the better off are more likely to incur catastrophic payments for health. This was confirmed by positive concentration indices for

the incidence of catastrophic payments at all thresholds.

Table 1 also shows OOP health payments in excess of catastrophic payments threshold budget share. Probably the incidence of catastrophic head count, the mean overshoot, falls from 0.976 to 0.245 % and from 0.276 to 0.069 % in 2012 and 2015, respectively, as the threshold rises from 10 to 25 %. In the last row of Table 1, the mean positive overshoot (MPO) is provided. It can be read as those spending more than 15 % of the total capacity to pay on health care payments, who on average spent 26.693 % (15 + 11.693 %) and 25.871% (15+10.871%) in 2012 and 2015, respectively. Those spending more than 40% of capacity to pay on health care payments on average spent 52.139 % in 2012 and 53.119% in 2015. On the other hand, the mean overshoot among those exceeding the threshold need is raised as the threshold increases.

Table 1. incidence and intensity of CHE

Catastrophic payment measures		OOP as a share of total expenditure				As a share of non-food expenditure			
		10%	15%	25%	40%	10%	15%	25%	40%
2012	Head counts (%)	10.476	5.551	2.070	0.573	16.281	9.292	3.789	1.249
	Concentration index, CE	0.058	0.102	0.269	0.534	-0.038	-0.014	0.049	0.268
	Ranked-weighted head count, Hw	0.099	0.050	0.015	0.003	0.169	0.094	0.036	0.009
	Mean Overshoot	0.976	0.588	0.245	0.075	1.708	1.087	0.484	0.152
	Concentration index, Co	0.204	0.287	0.466	0.648	0.052	0.099	0.218	0.435
	Ranked-weighted overshoot, Ow	0.008	0.004	0.001	0.000	0.016	0.010	0.004	0.001
	MPO	9.313	10.583	11.826	13.067	10.492	11.693	12.768	12.139
2015	Head counts (%)	3.122	1.575	0.550	0.164	4.720	2.533	0.912	0.283
	Concentration index, CE	0.131	0.209	0.292	0.514	-0.002	0.067	0.161	0.305
	Ranked-weighted head count, Hw	0.027	0.012	0.004	0.001	0.047	0.024	0.008	0.002
	Mean Overshoot	0.276	0.165	0.069	0.021	0.449	0.275	0.120	0.037
	Concentration index, Co	0.257	0.315	0.413	0.468	0.119	0.174	0.251	0.331
	Ranked-weighted overshoot, Ow	0.002	0.001	0.001	0.000	0.004	0.002	0.001	0.000
	MPO	8.854	10.470	12.547	12.746	9.505	10.871	13.153	13.119

3.3. Health care payments and poverty

Poverty measures corresponding to household expenditures both before and after health payments are shown in Table 2. As mentioned before, we used the Iranian national poverty line which was estimated in our study in every quintiles and regions, separately. At the Iranian national poverty line, the poverty head count is 0.033%, i.e. 0.033% of the Iranian population is estimated to be in poverty using household expenditures as a living standard indicator.

After accounting for OOP health care payments, a 0.009% rise in the poverty head count was observed which is ignorable. This result can be interpreted such that over five hundreds households in Iran are forced into poverty due to OOP health care payments. The poverty gap, the average deficit to reach the poverty line in the population, also rises from 197.063 (USD) to 261.791 (USD). The normalized poverty gap increased from 0.005 to 0.007%.

After the implementation of HTP in Iran, the mentioned incidence increased, clearly. It means that the implementation of Health transformation could not affect impoverishment in a right way and especially it just affected negatively. In 2015, over five thousand people in Iran are forced into poverty due to OOP health care payments, however, it was about five hundreds before the implementation of HTP.

OOP expenditures create financial difficulties for some households and push others into poverty. Measures of poverty, in details, before and after the implementation of HTP are shown in figure 2 and 3 both. Figure 2 shows impoverishment by province. As it is clear, in just region 5 (including: Tehran and Alborz) and region six (including: Qom, Qazvin, Markazi), impoverishment increased during the health transformation in Iran. This difference may exist because most of those who were impoverished were from the Central Provinces, 25 percent of the population is in this quintiles. Most residents of Tehran and Alborz Provinces are in the richest quintiles.

Figure 3 shows that the highest impoverishment in 2015 (0.458 percent) occurred in the first quintile, with the lowest impoverishment in the poorest quintile. This is because households in the poorest quintile were already under the poverty line before health payments. Seemingly, households with higher total expenditure are more likely to spend a large fraction of those resources on healthcare. This reflects the inability of the poorest of the poor to divert resources from basic needs. Additionally, in 2012, the first quintile experienced the highest impoverishment, as well.

Table 2: measures of poverty based on expenditure gross and net of spending on health care, Iran

Impoverishment	2012			2015		
	Gross of health payments	Net of health payments	Absolute	Gross of health payments	Net of health payments	Absolute
Poverty head count (%)	0.033	0.042	0.009	0.334	0.351	0.017
Poverty gap (USD)	197.063	261.791	64.728	3227.653	3466.149	238.496
Normalized poverty gap (%)	0.005	0.007	0.002	0.057	0.061	0.004

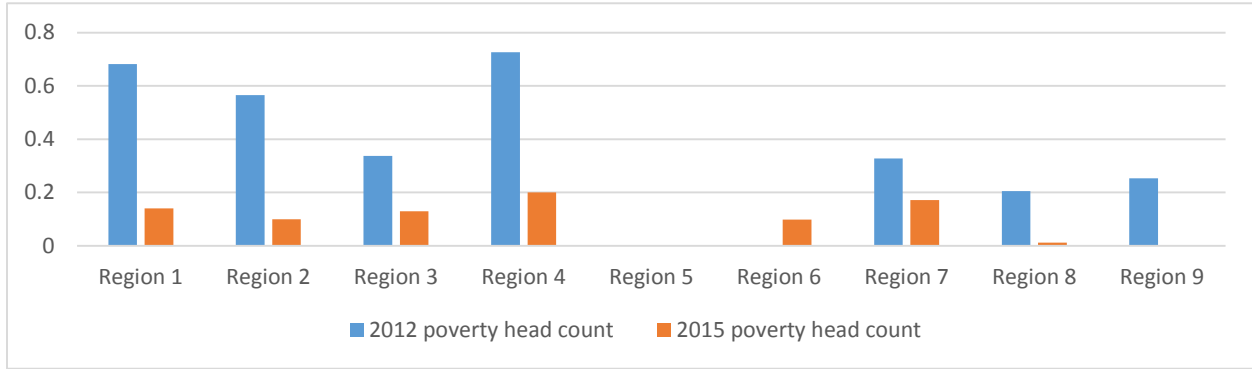


Figure 2. Measures of poverty based on expenditure gross and net of spending on health care, Iran (different regions)

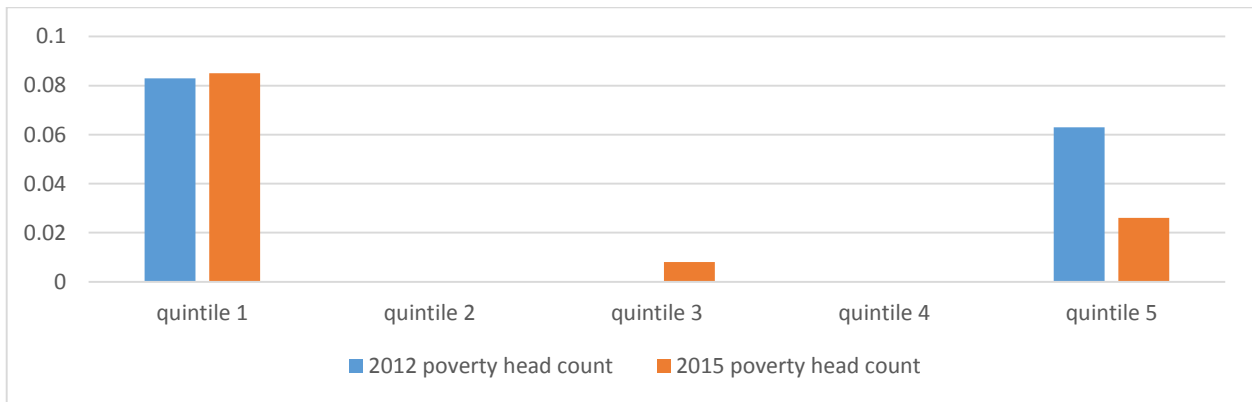


Figure 3. Measures of poverty based on expenditure gross and net of spending on health care, Iran (different quintiles)

4. Discussion

Measuring and monitoring based on an OOP threshold impact is critical for countries. Since there is an increasing OOP concern, this study using the most recent data provides new evidence on catastrophic health expenditure and its impoverishment effect in. In the past, Iran made efforts to estimate OOP impacts by using different methodologies and thresholds, which made it difficult to compare and follow-up policy reforms. The methodology used in the current study is described in the World Bank guidelines which are more relevant to health financing reforms aimed at improving financial protection (25).

In this study, we estimated the rate of catastrophic health expenditure and impoverishment due to the OOP payments for health care using the households' socio-economic surveys in 2012 and 2015 (to assess

the effects of HTP before and after the implementation of it). The study reveals several interesting points before and after the implementation of Health sector transformation.

First, 10.476 % (in 2012) and 3.122% (in 2015) of total households suffered from catastrophic health expenditures based on an OOP threshold at 10% of total household expenditure. At the threshold of 40% of capacity to pay, 1.249 (in 2012) and 0.283% (in 2015) of the total household incurred catastrophic health expenditures. The overall rate of households facing CHE reduced significantly just one year after the implementation of HTP in Iran. These results corroborate those of Atashbar et al. (28) and Mousavi et al. (29) who studied the situations of CHE index in Iran and showed that the measurement of this index decreased over the studied years, especially after the HTP.

The incidence of catastrophic expenditures is lower when OOP expenditures are expressed as a percentage of total expenditure than when expressed in terms of nonfood expenditure and capacity to pay. This implies that food expenditure forms a high proportion of total expenditure, which is typical of low-income countries (30).

Second, to our knowledge, this study provides one of the first evidence of intensity of catastrophic health payments in Iran. Intensity of catastrophic health payments was relatively low, for instance, it was 0.976 % (0.152%) at the threshold of 10% (40%) of total household expenditure (capacity to pay), there were at approximately 0.267 % (0.037%) in 2015. After the implementation of Health transformation, even the intensity of CHE decreased dramatically.

Third, the result demonstrates that the richer households (or households with a higher capacity to pay) are more likely to incur catastrophic health payments. Similar results were reported in other developing countries (24, 31) and Iran (32).

Fourth, we found that the poverty head count before accounting for OOP payments was 0.033 and 0.334 in 2012 and 2015, respectively, which is increased over the implementation of HTP. It can be explained by a choice of living standard indicator. After accounting for OOP for health care from household expenditures, the poverty rate increased by 0.009 (0.017) in 2012 (in 2015) percentage points. This indicates that about 611 (5895) people were forced into poverty due to paying for health services based on the Iranian national poverty line in 2012 (in 2015). Probably due to other non-poor people dropping below the poverty line and poor people falling further below it. This finding should be interpreted with caution. It does not provide an estimate of how poverty would change if some form of pre-payment replaced OOP financing of healthcare. Identification of such an effect would require tracing the impact of financing reform on households' use of healthcare, work effort, consumption, and savings. Nonetheless, the result illustrates the magnitude of the impoverishing effect of OOP payments for healthcare that is not currently reflected in poverty estimates. It shows that many people are not counted as poor despite being pushed below the official poverty line by OOP health

spending. A correct estimation of poverty would therefore require factoring the effect of OOP expenditures on non-poor households that fall below the poverty line only because they are forced to pay for healthcare at the point of consumption (1).

A study by van Doorslaer et al. (2006) found that, after estimating poverty gross and net of OOP expenditures in 11 Asian countries, Indonesia had the lowest incidence of households being pushed into poverty by healthcare payments. The authors contended that one explanation of the country's apparent success in shielding poor families from high payments for healthcare was its policy of targeted exemptions, implemented through a health card.

Conclusion

In accordance with the findings of the study, we emphasize some potential policy implications. First, our results suggest that intensity and incidence of catastrophic health expenditure is relatively low and the point here is that, HTP affected this incidence really significantly and the OOP payments decreased dramatically, as well; however, the OOP share of total health expenditures is still 4.5 %.

Second, the results also demonstrate that rich households are more likely suffer from catastrophic payments. In general, they tend to bypass primary health care services and seek more expensive upper health care services with self-referral, regardless of their health needs (33). In this scenario, direct and indirect costs are usually much higher for users owing to the current weak gatekeeping system. Hence, a more effective referral system may be beneficial, including stronger gatekeeping, at the primary health care level of the health sector. It would not only reduce households' risk of incurring catastrophic OOP payments for health expenditures, but it would also lead the health sector to better efficiency. For instance, the WHO concluded that primary health care is essential for better health outcomes of those health care systems, in which primary health care plays a main role in i) providing balanced preventive and promotive services regarding the social determinants, and ii) a referral service to higher level of hospitals (34).

Third, it is difficult to control cost escalation and unnecessary treatments in the health sector without improving the regulation of the private health sector, including hospitals and pharmacies. The growth of the private health sector with a weak regulation in the country leads to the unmet health needs among the population and increases duplications of health services in the private and public sectors (35, 36). However, these all are mentioned in HTP, Strict monitoring of the reform process, evaluating the results and transferring of findings to the stakeholders and general public are necessary. An accurate policy analysis for the continuation of the program components and new revisions/interventions can facilitate the process (37).

Additionally, it is known that people sell their apartments or borrow money from others in order to afford some specific and expensive health care services regardless of the insurance coverage in the country which is corroborated by the study of Maher et al. (32) and Musavi et al. (29). In this case, intensity of catastrophic health expenditure and impoverishment is much deeper among certain specific groups. Thus, we emphasize that the questionnaire should be extended with questions which focus on how people make health care payments, for example, from either savings or by loan, etc. Further studies aiming to acquire this information will provide more specific policy messages to the decision makers.

Finally, The Iranian government should urgently consider alternative health financing mechanisms about impoverishment in the sixth national development plan (2016-2021) in line with the country general policies on health that offer financial risk protection to the population. Such approaches, as clearly stated in the WHO 2010 report should encourage risk pooling and income cross-subsidization (38). The results presented in this paper show that however the implementation of HTP could decrease catastrophic health expenditures significantly, the urgent need for Iran is necessary to move beyond discussions and implement reforms that will protect the population from health care related impoverishment.

Acknowledgments: The author wishes to thank Hamid Helmi at Wayne State University, for his input to this paper.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Kimani, D. and T. Maina. 2015. *Catastrophic Health Expenditures and Impoverishment in Kenya*. Washington, DC: Futures Group, Health Policy Project.
2. Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans T. *Protecting households from catastrophic health spending*. Health Aff (Millwood). 2007; 26:972–83.
3. Knaul, F. M., H. Arreola-Ornelas, O. Mendez-Carniado, C. Bryson-Cahn, and J. Barofsky. 2006. "Evidence Is Good for Your Health System: Policy Reform to Remedy Catastrophic and Impoverishing Health Spending in Mexico." *Lancet* 368(9549): 1828–1841.
4. Baeza, C. and T. G. Packard. 2006. *Beyond Survival: Protecting Households from Health Shocks in Latin America*. Washington, DC: World Bank and Stanford University Press.
5. Van Doorslaer, E., O. O'Donnell, R. P. Rannan-Eliya, A. Samanathan, S. R. Adhikari, et al. 2006. "Effect of Payments for Healthcare on Poverty Estimates in 11 Countries in Asia: An Analysis of Household Survey Data." *Lancet* 368(9544): 1357–1361.
6. Wagstaff, A. and E. van Doorslaer. 2003. "Catastrophe and Impoverishment in Paying for Health Care: With Applications to Vietnam 1993–98." *Health Economics* 12(11): 921–934
7. Iran National Institute of Health Research. *Universal Health International Journal of Health Policy and Management*, 2015, 4(10), 637–640 Coverage in Iran. Vol First. Tehran, Iran: Gozineh Parsian Teb; 2015. <http://nihr.tums.ac.ir/wp-content/uploads/2015/08/uhc-book-edit1.pdf> . Accessed August 8, 2015.
8. Davari M, Haycox A, Walley T. *The Iranian Health Insurance System; Past Experiences, Present Challenges And Future Strategies*. Iran J Public Health. 2012;41(9):1-9.
9. Rashidian A, Khosravi A, Khabiri R, et al. *Islamic Republic of Iran's Multiple Indicator Demographic and Health Survey (IrMIDHS) 2010*. Tehran: Ministry of Health and Medical Education, 2012.

- <http://nihr.tums.ac.ir/Images/Archive/fffe97ff-53a0-486a-871d-3a10d48f6a6b.pdf> . Accessed May 11, 2015.
10. Manenti A. *Health situation in Iran*. Med J Islam Repub Iran. 2011;25(1):1-7.
 11. Takian A, Rashidian A, Kabir MJ. *Expediency and coincidence in re-engineering a health system: an interpretive approach to formation of family medicine in Iran*. Health Policy Plan. 2011;26(2):163-173. doi:10.1093/heapol/czq036
 12. Abolhallaje M, Hasani S, Bastani P, Ramezani M, Kazemian M. *Determinants of Catastrophic Health Expenditure in Iran*. Iran J Public Health. 2013;42(Supple1):155-160.
 13. Fazaeli AA, Seyedin H, Moghaddam AV, et al. *Fairness of Financial Contribution in Iranian Health System: Trend Analysis of National Household Income and Expenditure, 2003-2010*. Glob J Health Sci. 2015;7(5):260.
 14. Hajizadeh M, Nghiem HS. *Out-of-pocket expenditures for hospital care in Iran: who is at risk of incurring catastrophic payments? Int J Health Care Finance Econ*. 2011;11(4):267-285.
 15. Statistical center of Iran. *Iran National Health Accounts, 2002-2008*. https://www.amar.org.ir/Portals/0/topics/sna/hesab_salamat.pdf . Accessed August 21, 2015. Published 2011.
 16. Kavosi Z, Keshtkaran A, Hayati R, Ravangard R, Khammarnia M. *Household financial contribution to the health System in Shiraz, Iran in 2012*. Int J Health Policy Manag. 2014;3(5):243- 249. doi:10.15171/ijhpm.2014.87
 17. Daneshkohan A, Karami M, Najafi F, Matin BK. *Household catastrophic health expenditure*. Iran J Public Health. 2011;40(1):94-99.
 18. Nekoeimoghadam M, Esfandiari A, Ramezani F, Amiresmaili M. *Informal payments in healthcare: a case study of Kerman province in Iran*. Int J Health Policy Manag. 2013;1(2):157-162. doi:10.15171/ijhpm.2013.28
 19. Hajizadeh M, Connelly LB. *Equity of health care financing in Iran*. <http://mpr.ub.uni-muenchen.de/14672> . Accessed August 21, 2015. Published 2009.
 20. Hajizadeh M, Connelly LB. *Equity of health care financing in Iran: the effect of extending health insurance to the uninsured*. Oxf Dev Stud. 2010;38(4):461-476.
 21. Xu, K., G. Carrin, N. T. K. Phuong, N. H. Long, D. Bayarsaikhan, et al. 2006. *“Health Service Utilization and the Financial Burden on Households in Vietnam: The Impact of Social Health Insurance.”* Discussion paper. Geneva, Switzerland: World Health Organization.
 22. Saksena, P., K. Xu, and G. Carrin. 2006. *“The Impact of Universal Insurance Program on Catastrophic Health Expenditure: Simulation Analysis for Kenya.”* Discussion paper. Geneva, Switzerland: World Health Organization.
 23. O’Donnell, O., E. van Doorslaer, R. P. Rannan-Eliya, A. Somanathan, C. C. Garg, et al. 2005. *“Explaining the Incidence of Catastrophic Health Expenditures on Healthcare: Comparative Evidence from Asia.”* Working paper available at: <http://www.equitap.org/publications/publication.html?id=504>.
 24. Van Doorslaer, E., W. O’Donnell, R. P. Rannan-Eliya, A. Somanathan, S. R. Adhikari, et al. 2007. *“Catastrophic Payments for Healthcare in Asia.”* Health Economics 16: 1159–1184.
 25. O’Donnell O, van Doorslaer E, Wagstaff A, Lindelow M. *Analyzing health equity using household survey data: a guide to techniques and their implementation*. Washington, DC: World Bank Group; 2007.
 26. Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJ. *Household catastrophic health expenditure: a multicountry analysis*. Lancet. 2003; 362(9378):111–7.
 27. Xu k. *Distribution of health payments and catastrophic expenditures methodology by Ke Xu*. World Health Organization; Geneva; 2004.
 28. Atashbar T, Assari Arani A, Antoun J, Bossert Th. *Iran’s health reform plan: measuring changes in equity indices*. Iranian journal of public health. 2018 Mar; 47(3): 390–396.
 29. Mousavi MH, Raghfar H, Fazel Z. *Analysis Equity in Financing of Household’s Health in Development Programs of Iran*. Hakim Health Sys Res 2018; 21(1): 1- 12
 30. Chuma J, Maina T. *Catastrophic health care spending and impoverishment in Kenya*. BMC Health Serv Res. 2012; 12:413.
 31. Bredenkamp C, Buisman LR, Prencipe LM, Somanathan A, Tsilaajav T, Wagstaff A. *Mongolia - Health equity and financial protection report*. Health equity and financial protection report. Washington, DC: World Bank Group; 2012.

32. Maher A, Fazel Z. Analysis equity in financing of household's health in Iran (by concentration and extended concentration index). EJMED, European Journal of Medical and Health Sciences Vol. 1, No. 1, May 2019. DOI: <http://dx.doi.org/10.24018/ejmed.2019.1.1.18>
33. Dorjdagva J, Batbaatar E, Dorjsuren B, Kauhanen J. *Income-related inequalities in health care utilization in Mongolia, 2007/2008-2012*. Int J Equity Health. 2015;14:57.
34. WHO. *Closing the Gap: Health Equity through action on the social determinants of health*, World Health Organization. Geneva: World Health Organization; 2008.
35. Bayarsaikhan D, Kwon S, Chimeddagva D. *Social health insurance development in Mongolia: Opportunities and challenges in moving towards Universal Health Coverage*. Int Soc Secur Rev. 2015;68(4):93–113.
36. ADB. *Mongolia: Health and Social Protection*; 2008. Available at <http://www.oecd.org/countries/mongolia/42227662.pdf>.
37. Moradi-Lakeh M, Vosoogh-Moghadam A. Health sector evolution plan in Iran; Equity and sustainability concerns. Int J Health Policy Manag 2015, 4(10), 637–640. Doi: 10.15171/ijhpm.2015.160
38. World Health Organisation: *The world health report: health systems financing: the path to universal coverage*.