

Fairness of Health Financing before and after Introduction of Iranian Health Sector Evolution Plan: A Case Study

SORAYA NOURAEI MOTLAGH¹, BANAFSHEH DARVISHI², PAYAM HAGHIGHATFARD³, MOHAMMAD-HASAN IMANI-NASAB⁴

ABSTRACT

Introduction: Since out-of-pocket payments of household are a serious obstacle to the equitable utilization of health services, paying attention to the direct payment of households and, consequently, incidence of catastrophic health expenditures should always be considered in the planning and policy-making of health services. Iranian Health Sector Evolution Plan (HSEP) has been implemented since 2014, aiming at achieving universal coverage of health services and reducing the amount of out-of-pocket payments as a percentage of total health expenditures.

Aim: To measure the fairness of health care financing and to identify incidence rate of catastrophic health expenditures and its most important determinants before and after implementing the HSEP among households in one province of Iran (Lorestan).

Materials and Methods: The study population of present cross-sectional research was Lorestan households whose information was collected by a three-stage randomized cluster sampling method by the Statistics Center of Iran during 4/2012-3/2015. For data analysis, Logit's regression model using Stata14 software was performed.

Results: Based on the findings between 4/2012 and 3/2015,

the incidence rate of Catastrophic Health Expenditure (CHE) reduced from 6.7 to 4.34; Fairness Financial Contribution Index (FFCI) varied from 0.66 to 0.74 and percentage of poverty due to health expenditure varied from 1.96% to 0.28%. The most important determinants of facing catastrophic health expenditure are economic status of households, location of households (urban or rural), and number of people over the age of 65 and under the age of 5 in the household, age and sex of household head and insurance status of households. The use of health care also showed a significant relationship with the incidence of catastrophic health expenditure.

Conclusion: After implementing Iranian HSEP, the incidence of CHE and the percentage of poverty caused by health expenditure at the level of households were reduced to some degree, and fairness financial contribution index improved. The finding of this study will help health policymakers to identify factors increasing the likelihood of household exposure to catastrophic health expenditure, and based on these factors, to review and revise the programs implemented within the framework of Iranian HSEP and adopt appropriate policies to promote the protection of households against catastrophic health expenditure.

Keywords: Catastrophic Health Expenditure, Fairness Financial Contribution Index, Equity, Health Sector Evolution Plan

INTRODUCTION

In all societies, a percentage of household income is spent on health care. The amount of this partnership and its distribution in communities show the financial burden of health care on households. Protection of households from the financial burden of health care is the responsibility of healthcare systems [1]. Financial burden of health care has been considerably increased in recent decades due to technological advancement, increasing awareness and expectations of individuals and increasing health sector inflation in comparison to other sectors of economy [2]. One of the main ways to reduce the financial burden of health expenditures is to replace direct payments of households with prepayment mechanisms [3].

However, with all these interpretations, in most developing countries, direct payments have become the most important source of health financing [4]. Iran is one of the countries where direct payments are the main source of financing [5,6]. According to the statistics, the share of out-of-pocket expenditure for Iranian households ranged from 53% in 2001 to 59% in 2009 and 49% in 2013 [7,8]. Heavy and unpredictable payments for health services is an inappropriate and inequitable way to health care financing and a serious impediment to the equitable utilization of health services. It can also put households at risk with financial and economic problems [4,9].

Hence, the out-of-pocket payment of household and, subsequently incidence of CHE should always be considered in the planning and policy-making of health services [10]. For this reason, the World Health Organization has introduced protecting households against the cost of illness and equity in household financing as one of the three main goals of health systems [11].

An equitable system is a system in which households contribute to financing of health services based on their financial and income opportunities and do not pay more than their ability, leading to CHE [12]. Catastrophic expenditure in the health system occurs when payment of households for health care exceed a certain amount of household's capacity to pay, leading to the fall of the household in poverty [13,14]. Additionally, in most cases, it usually includes payments equal to or more than 40% of the household's capacity to pay when receiving health services [15,16]. When people or households use a large portion of their resources to pay for health care, they face financial problems, which can threaten their living standards by reducing their consumption of goods and services in the short term and by selling assets and spending savings or accumulating debt in the long term [17]. Several factors are effective in exposing to CHE. Many studies have shown that households with insurance coverage are not necessarily protected against CHE [16].

The use of health services, the type and number of use, are other determinants of CHE [4].

Households with disabled or chronic patient are more likely to be exposed to CHE [18,19]. Other household characteristics such as household size, gender and age of household head and presence of people over the age of 65 in the household are known as factors affecting the expenditure [20]. The incidence of CHE varies across countries and regions. In the studies conducted in Iran, the incidence of CHE has varied from 2.1 at the national level to 22.2 in regional studies [21,22]. Another indicator for measuring the financial equity is the FFCI which has been developed via the World Health Organization (WHO). This indicator represents each household should pay off an equal ratio of its capacity for healthcare expenditures and evaluate dispersals from the equal burden benchmark [11,21]. The value of this index in Iran varies from 83.7% at the national level to 56% at the regional level [21,22]. The evidence is against the goals set out in the Fifth Program of Economic, Social, Cultural Development of Iran (2011-2015) whose aim was to reduce the share of out-of-pocket spending from total health expenditure to less than 30%, and reducing the proportion of households facing with CHE to less than 1% [23].

Since late 2013, Iran has launched a reform package called the HSEP, which accomplished early 2014 with the three main objectives of financial protecting of households, ensuring access to health services and improving the quality of the services. Some interventions of this plan were included: free coverage of people without basic health insurance, reducing out-of-pocket payments by 6% of the total hospitalization expenditures and increasing medical tariffs to reduce informal payments [3,24].

The present study aims to assess the extent of realization to which the first goal of the plan, namely, financial protection of households, determines the incidence of households' exposure to CHE and measures most important indicators for fairness of health expenditure financing before and after implementing the HSEP in one province of Iran (Lorestan).

Lorestan Province, having a population of about two million people, is one of the most populated and less developed in the southwest of Iran; its demographic ranking is 13, and its ranking in gross national product is 21 of 31. Therefore, it can be a fairly good representative of the Iranian population. Studies on the fairness of financing and the key determinants of facing CHE in most cases are conducted during a particular period to collect information about the current situation. Nonetheless, such studies can be used to measure the effectiveness and success of policymaking on the spread of equity after their implementation such as Iranian HSEP.

MATERIALS AND METHODS

This cross-sectional study was conducted to evaluate the fairness of health expenditure financing among households in Lorestan Province between 4/2012 and 3/2015. The required information for this study was extracted from households' income and expenditure survey of Statistical Center of Iran (SCI). This survey is conducted annually in all provinces of Iran in both rural and urban regions and with the aim of examining cost and income status of households in the country. SCI selects its samples with a three-stage randomized cluster sampling process. In the first stage of this sampling, geographical areas were selected. At the second stage, urban and rural blocks (a set of homes which has been bounded to avenue in each hand) were selected randomly, and at the third stage of sampling, households were selected. These data is collected using a unique standard questionnaire and via personal interview by household head [25]. Collected information by SCI consists of four sections. The first part is the social characteristics of household members; the second part is residence profile, equipment and life facilities; the third part is households' food and non-food expenditure, and the fourth is household income [26]. All Lorestan

households whose information was collected by SCI from 4/2012 to 3/2015 were studied. The sample size of the study was variable in every year and it was not constant in the period of study. On an average, 1060 households were studied in each year. The sample size is estimated by SCI based on the following equation:

$$n = \left(\frac{Z_{0.975} S_{ct}}{\gamma_{ct} X_{ct}} \right)^2 * Deff_t * \alpha_t$$

In this equation,

$Z_{0.975}$ is equal to 1.96,

c indicates the considered variable (nonfood expenditure, total expenditures and income),

t Represents the province,

S_{ct} refers to Standard Deviation of c in any province,

α_t is the compensation rate of sample loss in any province,

γ_{ct} indicates the ideal level of precision,

Deff refers to minimum expected difference or also represents the effect size of any province.

Main indicators to measure the fairness of health expenditure financing are CHE and Fairness in FFCI. The ratio of household' health spending to household' capacity to pay was used to determine the ratio of households' exposure to CHE.

Households' capacity to pay means the effective household income, minus the household's minimum subsistence expenses. The total household expenditure was considered as an indicator of household income, since it reverberates the purchasing power of household correctly. Therefore, households' capacity to pay was achieved by subtracting household's minimum subsistence expenses from total household expenses.

To determine the household's minimum subsistence expenses, according to the WHO suggestion, first, households were ranked based on "proportion of food expenditure divided by total household expenditure", and the households between 45 and 55 percentile were determined. Then, the average per capita food expenditure was calculated for households in this range. By multiplying the earned average at the equivalent household size, it determines the household's subsistence expenses. If the household's subsistence expenses exceed the total household expenditure, this household is below the poverty line and it was poor formerly; however, if total household expenditure is higher than household subsistence expenses, and with the deduction of health costs from the total household expenditure, the remaining amount is lower than household's subsistence expenses, In this case, the household has been poor due to health costs. After determining the households' capacity to pay, if the share of household medical expenses exceeds 40% of the household's capacity to pay, they face with CHE [27,28].

To accurately analysis the occurrence of CHE, it is necessary, in any scientific method, to identify households with a higher probability of exposure to CHE, based on their economic and social characteristics. Among the popular and relevant econometric models of the subject, the Logit model was used in this study.

The Logit model is used in some cases which dependent variable appears as a binary variable. In this research, the dependent variable is CHE, which takes 0 for non-exposure to CHE and 1 to exposure to CHE.

The purpose of using the Logit model in this study is primarily to calculate the exposure likelihood to CHE, and in second stage, to extract the marginal effects of the explanatory variables. The marginal effect is percentage of change in the probability of exposure to CHE, for a unit increase in explanatory variables. [Table/Fig-1] lists the explanations for these variables.

In the next step, the FFC_t was calculated using the following formula:

Explanatory variable	Categories/Definition
Sex of household head	Male*, Female
Employment status of household head	Employed*, Unemployed
Members over 65-year-old	Number of members over 65-year-old in the household
Members under five-year-old	Number of members under five-year-old in the household
Education level of household head	Illiterate*, Elementary, Junior high school, High school Diploma, Associate degree, Bachelor and Higher
Household size	Equivalent household size: (household size) ^{0.56} [13]
Basic insurance status	Uninsured households*, Insured households
Utilization of dental services	The costs of household for dental services
Utilization of inpatient services	The costs of household for inpatient services
Utilization of drug services	The costs of household for pharmaceutical services
Place of residence	Urban*, Rural
Age of household head	The age of household head
Income group	Ten categories of household expense representing the level of household income from the poorest* to richest

[Table/Fig-1]: Description of the study variables.

* Reference category

$$FFC = 1 - 4 \left(\frac{\sum_{i=1}^n (HFC_i - \overline{HFC})^3}{.125n} \right)$$

The goal of this indicator is to give more weight to households which are spending a larger share of their income on health. In this formula HFC_i represents the financial contribution of a specific household and \overline{HFC} represents the average financial contribution of all households. The value of this index ranges from zero to one where one represents a complete equality and zero, represents a complete inequality between the households [11].

Finally, inequality in health payments distribution is calculated by Gini index. The Gini index generally is applied to calculate inequalities in the distribution of wealth or income in a community. The distribution of health resources so can be calculated by this coefficient. The numerical amount of this coefficient is between 0 and 1, where 0 indicates complete equality in distribution and one represents perfect inequality in health resources distribution. In this study Gini coefficient has been met through the formula proposed via Brown [29]:

$$G = 1 - \sum_{i=0}^{k-1} (y_{i+1} + y_i)(x_{i+1} - x_i)$$

In the formula above: y_i represents the cumulative percentage of health payments and x_i represents the cumulative percentage of population in terms of income decline [11].

RESULTS

In 2012, approximately 6.7% of households in Lorestan Province were exposed to CHE, while this rate in 2015 (after implementing the HSEP) reached 4.34%. The FFCI in this province also varied from 0.66 in 2012 to 0.74 in 2015. The Gini coefficient of health expenditure was estimated at approximately 0.43 during the investigation period. Finally, the percentage of households falling below the poverty line due to health costs in 2012 was estimated to be 1.96%, reaching 0.28% (in 2015) after implementing the Development Plan. [Table/Fig-2] presents the Indicators of the fairness in health expenditure financing.

[Table/Fig-3] presents the indicators of fairness in health expenditure financing in urban and rural areas during the study period.

Year	2012	2013	2014	2015
Percentage of exposure to CHE	6.7	4.9	4.47	4.34
FFCI	0.66	0.72	0.73	0.74
Gini coefficient of health expenditures	0.43	0.29	0.42	0.43
Percentage of poverty caused by health expenditures	1.96	1.03	1.12	0.28

[Table/Fig-2]: Indicators of the fairness in health expenditure financing in Lorestan Province.

Variables	Urban areas				Rural areas			
	2012	2013	2014	2015	2012	2013	2014	2015
Percentage of exposure to CHE	4.99	3.71	2.26	3.29	8.01	5.8	6.3	5.22
FFCI	0.77	0.81	0.89	0.83	0.58	0.65	0.61	0.67
Gini coefficient of health expenditures	0.47	0.29	0.42	0.48	0.39	0.3	0.43	0.4
Percentage of poverty caused by health expenditures	1.08	0.42	0.21	0.21	2.61	1.53	1.87	.35

[Table/Fig-3]: Indicators of fairness in health expenditure financing in urban and rural areas of Lorestan Province.

variable	1	2	3	4	5	6	7	8	9	10
2012	7.8	7.8	15.3	11.6	5.8	7.8	1.9	2.9	3.9	1.9*
2013	11.3	7.4	5.7	9.3	3.7	1.9	1.0	3.7	2.8	1.9*
2014	8.3	4.6	2.8	5.6	5.6	2.8	3.7	2.8	4.6	3.7
2015	1.9	4.7	5.7	5.6	0.0	7.6	4.7	4.7	3.8	8.4*

[Table/Fig-4]: Percentage of exposure to CHE in different income group, during the study period¹.

Pearson's chi-Square test

* indicates significance at the level of p-value<0.05

[Table/Fig-4] shows the percentage of exposure to CHE in different income groups. This table shows that during the study period (except for 2015), the percentage of exposure to CHE in lower income groups was higher than the high income groups.

[Table/Fig-5] shows the relationship between explanatory variables and CHE.

The results of the Logit model showed that there was no significant relationship between incidence of CHE and variables such as the household size and education level of the head of household. Uninsured households are more likely exposed to CHE.

The likelihood of confronting CHE for rural households was higher than urban households. The utilization of inpatient, dentistry and drug services increased the likelihood of confronting CHE. In addition, increasing the age of head would increase the chance of facing CHE. About the household economic variable, except for 2015, the chance of facing CHE decreased as economic status of households improved. In addition, the probability of encountering CHE in households which have over the age of 65 or under the age of five years members and in female-headed households was higher than other households.

DISCUSSION

Based on the findings of the present study, the incidence of CHE, varied from 6.7% in 2012 to 4.3% in 2015, and the FFCI, also varied from 0.66 in 2012 to 0.74 in 2015. The high percentage of exposure to CHE and the low level of FFCI show a weakness of the health system in financial protection of households. Despite the high rate of exposure to CHE and failure of health system to reach the goal underlined by the Fifth Economic, Social and Cultural Development plan of Iran (reducing incidence of CHE to less than one percent) [3], it seems that with implementing Iranian HSEP, the incidence of CHE at the household level has been reduced to some degree.

variable	2012			2013			2014			2015		
	coefficients	Z statistic	Marginal effect	coefficient	Z statistic	Marginal effect	coefficient	Z statistic	Marginal effect	coefficient	Z statistic	Marginal effect
Intercept	-4.4	-3.6	-	-6.6	-3.53	-	-7.53	-3.97	-	-7.4	-4.35	-
Basic insurance status	-.95	-2.07	-0.045	-0.28	1.57	-.011	-0.43	-1.92	-0.015	-0.35	-1.25	-0.01
Place of residence	1.7	3.45	0.078	0.45	2.28	0.018	1.48	2.7	0.05	1.26	2.6	0.033
Sex of household head	0.44	2.2	0.022	0.29	1.67	0.012	-0.46	-1.82	-0.016	0.21	1.35	0.006
Members over 65 years	0.08	1.3	0.004	0.21	1.65	0.01	0.67	2.28	0.023	0.32	1.88	0.008
Education level of household head	-0.09	-1.6	-0.004	-0.025	-1.16	-0.001	-0.18	-1.82	-0.006	-0.18	-1.85	0.005
Members under five years	0.41	2.1	0.019	0.72	2.37	0.029	0.87	2.44	0.03	0.73	1.98	0.018
Employment status of household head	0.18	1.3	0.008	0.18	1.25	.008	0.89	2.41	0.03	0.2	1.7	0.005
Household size	-0.51	-1.42	-0.016	0.36	0.89	0.014	-0.15	-0.47	-.0067	-0.33	-1.84	-0.008
Utilization of dental services	7.9e-06	6.3	3.7e-09	9.1e-07	2.42	3.9e-08	7.66e-07	2.58	2.62e-08	4.3e-07	3.7	1.1e-08
Utilization of inpatient services	4.6e-08	2.7	2.2e-09	3.8e-06	2.02	1.6e-07	9.2e-07	3.82	3.2e-08	8.7e-07	3.8	2.2e-08
Utilization of drug services	2.9e-08	7.2	1.3e-09	1.8e-06	5.08	7.2e-06	1.4e-06	3.3	4.6e-08	2.4e-06	5.7	6.2e-08
Income group	-0.46	-5.8	-0.021	-0.3	-3.6	-0.012	-0.12	-2.6	-0.004	0.12	2.3	0.003
Age of household head	0.43	2.09	0.014	0.84	1.96	0.034	0.5	2.62	0.017	0.45	2.15	0.012

[Table/Fig-5]: Relationship between explanatory variables and CHE¹.

One of the reasons for the high rate of exposure to CHE in the province (Lorestan) can be attributed to the lower development of this province compared to other provinces. Pursuant to Article 90 of the Fourth Economic, Social and Cultural Development plan of Iran (2006-2010), the FFCI index as a benchmark of fairness in financial contribution of households in financing of health care should be above 0.9 to upgrade equity in access and financing of health care [2]. According to the study results, although the FFCI in health care financing improved after implementing Iranian HSEP, there was a remarkable inequality in the financial contribution of households to health financing. In study of Daneshkohan A et al., the value of the above index in another western province (Kermanshah) of Iran was reported 0.57 [21]. The results of one study by Fazaeli A, showed that the value of FFCI during the study period (2003-2006) in the urban areas of Iran was significantly improved from 0.84 to 0.85, while the index in the rural areas had a descending trend and reached from 0.829 to 0.825 during the study period. In total, the value of the above index rose from 0.833 to 0.835 and improved [30]. According to the WHO report (2000), Colombia, Luxembourg, Denmark and Jibouti have the best rank among the 190 countries in terms of the FFCI in healthcare financing. In the report, Iran is ranked 112th in the world, indicating that Iran is has inappropriate status in comparison with other countries [11].

Based on the results of the present study, there are certain variables which increased the chances of encountering CHE. One of the most important determinants of facing CHE is the household's economic situation so that households with a better economic situation have a lower chance of facing CHE. The results of the study indicate that with implementing Iranian HSEP, the incidence of CHE has increased in households with a better economic situation. In justifying this, it can be mentioned that poor households, at the smallest expenditure, face economic difficulties due to their low capacity to pay, but by implementing the development plan and reducing the amount of health expenditures, their capacity to pay has been improved and the chance of exposure to CHE has decreased. It should not be forgotten that the health sector can only affect the amount of payment by households for health services, through factors such as health insurance and cost control. Furthermore, to improve the economic situation of households, intersectoral interventions and actions are needed. In some cases, low health expenditure for households with low capacity to pay is considered catastrophic expenditure. Moreover, supporting these households will not be possible except by reforming the social welfare system of countries and increasing the capacity to pay of households by the government. One study conducted in 13 Asian countries showed

that in households with a better economic situation, particularly in low and middle income countries, a large portion of their capacity to pay is allocated to health services. This is probably due to the avoidance of poor households from using and paying for health services [31]. The findings of the study by Samkotra T and Lagrange LP showed that with implementing the public health coverage in Thailand, the direction of CHE from poor households was changed to wealthy households due to the higher use of the poor households from public services covered by insurance and the use of the rich households from the expensive private sector services [18].

According to the results, the presence of individuals over the age of 65 in the household increased the chances of encountering CHE. These findings emphasize the shift in health policies to design and implement supportive programs from households with elderly individuals. The study result of Kavosi Z et al., and Ranson MK showed that the presence of individuals above 65-year-old in households increase the likelihood of household exposure to CHE [32,33]. Rivera CC et al., study showed that for one percent increase in the ratio of elderly individuals in households, the likelihood of household exposure to CHE would increase by approximately 6% [34].

Based on other findings of the present study, the presence of individuals under five-year-old in the household increased the chance of facing CHE. These findings show that increasing the number of young age individuals in household increase the household's need for health services and consequently higher utilization of health services leads to increasing the chance of household exposure to CHE. In addition, the results of Zoe's study indicated that presence of individuals under the age of 5 years in the household would increase the rate of utilization of private sector services and the consequent exposure of households to CHE [19].

Other results of the present study indicated that the chance of encountering CHE was higher in households without insurance coverage. Although, the prepayment mechanism and insurance coverage reduce the chance of encountering CHE, the low coefficient of insurance variable in the present study shows that it has no effective role in reducing households' out of pocket payments. Iran's health insurance packages are not sufficient and cover only a limited range of services. Additionally, Iran's basic insurance companies attempt to reduce costs and increase their productivity and households have to bear most of the expenditure of care or medication through formal or informal payments. Therefore, the protective effect of insurance coverage against medical expenditure is reduced. Kwon S, one of the health insurance theorists, considers deeper and wider range of benefits as the key to financial protecting against

risks of health expenditure. Therefore, to increase the protective role of health insurances, policymakers in Iran's health sector should identify the vital services that impose the highest financial burden on households and based on this, revise the health benefits package [35]. The protective effect of medical insurance against high incidence of CHE has also been confirmed in other studies [36-39]. Since the launch of public insurance in Turkey and Thailand, the amount of Household's direct payments for health services, as well as the percentage of exposure to CHE and the percentage of households falling below the poverty line due to health expenditure have shown a downward trend [3,40]. On the other hand, the results of Wagstaff A and Lindelow M study in China, indicates medical insurance encourage people to use more services, especially more advanced services, therefore lead to increasing the risk of exposure to CHE [41]. It seems that further studies are needed to conclude on the effect of medical insurance on exposure to CHE.

Other main determinant of household exposure to CHE in this study was utilization of healthcare; therefore the amount of exposure to CHE was significantly related to variables such as utilization of inpatient, drug and dentistry services. Other studies in Iran (Tehran and Shiraz) showed that utilization of dentistry and inpatient services increased the probability of facing CHE. Utilization of dentistry services which are costly and not covered via medical insurances in Iran, was one of the main causes of exposure to CHE [27,32]. Therefore, the policies reducing the incidence of CHE should consider coverage of the above services and determine which aspects of these services should be covered by basic and complementary insurance. Research in Thailand also indicated that hospitalization of one of the household's members during the past 12 months in public or private hospitals was one of the main determinants of household exposure to CHE, and this was more concerned with private hospitals [18]. A study conducted in Nepal also found that 20 percent of households with hospitalized patients fell below the poverty line or near the poverty line [4].

According to the present study results, it can be noted that rural households are more exposed to CHE, being in line with previous studies [13,42]. This difference is likely due to the low capacity of rural households to meet their needs and the delay in seeking health care, and as a result, meeting the need when more expensive and specialized services are needed. In addition, households with female head have greater risk of exposure to CHE. This result is consistent with the results of a study conducted in Gujarat, India, and study conducted by Mohammadalazadeh Hanjani and Fazaeli A in Iran [33,43]. Since women in Iran, like other developing countries, have a lower chance of attending labor markets, they have a lower average wage than men; the ability to pay in households with female head is lower than other households, therefore such households experienced a greater probability of exposure to CHE.

The results indicated that employment of the household heads due to increasing capacity to pay has a protective role against incidence of CHE. The results of the study by Ekman B also confirm the above findings [44]. In the present study, there was no significant relationship between the amount of exposure to CHE and the size of households. In studies by Piroozi B et al., and Kavosi Z et al., were found no significant relations between these two variables were found [3,45]. Whereas, the results of Yardim's M study in Turkey showed that for increase of one person to the household size, household expenditure and exposure to CHE would increase by 2% and 4%, respectively [40]. Therefore, further studies are needed to determine the relationship between size of household and likelihood of facing CHE.

LIMITATION

It should be noted that although, the used method to measure the incidence of CHE is one of the most widely used techniques in all countries, it must be considered that households who refuse receiving health care services due to financial problems or reduce

their other necessary expenses due to their health expenditure, will be eliminated.

CONCLUSION

The results of this study shows that identifying variables which increase the likelihood of exposure to CHE can help health policy makers to review and revise the programs implemented within the framework of Iranian HSEP and to adopt appropriate policies to promote the protection of households against incidence of CHE. Implementing prepayment mechanisms such as risk-pooling among different population groups can reduce the amount of household's out-of-pocket payments as a percentage of total health expenditure. Also, more budget is allocated in the public sector to support vulnerable and poor people. In other words, providing health services for the poor is free of charge, significant improvements will be made in their capacity to pay and there will be a progressive trend in health care financing. The level of participation in health care financing will be distributed based on the each household's capacity to pay.

ACKNOWLEDGEMENTS

The present study was financially supported by Lorestan University of Medical Sciences. The authors would like to express special thanks to Lorestan University of medical Sciences and those playing a role in conducting the current research for providing support and assistance.

REFERENCES

- [1] Hatam N, Orejlu PH, Jafari A, Kavosi Z. Catastrophic healthcare expenditures of hospitalized patients in the hospitals of Shiraz in 2013. *Shiraz E-Medical Journal*. 2015;16(5).
- [2] Ghafoori MH, Azar FE, Arab M, Mahmoodi M, Zadeh NY, Rezapour A. The distribution of health expenditures in Tehran's districts. *Journal of Community Health Research*. 2014;3(2):132-44.
- [3] Piroozi B, Moradi G, Nouri B, Bolbanabad AM, Safari H. Catastrophic health expenditure after the implementation of health sector evolution plan: a case study in the west of Iran. *International Journal of Health Policy and Management*. 2016;5(7):417-23.
- [4] Adhikari SR, Maskay NM, Sharma BP. Paying for hospital-based care of Kala-azar in Nepal: assessing catastrophic, impoverishment and economic consequences. *Health policy and planning*. 2009;24(2):129-39.
- [5] Juyani Y, Hamed D, Jebeli SSH, Qasham M. Multiple sclerosis and catastrophic health expenditure in Iran. *Global journal of health science*. 2016;8(9):194-99.
- [6] Abolhallaje M, Hasani S, Bastani P, Ramezani M, Kazemian M. Determinants of catastrophic health expenditure in Iran. *Iranian Journal of Public Health*. 2013;42(1):155.
- [7] Anbari Z, Mohammadbeigi A, Mohammad-salehi N, Ebrazeh A. Health expenditure and catastrophic costs for inpatient and out-patient care in Iran. *International Journal of Preventive Medicine*. 2014;5(8):1023-28.
- [8] Mehrolhassani M, Najafi B, Yazdi Feyzabadi V, Haghdoost A, Abolhallaje M, Ansari M, et al. Total health expenditures and proportion of out-of-pocket payments in Iranian Provinces; 2008-2014. *Iranian Journal of Epidemiology*. 2017;12(5):01-12.
- [9] Baji P, Pavlova M, Gulácsi L, Groot W. Changes in equity in out-of-pocket payments during the period of health care reforms: evidence from Hungary. *International Journal for Equity in Health*. 2012;11(1):36.
- [10] Ghiasvand H, Hadian M, Maleki M, Shabaninejad H. Determinants of catastrophic medical payments in hospitals affiliated to Iran University of Medical Sciences 2009. *Hakim Research Journal*. 2010;13(3):145-54.
- [11] Reinhardt UE, Cheng TM. The world health report 2000-Health systems: improving performance. *Bulletin of the World Health Organization*. 2000;78(8):1064-75.
- [12] Wagstaff A. Measuring financial protection in health. *World Bank Policy Research Working Paper Series*. 2009.
- [13] Van Minh H, Phuong NTK, Saksena P, James CD, Xu K. Financial burden of household out-of-pocket health expenditure in Viet Nam: findings from the National Living Standard Survey 2002-2010. *Social Science & Medicine*. 2013;96:258-63.
- [14] Wagstaff A, Doorslaer EV. Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993-1998. *Health economics*. 2003;12(11):921-33.
- [15] Soofi M, Rashidian A, Aabolhasani F, AkbariSari A, Bazayr M. Measuring the Exposure of Households to Catastrophic Expenditure in Iran in 2001: the World Health Organization and the World Bank Approach. *Hospital*. 2013;12(2):39-50[Persian].
- [16] Limwattananon S, Tangcharoensathien V, Prakongsai P. Catastrophic and poverty impacts of health payments: results from national household surveys in Thailand. *Bulletin of the World Health Organization*. 2007;85(8):600-06.

- [17] Somkotra T, Lagrada LP. Payments for health care and its effect on catastrophe and impoverishment: experience from the transition to Universal Coverage in Thailand. *Social science & medicine*. 2008;67(12):2027-35.
- [18] Somkotra T, Lagrada LP. Which households are at risk of catastrophic health spending: experience in Thailand after universal coverage. *Health affairs*. 2009;28(3):w467-w78.
- [19] Su TT, Kouyaté B, Flessa S. Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso. *Bulletin of the World Health Organization*. 2006;84(1):21-27.
- [20] Sun X, Jackson S, Carmichael G, Sleigh AC. Catastrophic medical payment and financial protection in rural China: evidence from the New Cooperative Medical Scheme in Shandong Province. *Health Economics*. 2009;18(1):103.
- [21] Daneshkohan A, Karami M, Najafi F, Matin BK. Household catastrophic health expenditure. *Iranian Journal of Public Health*. 2011;40(1):94.
- [22] Razavi M, Hasanazadeh, Abasmangi K. Fairness in financial contribution. Tehran: Ministry of Health and Medical Education. 2005.
- [23] Planning and Management Organization of the Islamic Republic of Iran. Five-Year Economic SaCDPottIRol, 2010-2015. Tehran: Deputy for Research, development and Codification of Laws and Regulations; 2009.
- [24] Moradi-Lakeh M, Vosoogh-Moghaddam A. Health sector evolution plan in Iran: equity and sustainability concerns. *International Journal of Health Policy and Management*. 2015;4(10):637-40.
- [25] Statistical Centre of Iran. Questionnaire of cost and income in urban and rural households. Available from: <https://www.amar.org.ir/Portals/0/info-unit/Files/94.pdf>
- [26] Statistical Centre of Iran (2015). Records Complex-Household Expenditure and Income Survey in Urban and Rural Area. Tehran; Iran Statistics Center Publications. Available from: https://amar.sci.org.ir/index_e.aspx
- [27] Kavosi Z, Keshtkaran A, Hayati R, Ravangard R, Khammarnia M. Household financial contribution to the health System in Shiraz, Iran in 2012. *International Journal of Health Policy and Management*. 2014;3(5):243-49.
- [28] Mehrara M, Fazaeli A. Health finance equity in Iran: an analysis of household survey data (1382-1386). *Journal of Health Administration*. 2010;13(40):51-62.
- [29] Sari AA, Rezaei S, Rad EH, Dehghanian N, Chavehpour Y. Regional disparity in physical resources in the health sector in Iran: a comparison of Two time periods. *Iranian Journal of Public Health*. 2015;44(6):848-54.
- [30] Fazaeli A. Measuring Equity in health care financing in Iran (2003-2006). Tehran: health deputy of ministry of health. Applied research center. 2007.
- [31] O'donnell O, Van Doorslaer E, Rannan-Eliya RP, Somanathan A, Adhikari SR, Akkzieva B, et al. Who pays for health care in Asia? *Journal of Health Economics*. 2008;27(2):460-75.
- [32] Kavosi Z, Rashidian A, Pourmalek F, Majdzadeh R, Pourreza A, Mohammad K, et al. Measuring household exposure to catastrophic health care expenditures: a Longitudinal study in Zone 17 of Tehran. *Hakim Research Journal*. 2009;12(2):38-47.
- [33] Ranson MK. Reduction of catastrophic health care expenditures by a community-based health insurance scheme in Gujarat, India: current experiences and challenges. *Bulletin of the World Health Organization*. 2002;80(8):613-21.
- [34] Rivero CC, Ruiz GAL, Barrera RM, Levet CGC. Catastrophic expenditure in health and income elasticities by item of expenditure in health services in Mexico. *Well-Being and Social Policy*. 2006;2(1):47-69.
- [35] Kwon S. Health care financing in Asia: key issues and challenges. *Asia Pacific Journal of Public Health*. 2011;23(5):651-61.
- [36] Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans T. Protecting households from catastrophic health spending. *Health Affairs*. 2007;26(4):972-83.
- [37] Waters HR, Anderson GF, Mays J. Measuring financial protection in health in the United States. *Health Policy*. 2004;69(3):339-49.
- [38] Nguyen HT, Rajkotia Y, Wang H. The financial protection effect of Ghana National Health Insurance Scheme: evidence from a study in two rural districts. *International Journal for Equity in Health*. 2011;10(1):04.
- [39] Limwattananon S, Tangcharoensathien V, Prakongsai P. Equity in financing healthcare: impact of universal access to healthcare in Thailand. 2008.
- [40] Yardim MS, Cilingiroglu N, Yardim N. Catastrophic health expenditure and impoverishment in Turkey. *Health Policy*. 2010;94(1):26-33.
- [41] Wagstaff A, Lindelow M. Can insurance increase financial risk?: The curious case of health insurance in China. *Journal of Health Economics*. 2008;27(4):990-1005.
- [42] Moghadam MN, Banahi M, Javar MA, Amiresmaili M, Ganjavi S. Iranian household financial protection against catastrophic health care expenditures. *Iranian Journal of Public Health*. 2012;41(9):62-70.
- [43] Mohammadalizadeh Hanjani H, Fazaeli A. Equity status in Iran Health system financing. *Social Welfare Journal*. 2008;5:289-99.
- [44] Ekman B. Catastrophic health payments and health insurance: Some counterintuitive evidence from one low-income country. *Health policy*. 2007;83(2):304-13.
- [45] Kavosi Z, Rashidian A, Pourreza A, Majdzadeh R, Pourmalek F, Hosseinpour AR, et al. Inequality in household catastrophic health care expenditure in a low-income society of Iran. *Health Policy and Planning*. 2012;27(7):613-23.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Lorestan, Iran.
2. Researcher, Department of Health Economics, Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, Iran.
3. PhD Student, Department of Health Economics, Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, Iran.
4. Assistant Professor, Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Lorestan, Iran.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Mohammad-Hasan Imani-Nasab,
Assistant Professor, School of Health and Nutrition, Karimkhan Zand Avenue, Goldasht Shargi, Khorramabad, Lorestan,
Pin- 6813833946, Iran.
E-mail: imani_mh@yahoo.com

Date of Submission: **Dec 30, 2017**

Date of Peer Review: **Feb 27, 2018**

Date of Acceptance: **Apr 10, 2018**

Date of Publishing: **Jun 01, 2018**

FINANCIAL OR OTHER COMPETING INTERESTS: None.