Has Iran achieved the goal of reducing the prevalence of households faced with catastrophic health expenditure to 1%? The results of a national study

Bakhtiar Piroozi

Kurdistan University of Medical Sciences

Hassan Mahmoodi

Kurdistan University of Medical Sciences <https://orcid.org/0000-0002-1234-9037>

Hossein Safari

Iran University of Medical Sciences: Tehran University of Medical Sciences

Amjad Mohamadi Bolbanabad

Kurdistan University of Medical Sciences

Satar Rezaei

Kermanshah University of Medical Sciences

Mohammad Moradi-Joo

Iran Health Institute Research

Azad Shokri (✉ azad_shokri@yahoo.com)

Kurdistan University of Medical Sciences

Research

Keywords: Catastrophic Health Expenditure, Health Care Expenditure, Financial Protection, Iran

Posted Date: September 9th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-847322/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

Access to universal health coverage and reducing the prevalence of catastrophic health expenditure (CHE) to 1% are the commitments of the Islamic Republic of Iran. The aim of this study was to investigate the prevalence of households exposed to CHE.

Methods

This cross-sectional study was performed on 2000 households in five provinces of Iran in 2021. Data were collected through interviews using the World Health Survey questionnaire.

Results

Data from households whose health care costs were more than 40% of their capacity to pay were included in the group of households with CHE. Determinants of CHE were identified using multivariate regression analysis. 8.3% of households were exposed to CHE. The variables of being a female head of household, use of inpatient, outpatient, dental, and rehabilitation services, families with disabled members and low economic status of the households were significantly associated with increased odds of facing CHE.

Conclusion

In the final year of the sixth five-year development plan, Iran has not yet achieved its goal of "reducing the percentage of households exposed to CHE to 1%," and a high percentage of Iranian households still face CHE. Policymakers should pay attention to factors increasing the chance of facing CHE in designing interventions and this can help the goal of financial protection against health costs.

Background

According to the World Health Organization, one of the ultimate goals of health systems is to protect citizens financially against the catastrophic health expenditure[1].A household will face CHE when it spends more than 40% of its payment capacity out of pocket on receiving health services[2, 3].Health systems try to reduce the share of out-of-pocket payments when using health services by implementing mechanisms such as prepayments, subsidies, and free essential health services to increase financial protection. According to the World Health Organization, the CHE index in countries should be less than 1% [4, 5].Annually, a significant percentage of the world's population, often living in low and middle-income countries, face catastrophic and impoverishing health expenditures due to the direct payment of health costs, or avoid receiving appropriate and timely health services[6–8]. Out-of-pocket payment of health

expenditures is the most unfair way of financing health systems and brings about the highest risk for households to face CHE [9, 10]. However, the main method of financing health systems in low and middle-income countries is out-of-pocket payment[11].

Universal health coverage and financial protection of citizens against the catastrophic health expenditures is one of the obligations of the Islamic Republic of Iran[12]. For this purpose, in the law of the fourth (2005–2009), fifth (2011–2015), and the sixth (2017–2021) five-year development plans, as one of the national strategic plans and upstream documents of the country, the percentage of Iranian households facing CHE was targeted at 1%[13]. In this regard, measures and policies such as increasing the percentage of population with basic health insurance, implementing rural family physician program and the health system transformation plan (as the latest reform in the country's health system whose details are given elsewhere) have been implemented so far[12, 14].

However, at the end of the fourth and fifth plans, this goal was not achieved and according to various studies, there was a significant difference between the current situation and the predetermined goal (1%) [15–17]. According to the report of the research center of the Iranian parliament, the value of the CHE index for the country at the end of 2015 (end of the fifth development plan) was reported 6% [18]. Therefore, the goal of reducing the percentage of households facing catastrophic health expenditures to less than 1% was again included in the sixth development plan (Article 78)[13]. We are now in the final months of the sixth development plan. The main question is what is the percentage of households exposed to CHE in Iran? Has Iran achieved the goal of adequate financial protection of citizens against health costs and reducing the percentage of households facing CHE to 1%? This study was designed to answer these two questions.

Materials And Methods

Study Design

This cross-sectional and descriptive-analytical study was performed on Iranian households in 2021.

Data collection Tools

World Health Survey Questionnaire developed by the World Health Organization was used to collect the data[19]. This questionnaire has been translated in Iran and its validity and reliability have been confirmed in previous studies[6]. This questionnaire was completed through an interview with the head of the household or an informed household member over 18 years of age. The questionnaire consists of three parts:

- Background characteristics, demographic and socio-economic status of the household
- Status of using outpatient health services (including visiting a doctor, psychologist, midwife and nurse, pharmacy, medicine, and laboratory), dental and rehabilitation services and hospitalization.

The reminder period for using outpatient, dental and rehabilitation services was one month (last 30 days) and the reminder period for using inpatient services was one year (last 12 months).

- Monthly household expenses by type of expense, including total household expenses, household food expenses and out-of-pocket payments for health services. In this study, the reminder period for total household expenses was one month (last 30 days).

Sampling and Sample size

The sample size was estimated equal to 385 households based on the following formula, taking into account the exposure of 50% of households to CHE ($p = 0.5$), 95% statistical significance, and 5% accuracy rate. Due to the fact that the study was conducted in 5 provinces, the total sample size was determined to be 2000 households (400 households from each province).

$$n = \frac{Z^2_{1-\frac{\alpha}{2} \times P(1-P)}}{d^2}$$

Multi-stage sampling was used to choose the samples. Thus, among all the provinces of Iran (31 provinces), 5 provinces, including Tehran, Kurdistan, Golestan, Hormozgan, Kohgiluyeh and Boyer-Ahmad, were randomly selected. In the next stage, within each province, the city center of the province was selected. Then, the city center and its villages were selected. Next, 10 centers were randomly selected from the comprehensive health centers in each city and 10 centers from rural health centers. From the households covered by each urban and rural center, 20 households were randomly selected and the questionnaire was completed by visiting the door of the household. The head of the clusters was considered as the first household.

Statistical Analysis

Economic status of households

The economic status of the households was determined using the method proposed by O'Donnell et al[20]. In this method, household assets including LCD TVs, separate refrigerators, washing machines, cell phones, dishwashers, microwave ovens, Internet access, private cars, private homes, and the number of rooms were assessed. Then, the asset index for each individual was calculated using principal component analysis (PCA) and the study population was classified into 5 quantiles of 1 (the poorest), 2, 3, 4, and 5 (the richest). In some studies, the asset index has been used to determine SES in the Iranian population.

Catastrophic health care expenditure

In this study, the method provided by WHO was used to estimate the incidence of catastrophic health expenditures. Accordingly, if the amount of out-of-pocket payment (OOP) for health expenses by family members is more than 40% of the households' capacity to pay, the household is in the group of

households facing catastrophic health expenditures. Households' capacity to pay means effective income minus household living expenses. The method and details of CHE calculation are given in other studies[2].

Determinants of catastrophic health care expenditure

Multivariate logistic regression analysis was used to examine the role of determining variables (gender and age of the head of the household, basic and supplementary health insurance status, education and occupation of the head of the household, place of residence, use of inpatient, outpatient, dental and rehabilitation services, household size, household with a member more than 65 years old, having a disabled member, having a member under 5 years old and economic status of the household) when exposed to CHE. The use of health services was a two-way variable (yes / no). It should be noted that the "use of outpatient services" was not included in the multivariate logistic model due to its compatibility with the "socio-economic status."

Results

A total of 1926 households from five provinces of the country participated in this study, of which 90% (1739 people) were male heads of households and most had primary or middle school education (72%), were employed (75%) and only 5.8% (112 people) had supplementary insurance. In this study, the rate of exposure to CHE was reported to be 8.3%, which was significantly higher among users of rehabilitation services (35%), households with a socioeconomic status lower than average (27%), households with disabled members (22%), users of dental services (20%), female head of the household (17%) and being a housewife (17%) ($p < 0.05$). It should be noted that there was no difference in exposure to CHE between the studied provinces, educational groups, basic insurance coverage status, urban or rural status of the households, and household size ($p > 0.05$).

Table 2 shows the determinants of CHE exposure in the crude model, adjusted models and stepwise model. In the crude model, the majority of variables were among the determinants of CHE exposure ($p < 0.05$).

For instance, the odds for female heads facing CHE were 2.6 times higher than male heads ($P < 0.001$, 95% CI: 1.71-3.96), for households without supplementary insurance were 5.3 times ($P < 0.001$, 95% CI: 1.71-3.96), for users of outpatient services were 12.7 times ($P < 0.001$, 95% CI: 7.02-23.10), for users of rehabilitation services were 7.3 times ($P < 0.001$, 95% CI: 4.58-11.51), for users of inpatient services were 1.99 times ($P = 0.003$, 95% CI: 1.26-3.15), for households with lower socioeconomic status were 9 times ($P < 0.001$, 95% CI: 5.15-15.63), and for households with a disabled member were 3.8 times ($P < 0.001$, 95% CI: 5.33-15.14).

In the first adjusted model (control factors of age, sex, and education), the odds of encountering CHE in a household without supplementary insurance (OR = 4.35), in users of outpatient (OR = 12.73), hospitalization (OR = 1.68), rehabilitation (OR = 7.01), and dental services (OR = 3.17), in households

with a disabled member (OR = 3.75), and in households with a low socio-economic status (OR = 10.18) were reported to be significantly higher ($p < 0.05$).

In the final models, in order to obtain the desired model by removing variables with $p > 0.2$ in the adjusted model and by removing the independent variable that had little effect on the dependent variable in the stepwise model, still gender of head of the household, use of inpatient, dental and rehabilitation services, households with disabled members and socioeconomic status of households as final variables were significantly associated with household exposure to CHE ($p < 0.05$).

Discussion

Universal health coverage means that everyone has access to health services they need without facing financial barriers[21]. According to the World Health Organization, the CHE value should be less than 1% [4]. Achieving universal health coverage is one of the commitments of the Islamic Republic of Iran. In this regard, reducing the CHE index to 1% has been stated as a goal in the fourth, fifth and sixth five-year development plans of the country[13].

In this study, in total, the rate of exposure to catastrophic health expenditures in Iran was reported 8.3%. The highest percentage of exposure was seen among users of rehabilitation services (35%), households with poor socioeconomic status (27%), households with a disabled member (22%), dental services users (20%), female head of the household (17%) and housewives (17%). The difference in the percentage of CHE between provinces was not significant. Based on the findings of this study, in the last year of the sixth five-year development plan (2017–2021) as a strategic document, like the two previous development plans, Iran not only did not achieve the goal of reducing the percentage of households exposed to CHE to 1% and there is still a big gap to reach that goal, but also, based on the findings of previous studies, this gap seems to have become deeper[15–17]. According to the findings of another systematic and meta-analysis study in Iran (2017) conducted by Ghorbaian et al., the prevalence of households faced with CHE was reported to be 3.9% (95% CI, 3.26–11.07)[22]. Also, in the latest systematic and meta-analysis study in Iran (2018) conducted by Aryankhesal et al., in total, the percentage of households exposed to CHE was 7.5% (95% CI, 6.2–9.1) and for inpatient services was 35.9% (95% CI, 23.5–54.3)[15]. Based on a national study in Iran (2020) conducted by Moradi et al. on households with disabled children, 32.7% of households were exposed to CHE[23]. Also, according to the report of the research center of the Iranian parliament, the value of the CHE index for the country at the end of 2015 (end of the fifth development plan) was reported 6%[18]. A comparison of the findings of our study with the findings of the above studies conducted in recent years shows that the status of the financial protection index against CHE in Iran not only did not reach the 1% target but rather the gap between the status quo with a predetermined goal and the desired status seems to have widened[15, 17, 22]. Due to the situation caused by the Corona virus in the world and in Iran, on the one hand, it seems that the use of elective health services has decreased, which in turn can lead to an increase in unmet health needs and a false decrease in the percentage of exposure to CHE because of not using health services. On the other hand, the current situation can weaken the economic situation of households and

thus reduce households' capacity to pay and increase the prevalence of households facing CHE. Designing appropriate and targeted interventions to move towards achieving universal health coverage and more financial protection should be on the agenda of policy makers in the Iranian health system.

According to our study, in final models, variables of female head of household, use of inpatient, outpatient, dental, and rehabilitation services, families with disabled members and households with low socioeconomic status, were significantly associated with increased odds of facing CHE.

In most similar studies conducted in Iran, these variables have been reported as variables affecting the CHE[6, 24, 25]. In Iran, despite the fact that a high percentage of population is covered by basic health insurance, service coverage and depth of coverage of health costs are not in a good situation and these insurance companies have not been able to provide adequate financial protection of people against health costs and a significant part of the costs is paid out of the pockets[26]. In Iran, dental and rehabilitation services and equipment are not covered by basic health insurance and most of these services are provided by the private sector. In most studies, the use of rehabilitation and dental services have been reported as determinants of exposure to CHE[6]. The results of a systematic and meta-analysis study in Iran (2021) conducted by Soofi et al. showed that health insurance companies do not provide effective financial protection against CHE[26]. Based on the results of the study, the expansion of prepayment mechanisms, integration of insurance funds and designing insurance service packages to cover chronic diseases have been proposed as appropriate solutions for financial protection against CHE[26]. Findings of another systematic and meta-analysis study in Iran (2019) indicated that the variables of using inpatient, outpatient, and dental services, low education, rural life and low household income are the factors that determine CHE in Iran, and these variables increase the odds of encountering CHE[22, 23]. In another study in Iran (2020) on households with children with disabilities, the variables of female head of household, poor economic status of the household, lack of supplementary insurance and type of basic health insurance significantly increased the chances of facing CHE. According to a study by Kavosi et al. in Iran (Tehran), exposure to CHE was significantly associated with consumption of inpatient and dental services, the presence of a person over 65 in the household and low economic status[6].

According to our study, having supplementary insurance did not lead to greater financial protection and nor reduced the chance of facing CHE, which contradicts the findings of a number of previous studies[8, 10, 12].

Strengths Of The Study

This study was conducted at the national level and is the first study at this level to evaluate the goal related to the financial protection of citizens in the sixth five-year development plan of the Islamic Republic of Iran.

Limitations Of The Study

In this study, information was collected based on self-declaration of individuals, so the reminder bias may have occurred about the household expenses, health care costs and the type of health services consumed, although we tried to reduce this type of bias by shortening the reminder period.

Conclusion

The findings of this study indicated that in the last year of the sixth five-year development plan, Iran has not achieved the goal of "reducing the percentage of households exposed to CHE to 1%" and still a high percentage of Iranian households face CHE. Policymakers should pay attention to factors increasing the chance of facing with CHE in designing interventions and this can help the goal of financial protection against health costs. Considering the commitment of the Islamic Republic of Iran to achieve universal health coverage and provide adequate financial protection against health costs and the presence of this goal in various development programs; therefore, designing and implementing targeted interventions to reduce out-of-pocket payments and ultimately greater financial protection and a reduction in the percentage of households facing CHE should be on the agenda of policymakers. In this regard, increasing the government's share of total health costs, expanding appropriate prepayment mechanisms, reviewing service packages under insurance coverage and covering services such as dental and rehabilitation services, increasing the depth of coverage of health costs by insurance companies, payment exemptions for poor households and households with a disabled person can increase the protection of households against CHE.

Declarations

- **Ethics approval and consent to participate**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional level and/or national level Medical Research Ethics Committee (MREC) and in line with the 1964 Helsinki declaration and its later amendments.

- **Adherence to national and international regulations**

Not applicable

- **Consent for publication**

Not applicable

- **Availability of data and material**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

- **Competing interests**

The authors declare that they have no competing interests.

• Funding

This study was conducted with the financial support of the Vice Chancellor for Research and Technology of Kurdistan University of Medical Sciences (Contract number: 1399.076).

• Authors' contributions

BP and AS, contributed to study conception and BP, MMJ, HM, and AMB gathered data design and all authors were involved in analysis and interpretation process of data. SR, HS, AS and BP drafted and translated the manuscript and all the authors contributed by their comments of improvement in several revisions to reach a final manuscript.

• Acknowledgements

The authors of this article would like to thank all the participants who took part in this study.

• Authors' information (optional)

References

1. World Health Organization. The world health report 2000: health systems: improving performance. World Health Organization; 2000.
2. Xu K, Evans DB, Kawabata K, Zeramndini R, Klavus J, Murray CJL. Household catastrophic health expenditure: a multicountry analysis. *Lancet*. 2003;362:111–7.
3. Daneshkohan A, Karami M, Najafi F, Matin BK. Household catastrophic health expenditure. *Iran J Public Health*. 2011;40:94.
4. Etienne C, Asamoah-Baah A, Evans DB. Health systems financing: the path to universal coverage. World Health Organization; 2010.
5. Li Y, Wu Q, Xu L, Legge D, Hao Y, Gao L, et al. Factors affecting catastrophic health expenditure and impoverishment from medical expenses in China: policy implications of universal health insurance. *Bull World Health Organ*. 2012;90:664–71.
6. 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 Plan*. 2012;27:613–23.
7. Yardim MS, Cilingiroglu N, Yardim N. Catastrophic health expenditure and impoverishment in Turkey. *Health Policy*. 2010;94:26–33.
8. Ghiasvand H, Sha'baninejad H, Arab M, Rashidian A. Hospitalization and catastrophic medical payment: evidence from hospitals located in Tehran. *Arch Iran Med*. 2014;17.

9. Aregbeshola BS, Khan SM. Out-of-pocket payments, catastrophic health expenditure and poverty among households in Nigeria 2010. *Int J Heal policy Manag.* 2018;7:798.
10. Karami M, Najafi F, Karami Matin B. Catastrophic health expenditures in Kermanshah, west of Iran: magnitude and distribution. *J Res Health Sci.* 2009;9:36–40.
11. Chang AY, Cowling K, Micah AE, Chapin A, Chen CS, Ikilezi G, et al. Past, present, and future of global health financing: a review of development assistance, government, out-of-pocket, and other private spending on health for 195 countries, 1995–2050. *Lancet.* 2019;393:2233–60.
12. Takian A, Doshmangir L, Rashidian A. Implementing family physician programme in rural Iran: exploring the role of an existing primary health care network. *Fam Pract.* 2013;30:551–9.
13. Tehran. Deputy for Research D and C of L and R. Planning and Management Organization of the Islamic Republic of Iran. Five-Year Economic, Social and Cultural Development Plan of the Islamic Republic of Iran; 2017. pp. 2017–21.
14. Moradi-Lakeh M, Vosoogh-Moghaddam A. Health sector evolution plan in Iran; equity and sustainability concerns. *Int J Heal policy Manag.* 2015;4:637.
15. Aryankhesal A, Etemadi M, Mohseni M, Azami-Aghdash S, Nakhaei M. Catastrophic health expenditure in Iran: a review article. *Iran J Public Health.* 2018;47:166.
16. Vahedi S, Rezapour A, Khiavi FF, Esmaeilzadeh F, Javan-Noughabi J, Almasiankia A, et al. Decomposition of socioeconomic inequality in catastrophic health expenditure: an evidence from Iran. *Clin Epidemiol Glob Heal.* 2020;8:437–41.
17. Yazdi-Feyzabadi V, Bahrampour M, Rashidian A, Haghdoost A-A, Javar MA, Mehrolhassani MH. Prevalence and intensity of catastrophic health care expenditures in Iran from 2008 to 2015: a study on Iranian household income and expenditure survey. *Int J Equity Health.* 2018;17:1–13.
18. Heidari A, Adhami B, Vosoogh Moghaddam A. Evaluation of Implementation Laws for the Health Sector in the Fifth Development Plan. *Hakim Res J.* 2019;22:94–9.
19. Üstün TB, Chatterji S, Mechbal A, Murray CJL. The world health surveys. *Heal Syst Perform Assess debates, methods empiricism Geneva, World Heal Organ.* 2003;797.
20. O'donnell O, Van Doorslaer E, Wagstaff A, Lindelow M. Analyzing health equity using household survey data: a guide to techniques and their implementation. The World Bank; 2007.
21. Reich MR, Harris J, Ikegami N, Maeda A, Cashin C, Araujo EC, et al. Moving towards universal health coverage: lessons from 11 country studies. *Lancet.* 2016;387:811–6.
22. Ghorbanian A, Rashidian A, Bagheri Lankarani K, Kavosi Z. The prevalence and determinants of catastrophic health expenditures in Iran: a systematic review and meta-analysis. *Heal Scope.* 2019;8.
23. Moradi G, Bolbanabad AM, Abdullah FZ, Safari H, Rezaei S, Aghaei A, et al. Catastrophic Health Expenditures for Children with Disabilities in Iran: A National Survey. 2020.
24. Abolhallaje M, Hasani SA, Bastani P, Ramezani M, Kazemian M. Determinants of catastrophic health expenditure in Iran. *Iran J Public Health.* 2013;42:155.

25. Ghiasvand H, Gorji HA, Maleki M, Hadian M. Catastrophic health expenditure among Iranian rural and urban households, 2013–2014. Iran Red Crescent Med J. 2015;17.

26. Soofi M, Arab-Zozani M, Kazemi-Karyani A, Karamimatin B, Najafi F, Ameri H. Can Health Insurance Protect Against Catastrophic Health Expenditures in Iran? A Systematic Review and Meta-Analysis. World Med Heal Policy; 2021.

Tables

Table 1: Demographic characteristics of households by catastrophic health expenditure exposure status

		Faced with catastrophic health expenditures		
	Number (%)	No n (%)	Yes n (%)	<i>p-value</i>
Sex of household head				<0.001
Male	1739 (90.3)	1611 (92.6)	128 (7.4)	
Female	187 (9.7)	155 (82.9)	32 (17.1)	
Age of household head				0.001
<40	780 (40.5)	707 (90.6)	73 (9.4)	
40-50	713 (37.0)	643 (90.2)	70 (9.8)	
50<	433 (22.5)	416 (96.7)	17 (8.3)	
Insurance coverage				0.563
Yes	1874 (97.3)	1718 (91.7)	156 (8.3)	
No	52 (2.7)	48 (92.3)	4 (7.7)	
Supplementary insurance coverage				0.001
Yes	112 (5.8)	111 (99.1)	1 (0.9)	
No	1813 (94.2)	1654 (91.2)	159 (8.8)	
Education status of the household head				0.224
Illiterate	161 (8.4)	143 (88.8)	18 (11.2)	
Primary school	801 (41.6)	726 (90.6)	75 (9.4)	
Middle school	579 (30.1)	536 (92.6)	43 (7.4)	
High school	226 (11.7)	212 (93.8)	14 (6.2)	
University	159 (8.3)	149 (93.7)	10 (6.3)	
Job of household head				0.008
Has job	1444 (75.0)	1337 (92.6)	107 (7.4)	
Retired	93 (4.8)	88 (94.6)	5 (5.4)	
Housewife	23 (1.2)	19 (82.6)	4 (17.4)	
Unemployed	366 (19.0)	322 (88.0)	44 (12.0)	
Place of residence				0.171
Urban	1002 (52.0)	925 (92.3)	77 (7.7)	
Rural	924 (48.0)	841 (91.0)	83 (9.0)	

Utilization of Inpatient Services				<i>0.007</i>
No	1752 (91.0)	1616 (92.2)	136 (7.8)	
Yes	174 (9.0)	150 (86.2)	24 (13.8)	
Utilization of Outpatient Services				<i><0.001</i>
No	913 (47.4)	908 (99.5)	5 (0.5)	
Yes	654 (52.6)	857 (84.7)	155 (15.3)	
Utilization of Dental Services				<i><0.001</i>
No	1765 (91.6)	1604 (93.1)	119 (6.9)	
Yes	161 (8.4)	162 (79.8)	41 (20.2)	
Utilization of Rehabilitation Services				<i><0.001</i>
No	1832(95.1)	1705 (93.1)	127 (6.9)	
Yes	94 (4.9)	61 (64.9)	33 (35.1)	
Household size				0.064
4>	1076 (55.9)	977 (90.8)	99 (9.2)	
4<	203 (10.5)	789 (92.8)	61 (7.2)	
No	1860 (96.6)	1727 (92.8)	133 (7.2)	
Yes	66 (3.4)	39 (59.1)	27 (40.9)	
Household having member over 65 years old				<i><0.001</i>
No	1483 (77.0)	1357 (91.5)	126 (8.5)	
Yes	443 (23.0)	409 (92.3)	34 (7.7)	
Household having member(s) with disabilities				<i><0.001</i>
No	1799 (93.4)	1668 (92.7)	131 (7.3)	
Yes	127 (6.6)	98 (77.2)	29 (22.8)	
Household having member(s) under 5 years old				0.231
No	1425 (74.0)	1311 (92.0)	114 (8.0)	
Yes	501 (26.0)	455 (90.8)	46 (9.2)	
Socioeconomic status				<i><0.001</i>
Q1 (the poorest)	223 (11.6)	198 (88.8)	25 (11.2)	
Q2	441 (22.9)	371 (84.1)	70 (15.9)	

Q3	441 (22.9)	391(88.7)	50 (11.3)
Q4	408 (21.2)	398 (97.5)	10 (2.5)
Q5 (the richest)	413 (21.4)	408 (98.8)	5 (1.2)
Province			0.921
Tehran	383 (19.9)	355 (92.7)	28 (7.3)
Golestan	392 (20.4)	360 (91.8)	32 (8.2)
BandarAbas	382 (19.8)	350 (91.6)	32 (8.4)
BoyehAhmad	381 (19.8)	346 (90.8)	35 (9.2)
Kurdistan	388 (20.1)	355 (91.5)	33 (8.5)
Total	1926	1766 (91.7)	160 (8.3)

*Obtained from ANOVA

Average household total monthly expense was 3.07 ± 1.15 Iranian million Rial (122.8 US\$) and average household total monthly health expenditure was 197.06 ± 118.49 Iranian thousand Rial (7.89 US\$).

Table 2: Multivariate logistic regression results for determinants of exposure to CHE

	Model 1		Model 2		Model 3		Model 4	
	OR (95% CI)	<i>P- Value</i>	OR (95% CI)	<i>P- Value</i>	OR (95% CI)	<i>P- Value</i>	OR (95% CI)	<i>P- Value</i>
Sex of household head								
Male	1.00				1.00		1.00	
Female	2.59 (1.71- 3.96)	< 0.001	—		2.87 (1.76- 4.68)	< 0.001	2.75 (2.75- 1.64)	< 0.001
Age of household head								
<40	1.00							
40-50	1.05 (0.74- 1.49)	0.763	—					
50<	0.39 (0.23- 0.68)	< 0.001	—					
Insurance coverage								
Yes	1.00		1.00					
No	0.87 (0.32- 2.57)	0.871	0.92 (0.32- 2.60)	0.918				
Supplementary insurance coverage								
Yes	1.00		1.00		1.00			
No	5.25 (1.28- 21.45)	0.021	4.35 (1.05- 18.08)	0.043	0.32 (0.48- 2.68)	0.317		
Education status of the household head								
Illiterate	1.00							
Primary school	0.82 (0.47- 1.42)	0.477	—					
Middle school	0.64 (0.35- 1.14)	0.128	—					
High school	0.52 (0.25-	0.083	—					

	1.09)							
University	0.53 (0.23- 1.19)	0.126	—					
Job of household head								
Has job	1.00		1.00					
Retired	0.71 (0.28- 1.79)	0.467	0.90 (0.34- 2.35)	0.825				
Housewife	2.63 (0.88- 7.88)	0.084	1.65 (0.51- 5.34)	0.404				
Unemployed	1.71 (1.18- 2.47)	0.005	1.97 (1.34- 2.88)	0.001				
Place of residence								
Urban	1.00		1.00					
Rural	1.18 (0.86- 1.64)	0.303	1.25 (0.89- 1.74)	0.19				
Utilization of Inpatient Services								
No	1.00		1.00		1.00		1.00	
Yes	1.99 (1.26- 3.15)	0.003	1.68 (1.05- 2.69)	0.032	2.144 (1.28- 3.59)	0.004	1.82 (1.05- 3.15)	0.032
Utilization of Outpatient Services								
No	1.00		1.00					
Yes	12.73 (7.02- 23.10)	< 0.001	12.73 (7.02- 23.10)	< 0.001	—		—	
Utilization of Dental Services								
No	1.00		1.00		1.00		1.00	
Yes	3.41 (2.31- 5.04)	< 0.001	3.17 (2.13- 4.71)	< 0.001	3.28 (2.14- 5.03)	< 0.001	3.09 (1.99- 4.80)	< 0.001
Utilization of Rehabilitation Services								

No	1.00		1.00		1.00		1.00	
Yes	7.26 (4.58- 11.51)	$\leq$ 0.001	7.01 (4.39- 11.18)	$\leq$ 0.001	5.86 (3.30- 10.41)	$\leq$ 0.001	6.12 (3.38- 11.11)	$\leq$ 0.001
Household size								
4>	1.00		1.00		1.00			
4<	0.76 (0.55- 1.60)	0.11	0.87 (0.62- 1.23)	0.451	0.86 (0.59- 1.23)	0.400		
Household having member over 65 years old								
No	1.00		1.00					
Yes	0.89 (0.60- 1.32)	0.58	0.83 (0.56- 1.24)	0.372				
Household having member(s) with disabilities								
No	1.00		1.00		1.00		1.00	
Yes	3.76 (2.40- 5.91)	$\leq$ 0.001	3.75 (1.37- 5.95)	$\leq$ 0.001	3.38 (1.38- 4.10)	0.002	2.30 (1.32- 4.02)	0.003
Household having member(s) under 5 years old								
No	1.00		1.00					
Yes	1.16 (0.81- 1.66)	0.41	1.11 (0.76- 1.58)	0.61				
Socioeconomic status								
Q3 (the richest)	1.00		1.00		1.00		1.00	
Q2	6.87 (3.81- 12.39)	$\leq$ 0.001	6.71 (3.69- 12.21)	$\leq$ 0.001	7.06 (3.85- 12.95)	$\leq$ 0.001	7.12 (3.82- 13.25)	$\leq$ 0.001
Q1 (the poorest)	8.97 (5.15- 15.63)	$\leq$ 0.001	10.05 (5.72- 17.64)	$\leq$ 0.001	10.18 (5.73- 18.10)	$\leq$ 0.001	10.73 (6.00- 19.19)	$\leq$ 0.001

Province

Tehran	1.00			
Golestan	1.13 (0.66-1.91)	0.657	1.04 (0.61-1.77)	0.884
BandarAbas	1.15 (0.68-1.96)	0.584	1.07 (0.63-1.83)	0.800
BoyehAhmad	1.28 (0.76-2.15)	0.347	1.14 (0.67-1.93)	0.624
Kurdistan	1.18 (0.69-1.99)	0.539	1.09 (0.64-1.85)	0.762

Model 1: Crude model

Model 2: Adjusted model by age, sex and education level

Model 3: Adjusted model by removing all variables with p-value >0.2

Model 4: The stepwise regression method by adding or removing predictor variables in order to obtain the most parsimonious model