



Catastrophic Health Expenditure and Out-of-pocket Payments for Percutaneous Coronary Intervention (PCI) and Coronary Artery Bypass Grafting (CABG)

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Abstract

Background: When households have high out-of-pocket (OOP) expenses, they are more likely to experience poverty and encounter catastrophic health expenditures (CHE). Heart disease is a significant cause of health decline and mortality.

Objectives: This study aimed to provide essential knowledge about CHE and OOP for heart disease patients who underwent coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI) in Shiraz, Iran.

Methods: This cross-sectional study with two prospective follow-ups was conducted in three heart surgery centers in Shiraz, Iran. The data were collected using the world health survey (WHS). Catastrophic health expenditures and OOP were asked from the most informed family member. Generalized estimating equation (GEE) modeling was employed to identify the main factors related to CHE and OOP. Binary distribution with logit link and gamma distribution with log link were used for CHE and OOP, respectively. The significance level was set at 0.05.

Results: We found that OOP payment among patients who needed cardiovascular services in public-private partnership (PPP) hospitals was 76,953,100 Rials (R), equal to 2,506.78 \$ (USD) (SD = 53,247,600 R/1,734.56 \$) in the PCI group and 230,937,700 R equal to 7,522.89 \$ (SD = 248,295,200 R/8,088.32 \$) in the CABG group. This value in public hospitals was 15,083,800 R, equal to 491.36 \$ (SD = 18,637,600 R/ 607.13 \$) in the PCI group and 12,276,800 R, equal to 399.92 \$ (SD = 11,131,900 R/ 362.63 \$) in the CABG group. We also found that admission duration, age, type of hospital, and being currently a smoker were significant factors for OOP (P-value < 0.05). During baseline assessment, we also found that the percentage of PCI patients that faced CHE was 95.56% and 47.92% in PPP and public hospitals, respectively. This value in CABG patients was 92.31% and 40.45%. Our study showed that the type of hospital and socioeconomic status were significant factors (P-value < 0.05) that pushed a family facing CHE.

Conclusions: The baseline CHE is very high in both PCI and CABG patients. Thus, the government should pay special attention to this issue. Further investigations are needed on factors affecting OOP and CHE.

Keywords: Health Expenditures, Percutaneous Coronary Intervention, Coronary Artery Bypass, Iran

1. Background

Medical care imposes a high cost on patients and their families. High healthcare costs can increase patients' out-of-pocket (OOP) payments in suboptimal insurance coverage. When households share a high percentage of their healthcare cost in OOP, they are more likely to come upon impoverishment and catastrophic health expenditure (CHE) (1-4). Therefore, factors contributing

to the OOP and, consequently, CHE are important for health policymakers looking for ways to decrease them. To this end, countries worldwide have conducted different healthcare plans; for instance, Vietnam launched a healthcare system reform focusing on promoting social insurance in 1992 (5). Colombia performed healthcare reform to reduce healthcare financing through out-of-pocket payments and to decrease financial

barriers to access in 1993 (6). Since 2003, Turkish health policymakers conducted a program with the purpose of financial protection and enhancement of equity (7, 8). Besides, health policymakers in Iran decided to implement the health sector evolution plan (HSEP) on 5 May 2014 to reduce OOP payments for inpatient services and eradicate informal payments (9).

Heart disease is a major source of health loss and death worldwide, and coronary atherosclerosis, as a major representative of heart problems, is the most expensive state treated (10, 11). The majority of cases of coronary atherosclerosis involve patients who underwent percutaneous coronary intervention (PCI) or cardiac revascularization (coronary artery bypass graft (CABG)) during their hospitalization (12).

2. Objectives

This study aimed to determine CHE and OOP payment of heart disease patients who underwent CABG or PCI in Shiraz public and public-private partnership (PPP) hospitals after the HSEP.

3. Methods

3.1. Study Design

This cross-sectional study with two prospective follow-ups was conducted in hospitals F, K, and A, some of Shiraz's main heart surgery centers. Since we aimed to determine CHE and OOP, certain hospitals were selected among many Shiraz hospitals where heart surgery and heart care activities are performed. Hospitals F and A represent public (governmental) teaching hospitals, and hospital K represents PPP, non-teaching hospitals.

3.2. Study Population

All patients hospitalized in the hospitals from May 2019 to January 2021 comprised our study population. After receiving an ethical approval code for research and coordination with the Treatment Deputy and the Security Center, Health Policy Research Center (HPRC) investigators visited the mentioned hospitals daily in particular periods. The eligibility criteria were as follows:

(1) Families of admitted patients undergoing CABG surgery with stable conditions and the ability to speak intending to participate in the study.

(2) Families of patients undergoing PCI with stable conditions intending to participate in the study.

Families of patients with unstable conditions were not included in this inquiry.

3.3. Data Collection

In this research, CHE and OOP were asked from the most informed family member, who was aware of the household expenditures and financial affairs, besides the state of the members' insurance and jobs and their health service usage. The word 'household' is used since the mentioned factors involve the whole family. The world health survey (WHS) is a valid, reliable, and comparative instrument developed by the World Health Organization to help countries monitor their health system performance (13-15). The initial part of this questionnaire gathered demographic information. The patient was reminded that the study is prospective and (s)he will be called several times. Three valid phone numbers were taken. Afterward, the main part of the questionnaire again from the most informed family member, three, six, and nine months later prospectively (via a telephone call). The flowchart of the study is found in [Figure 1](#).

3.4. Study Variables

The study variables regarding the household included economic status based on household total expenditure, having health insurance or not, household head (father, mother, or others), having a member aged ≥ 65 years, having a member aged ≤ 5 years, the number of household members, having a disabled member, expenditure on dentistry service in the previous month, expenditure on inpatient service in the previous year, expenditure on outpatient service in the previous month, type of intervention (CABG or PCI), and hospital's category (public and PPP).

3.5. Catastrophic Health Care Expenditure Definition

According to Xu et al., we considered healthcare expenditure catastrophic if it was equal to or higher than 40% of the household capacity to pay and defined a second variable to capture this. Capacity to pay was defined as effective income (measured by total expenditure) minus basic subsistence needs adjusted for household size. Xu et al. have explained the methodology in detail (1, 13, 14, 16).

Another factor that must be considered is the amount spent on outpatient services, inpatient expenses besides the mentioned surgeries, and dentistry since they increase the percentage of CHE facing.

3.6. Statistical Analysis

In this research, generalized estimating equation (GEE) modeling, which is an extension of the generalized linear model and quasi-likelihood procedure, was employed to identify the main factors related to CHE and OOP

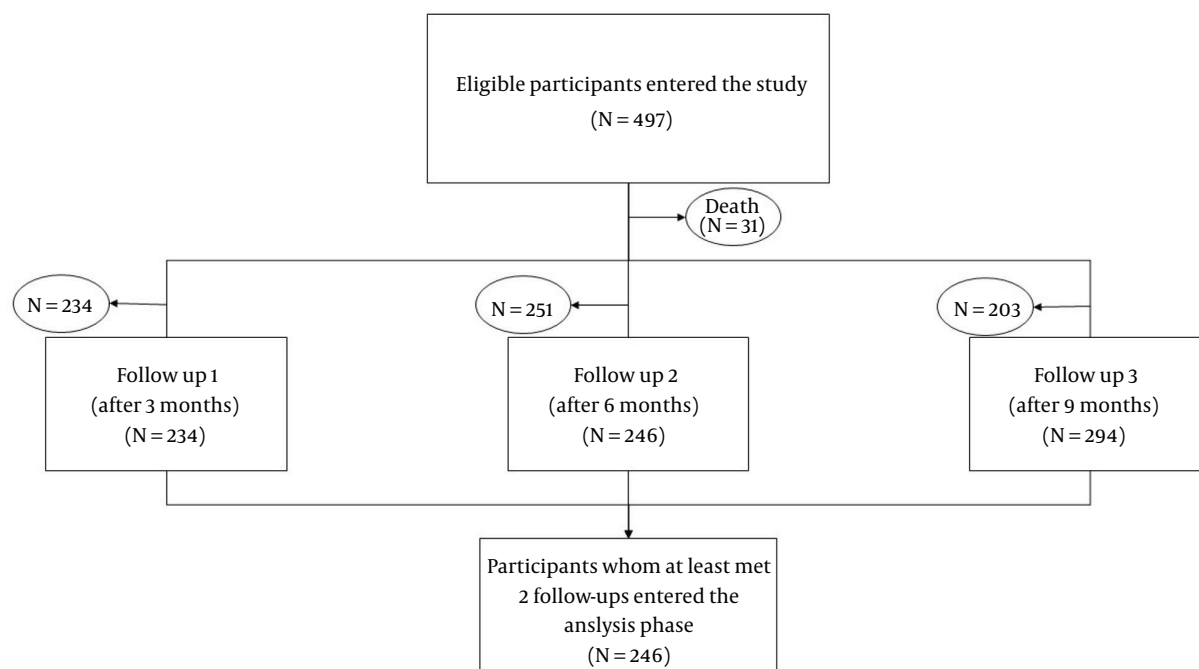


Figure 1. Flowchart of the study

(17, 18). Binary distribution with logit link and gamma distribution with log link were used for CHE and OOP, respectively. Moreover, the socioeconomic status (SES) variable was created using latent class analysis (LCA) in Mplus (ver. 7.0) (19-21). The number of owned cars, access to Wi-Fi internet, number of rooms, number of TVs, and ownership of dishwasher and microwave were used to construct SES clusters. Akaike information criteria (AIC), Bayesian information criteria (BIC), and the Bootstrap Likelihood Ratio Test (BLRT) were used to determine the optimal number of clusters. The optimal model was chosen based on the lower values for AIC and BIC and the significant P-values for BLRT. Costs in Iranian Rials were converted to the purchasing power parity adjusted US Dollars using the World Bank's data (world economic outlook database 2020). The significance level was set at 0.05.

4. Results

According to the AIC, BIC, and BLRT measures, the model with two clusters was selected to build the SES variable (Appendix 1). We named the clusters poor and middle/rich based on the frequency of assets in clusters. The frequency of assets in poor and middle/rich clusters is provided in Appendix 2. The patient characteristics

based on hospital groups are represented in Table 1. The frequency of CHE and descriptive statistics of OOP based on the type of operation (PCI and CABG) are presented in Table 2.

4.1. Generalized Estimating Equation

The results of the GEE model for CHE are displayed in Table 3. According to Table 4, patients admitted to hospital K (a PPP hospital) and hospital A (a public hospital) had higher odds of having CHE compared to hospital F (a public hospital). Patients with middle or rich SES had a lower chance of CHE than poor ones. Moreover, the results of the GEE model for OOP are illustrated in Table 4. As observed, patients admitted to hospitals K and A paid significantly more OOP than those admitted to hospital F. In addition, an increase in admission duration was associated with higher OOP payments. On the contrary, an increase in participants' age was linked to lower OOP payments. In addition, current smoker patients spent significantly less OOP than non-smokers.

5. Discussion

This study aimed to determine the proportion of patients facing CHE and estimate the OOP payments among the households of patients who underwent PCI

Table 2. The Frequency of Catastrophic Health Expenditures and Descriptive Statistics of Out-of-pocket Based on Operation Type ^a

	PCI		CABG	
	PPP Hospital	Public Hospitals	PPP Hospital	Public Hospitals
Catastrophic health expenditure				
Baseline				
No	5	25	1	22
Yes	143 (95.56%)	23 (47.92%)	12 (92.31%)	15 (40.45%)
After three months				
No	68	24	9	15
Yes	80	24	4	22
After six months				
No	61	13	6	13
Yes	87	35	7	24
After nine months				
No	52	14	10	8
Yes	96	34	3	29
Out-of-pocket				
Baseline	76953100 R/2506.78 \$ ± 53247600 R/1734.52 \$	15083800 R/491.36 \$ ± 18637600 R/607.13 \$	230937700 R/7522.89 \$ ± 248295200 R/8088.32 \$	12276800 R/399.92 \$ ± 11131900 R/362.63 \$
After three months	21827000 R/711.02 \$ ± 70934400 R/2310.72 \$	25874400 R/842.87 \$ ± 80267700 R/2614.75 \$	16196900 R/527.62 \$ ± 22992900 R/749.00 \$	33429500 R/1088.98 \$ ± 96808100 R/3153.56 \$
After six months	18308900 R/596.42 \$ ± 43173300 R/1406.39 \$	20721300 R/675.00 \$ ± 24378000 R/794.12 \$	67073100 R/2184.93 \$ ± 209936300 R/6838.76 \$	28970500 R/943.73 \$ ± 72626900 R/2368.85 \$
After nine months	21070300 R/686.37 \$ ± 63983000 R/2084.27 \$	16177700 R/527.00 \$ ± 19462500 R/634.00 \$	13134600 R/427.87 \$ ± 21360400 R/695.82 \$	15080300 R/491.25 \$ ± 12944800 R/421.68 \$

Abbreviations: PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting; PPP, public-private partnership.

^a Values are expressed as mean ± SD unless otherwise indicated.

and CABG in Shiraz, Iran, during 2019 - 2021 in public and PPP hospitals. We found that OOP payment among PPP hospitals was 76953100 R/2506.78 \$ (SD = 53247600 R/1734.56 \$) in the PCI group and 230937700 R/7522.89 \$ (SD = 248295200 R/8088.32 \$) in the CABG group. This value in public hospitals was 15083800 R/491.36 \$ (SD = 18637600 R/607.13 \$) in the PCI group and 12276800 R/399.92 \$ (SD = 11131900 R/362.63 \$) in the CABG group. Our results showed that admission duration, age, type of hospital, and being currently a smoker significantly impacted OOP payment.

During baseline assessment, we found that the percentage of PCI patients that faced CHE was 95.56% and 47.92% in PPP and public hospitals, respectively. This value in the CABG patients was 92.31% and 40.45%. Our study showed that the type of hospital and SES were significant factors that push a family facing CHE.

We estimated the OOP payments among households of patients who underwent CABG and PCI in different hospital types. A study conducted in 2016 compared OOP costs in 8 Asian countries and showed that OOP payments

had a broad range across countries. For example, in Malaysia, mean OOP costs were 69 US\$ for ST-elevation myocardial infarction (MI), while in China, this value was 4047 US\$ (22). Another study during 2018 - 2019 in Iran showed that the direct medical costs of CABG were about 183,907,460 Rials, and PCI was about 122,508,920 Rials in Tehran Heart Center, which is different from our finding (23). It could be due to the type of hospitals the study has not mentioned and different medical services prices in both cities (Tehran vs. Shiraz). In another study, OOP costs were estimated to be 16 million Rials per year for cardiovascular patients in 2015 (24).

Our results showed that admission duration, age, types of hospital, and being a smoker significantly affected OOP costs. The longer the duration of stay, the higher the OOP costs. Other studies confirmed our findings (25-27). When a patient's hospital stay is prolonged, their medical costs increase. In our study, age was inversely associated with OOP expenditure. In contrast, a study from Bangladesh found that age group was significantly associated with

Table 3. The Results of Generalized Estimating Equation Modeling for Catastrophic Health Expenditure

Variables (Reference)	Odds Ratio	Std. Err.	P > z	95% Confidence Interval	
Admission duration	0.979	0.050	0.682	0.886	1.082
Age	0.998	0.012	0.856	0.975	1.021
Number of family members	0.930	0.064	0.287	0.813	1.063
Hospital (hospital F)					
Hospital K ^a	3.463	1.622	0.008	1.383	8.673
Hospital A ^a	3.221	1.520	0.013	1.278	8.120
Informed person (other)	0.756	0.168	0.209	0.488	1.170
Father					
Breadwinner (no)	1.562	0.536	0.194	0.797	3.060
Yes					
Sex (female)	0.879	0.462	0.806	0.314	2.462
Male					
Job (unemployed)					
Employed	0.711	0.362	0.504	0.262	1.929
Disabled or retired	0.831	0.399	0.699	0.324	2.129
Education (illiterate)					
Diploma or under diploma	0.782	0.238	0.418	0.431	1.419
Academic	0.684	0.318	0.414	0.276	1.700
Ethnicity (other)					
Fars	1.073	0.229	0.742	0.706	1.631
Marital status (unmarried)					
Married	1.221	0.357	0.494	0.689	2.165
Complementary insurance (not have)					
Have	0.959	0.240	0.867	0.587	1.566
Operation (CABG)					
PCI	1.449	0.384	0.162	0.861	2.437
Habits					
Ex-smoker	0.693	0.241	0.292	0.350	1.371
Current smoker	0.747	0.203	0.284	0.438	1.274
Hookah	1.128	0.467	0.771	0.501	2.541
Opium	0.981	0.463	0.968	0.389	2.474
Surgical history (not have)					
Have	1.081	0.234	0.719	0.708	1.651
Other health problems (without)					
One health problem	0.882	0.231	0.630	0.528	1.473
Two or three health problems	0.784	0.222	0.390	0.451	1.365
More than three health problems	0.620	0.255	0.246	0.277	1.389
House care (no)					
Yes	1.841	1.301	0.387	0.461	7.351
Socioeconomic status (poor)					
Middle/rich ^a	0.515	0.110	0.002	0.339	0.782

Abbreviations: PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting.

^a Significant P-value (< 0.05).

higher OOP costs (28). One explanation for this result is that we analyzed the data of households for OOP, and the age variant is only for the patients who underwent the procedure.

Our study showed that types of hospitals have an association with OOP expenditures. The PPP hospital has a 5.3 times higher chance of having more patients with

OOP costs. That is because the insurance coverage for PPP hospitals is lower than that for public hospitals. Implementing the "health system reform" in Iran significantly reduced the proportion of OOP expenses for patients undergoing operations in public hospitals. The costs are now covered by the Ministry of Health in Iran (29). Hospital A is also a public hospital, and our results

Table 4. The Results of Generalized Estimating Equation Modeling for Out-of-pocket Payment

Variables (Reference)	Exp(b)	Std. Err.	P > z	95% Confidence Interval	
Admission duration ^a	1.077	0.036	0.024	1.010	1.149
Age ^a	0.983	0.007	0.026	0.969	0.998
Number of family members	0.963	0.042	0.386	0.883	1.049
Hospital (hospital F)					
Hospital K ^a	5.302	1.606	0.000	2.929	9.601
Hospital A ^a	2.641	0.809	0.002	1.449	4.814
Informed person (other)					
Father	0.877	0.125	0.357	0.664	1.159
Breadwinner (no)					
Yes	0.980	0.213	0.926	0.640	1.500
Sex (female)					
Male	1.465	0.500	0.263	0.751	2.858
Job (unemployed)					
Employed	0.980	0.324	0.950	0.512	1.875
Disabled or retired	0.972	0.304	0.926	0.526	1.793
Education (illiterate)					
Diploma or under diploma	0.781	0.145	0.183	0.543	1.124
Academic	0.868	0.257	0.631	0.486	1.550
Ethnicity (other)					
Fars	1.194	0.164	0.196	0.912	1.564
Marital status (unmarried)					
Married	1.017	0.191	0.927	0.704	1.469
Complementary insurance (not have)					
Have	0.878	0.138	0.410	0.645	1.196
Operation (CABG)					
PCI	0.765	0.133	0.124	0.545	1.076
Habits					
Ex-smoker	0.923	0.209	0.724	0.592	1.439
Current smoker ^a	0.607	0.108	0.005	0.428	0.860
Hookah	0.608	0.155	0.051	0.369	1.003
Opium	1.027	0.305	0.930	0.574	1.837
Surgical history (not have)					
Have	1.119	0.155	0.416	0.853	1.468
Other health problems (without)					
One health problem	1.191	0.198	0.294	0.860	1.649
Two or three health problems	1.104	0.198	0.581	0.777	1.569
More than three health problems	0.964	0.256	0.892	0.573	1.622
House care (no)					
Yes	1.756	0.751	0.188	0.759	4.059
Socioeconomic status (poor)					
Middle/rich	0.791	0.111	0.093	0.601	1.040

Abbreviations: PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting.

^a Significant P-value (< 0.05).

showed that patients' OOP was about 2.6 times higher in this hospital than in hospital F. Another study by Maharlou et al. showed the same results that hospital types have a significant effect on OOP (29). One explanation is the possibility of severity of the disease. Severe patients may be referred to hospital A, so the OOP expenditures differ. Another explanation is the possible effect of hospital

A being a teaching center for cardiologist residents, which may affect the OOP expenditures. However, we recommend further investigations and research.

We found that being a current smoker was an independent predictor of less OOP. This was also correct for the hookah; however, it was non-significant. No previous research has assessed "being a smoker" and its impact on

OOP. The possible explanations need more investigations with a larger sample size and on the difference of the elasticity of demand for healthcare compared to the cigarette in households of current smokers compared to the normal population. As mentioned before, we analyzed the variables on a household level, and "being a current smoker" is a characteristic specific to the patient only.

We estimated the proportion of patients who underwent CABG and PCI that faced CHE. Worldwide, a cross-sectional study performed in Ibadan, Nigeria, in 2022 found that catastrophic OOP payments ranged between 3.9% and 54.6% (30). Also, in another study, CHE was reported by 66% of those without insurance versus 52% of those with health insurance (22). In Iran, a cohort study showed that the proportion of households facing CHE had no significant change from 2003 (12.6%) to 2008 (11.8%) (14). Also, another study in Iran in 2017 demonstrated that 55% of patients faced catastrophic expenditures (24). In our study, CHE was above 90% in PPP hospitals and about 40% in public hospitals at the baseline, which is too much for patients who face it. The government must pay special attention to facilitating cardiovascular services for patients. Decimals of the population can be a good indicator for policymakers to be concerned about this problem.

Our study showed that the type of hospital and SES significantly affected the likelihood of patients facing CHE. As we discussed the types of hospitals and OOP before, the same applies to the chance of CHE. The more one pays for medical expenses, the higher the likelihood of facing CHE.

Our study categorized patients as poor, middle, and rich concerning SES. The results showed that having poor status doubles the chance of facing CHE. A systematic review conducted by Azzani et al. found that socioeconomic inequality plays an important role in facing CHE, and low-income households are at a high risk of financial hardship of medical expenditures (31). Also, Emamgholipour et al. found that income level negatively impacts CHE (24).

5.1. A Picture of OOP and CHE Over Time

Looking at the goals of HSEP, it seems that the CHE proportions found in this study are far more than its goal. Assessment of Iran's HSEP shortly after implementation showed a decreased percentage of direct patients' costs and OOP. However, the net value of payment and expenses were even increased. Most previous studies were cross-sectional and could not present a picture of the OOP and CHE during time. For this group of patients, we emphasize further investigation into the causes of the non-success of HSEP toward its goal (32).

The biggest strength of our study was its design, which followed patients prospectively. We followed our participants for one year by making phone calls every three months. Our sample size was another strength. We also included socioeconomic factors in our analytic methods to find effective factors in facing CHE. We even used appropriate and strong models to analyze our data.

The limitation of our study was the loss of participants during follow-up periods. We suggest that future studies should include private hospitals, other cities, and other factors that can affect CHE and OOP, such as insurance coverage, in their analysis.

In conclusion, we found that the baseline CHE is very high for both PCI and CABG patients. Thus, the government should pay special attention to this issue. We also found that admission duration, age, type of hospital, and being a smoker significantly affected OOP, and type of hospital and SES significantly affected CHE. The baseline CHE was very high, so the government should pay special attention to this issue. Finally, we recommend further investigating the effect of "age" and "being a smoker" on OOP.

Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Footnotes

Authors' Contribution: Study concept and design: KBL and SG; acquisition of data: AARK, AHRK, and SH; analysis and interpretation of data: SG and AARK; drafting of the manuscript: AARK, SG, and MS; critical revision of the manuscript for important intellectual content: KBL and SG; statistical analysis: MS and AARK; administrative, technical, and material support: SG, SH, and AARK; study supervision: KBL and SG.

Conflict of Interests: The authors declare that there is no conflict of interest.

Data Reproducibility: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to patient personal and financial information.

Ethical Approval: This study is approved under the ethical approval code of the Iran National Committee of Ethics [IR.SUMS.REC.1398.414](#).

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registered by the Research Deputy of Shiraz University of Medical Sciences with registration number 97-01-21-17871.

Informed Consent: All participants and their legal guardians (for illiterate participants) who entered the study filled out the informed consent form and were aware that they could leave this cohort study whenever they wanted.

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Table 1. Patient Characteristics Based on Hospital Groups (N = 246)^a

Subgroups	Qualitative Variables	
	PPP Hospital	Public Hospitals
Catastrophic health expenditure		
Baseline		
No	6 (3.7)	47 (55.3)
Yes	155 (96.3)	38 (44.7)
After three months		
No	77 (47.8)	39 (45.9)
Yes	84 (52.2)	46 (54.1)
After six months		
No	67 (41.6)	26 (30.6)
Yes	94 (58.4)	59 (69.4)
After nine months		
No	62 (38.5)	22 (25.9)
Yes	99 (61.5)	63 (74.1)
Gender		
Male	108 (67.1)	64 (75.3)
Female	53 (32.9)	21 (24.7)
Breadwinner		
No	45 (28.0)	17 (20.0)
Yes	116 (72.0)	68 (80.0)
Informed person		
Other	98 (60.9)	40 (47.1)
Father	63 (39.1)	45 (52.9)
Marital status		
Unmarried	28 (17.4)	12 (14.1)
Married	133 (82.6)	73 (85.9)
Employment		
Unemployed	49 (30.4)	23 (27.1)
Employed	36 (22.4)	34 (40.0)
Disabled or retired	76 (47.2)	28 (32.9)
Education		
Illiterate	27 (16.8)	19 (22.4)
Diploma or under diploma	119 (73.9)	58 (68.2)
Academic	15 (9.3)	8 (9.4)
Ethnicity		
Persian	110 (68.3)	65 (76.5)
Other	51 (31.7)	20 (23.5)
Province		
Fars	116 (72.0)	74 (87.1)
Other	45 (28.0)	11 (12.9)
Complementary insurance		
No	29 (18.0)	53 (62.4)
Yes	132 (82.0)	32 (37.6)
Operation		
PCI	148 (91.9)	48 (56.5)
CABG	13 (8.1)	37 (43.5)
Habit		
Never smoked	113 (70.2)	50 (58.8)
Ex-smoker	13 (8.1)	6 (7.1)
Current smoker	20 (12.4)	18 (21.2)

Hookah	9 (5.6)	6 (7.1)
Opium	6 (3.7)	5 (5.9)
Surgical history		
No	38 (23.6)	28 (32.9)
Yes	123 (76.4)	57 (67.1)
Other health problems		
Without health problems	30 (18.6)	25 (29.4)
One health problem	55 (34.2)	29 (34.1)
Two or three health problems	59 (36.6)	27 (31.8)
More than three health problems	17 (10.6)	4 (4.7)
House care		
Yes	3 (1.9)	2 (2.4)
No	158 (98.1)	83 (97.6)
Socioeconomic status		
Poor	107 (66.5)	64 (75.3)
Middle/rich	54 (33.5)	21 (24.7)
Quantitative Variables		
Out-of-pocket (baseline)	89386600 R/2911.81 \$ ± 94866800 R/3090.33 \$	13861900 R/651.56 \$ ± 15793200 R/514.47 \$
Out of pocket (after three months)	21372400 R/696.21 \$ ± 68300000 R/2224.90 \$	29163100 R/950 \$ ± 87382200 R/284651 \$
Out of pocket (after six months)	22246300 R/724.68 \$ ± 72080500 R/2348.05 \$	24312100 R/791.98 \$ ± 51088300 R/1664.22 \$
Out of pocket (after nine months)	20429500 R/665.50 \$ ± 61645100 R/2008.11 \$	15700000 R/511.43 \$ ± 16853900 R/549.02 \$
Age	61.16 ± 9.58	58.49 ± 10.59
Number of family members	3.70 ± 1.55	3.41 ± 1.26
Admission duration (days)	1.40 ± 1.15	2.13 ± 2.78

Abbreviations: PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting; PPP, public-private partnership.

^a Values are expressed as No. (%) or mean ± SD.