

Factors Affecting Health Care Expenditure in the First Piloted Government Health Insurance Program District of Nepal

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Financial burden on households due to health care is high in Nepal. High health care expenditure stands as a major obstacle in achieving universal health coverage, an explicit target of sustainable development goals. This study investigated the factors affecting health care expenditure in the first piloted government health insurance program in Kailali district of Nepal. A cross-sectional survey was conducted from January to February 2018 among 1048 households (6480 individuals) located in 26 wards of Kailali district after 21 months of the implementation of health insurance program in Nepal. The sample was selected in two stages, first stage being the selection of wards and second being the households. The analysis was restricted to only those individuals who reported illness and health care expenditure in the month prior to the survey. The data were analyzed using Mann Whitney U test, Kruskal Wallis test, and log-linear regression model. Out of 1439 ill individuals who reported health expenditure in the month prior to survey, the monthly average expenditure was 4907 Nepalese Rupees (NPR) (43.54 USD)- the medical cost was the main driver of health care expenditure. The log-linear multiple regression analysis revealed that health care expenditure was significantly associated with economic well-being, enrolment in health insurance, household size, type of residence, access to health facility, type of illness experienced, and severity of illness. The health insurance coverage was found to have reduced health care expenditure and it was progressive with the rich spent more on health care. Since health insurance coverage was associated with lower expenditure, findings from this study could inform policy in the on-going national health insurance debate in Nepal. The government health insurance program of Nepal is currently at initial stage, and if implemented effectively, will help financially vulnerable groups by covering health care expenditure.

Keywords: Health care expenditure; health insurance; Kailali, Nepal.

Introduction

It is widely accepted that health care expenditure imposes a significant burden on households facing health crisis (Essue et al., 2015) and is a worldwide concern (Barros & Bertoldi, 2008). In Nepal, access to health care largely depends on a patient's ability to meet expenses at the point of care. For example, household health care expenditure in Nepal constitutes a large share (55.4%) of the total current health expenditure (MOHP, 2018). This indicates that financial burden on households due to health care is high in Nepal. In this regard, the World Health Organization (WHO) has recently recommended the monitoring of such expenses through relevant financial protection indicators- one of the core components of universal health coverage (Adhikari, 2015; WHO & The World Bank, 2017). High household health care expenditure is a major obstacle in achieving universal health coverage, an explicit target under the recently announced sustainable development goals (WHO, 2015). Health is the most essential component of sustainable development. Out of pocket (OOP) payment is the principal source of health care finance in most South Asian countries, and Nepal is no exception. This fact has important implications for household living standard. Individuals can fall below the poverty line when they pay for health care at the expense of meeting their basic needs. But too often, families have no choice but to pay for care.

In a bid to address the financial constraint in health services, the Government of Nepal has implemented the Social Health Insurance Program (SHIP) in 2016. However, the program has been facing many challenges and only small segments of the population are enrolled in this scheme (Pokharel & Silwal, 2018; World Bank, 2017) and the social health insurance (SHI). Despite the fact that research pertaining to health expenditure and utilization is sporadically observed in the past, limited research papers have been published with respect to Social Health Insurance (SHI) in Nepalese context. In light of the above, this paper describes and delves into the potential covariates that explain the variation in health care expenditure of ill household members who sought health services in the first piloted SHIP at Kailali district, Nepal.

Study methods

Social health insurance program of Nepal

The SHIP is a social protection program of Government of Nepal, which aims to enable its citizens to access health care services without inflicting a financial burden. The program intends to prevent people from falling into poverty due to health care costs by combining prepayment and risk pooling with mutual support. The SHIP is a family-based health insurance scheme initiated by the Social Health Security Development Committee (SHSDC). This program is expected to play an important role in achieving Sustainable Development Goals (SDGs) by 2030, propelling the country towards Universal Health Coverage. The program was first implemented in Kailali district of Nepal and it is currently at the stage of expansion.

Study design, setting and sampling procedure

A cross-sectional household survey was conducted from January to February 2018 among 1048 households (98.3% response rate) with 6480 individuals in Kailali district after 21 months of the introduction of SHIP in Nepal. Kailali is home to approximately 142 thousand households with significantly higher poverty level as compared to national average (34% versus 24%) (CBS/The World Bank, 2013). A two-stage cluster sampling design was employed using United Nation's household survey (UN, 2008)- the first stage being the selection of wards followed by the selection of households. At the first stage, 26 wards comprising at least ten insured households from a list of wards were randomly chosen. The rationale behind selecting only wards comprising at least ten insured households was similar to the 2017 World Bank study regarding Nepal's SHIP (World Bank, 2017). During the second stage, 41 households were randomly sampled from each ward. In each ward, about 25% of the insured households were selected in such a way that health expenditure comparison would be meaningful. In other words, the case control ratio was approximately 1:3 and the design protocol was also endorsed during the process of ethical approval. Information regarding ward level insurance enrollment was obtained from local office, SHSDC, Kailali district.

Tool and data collection procedures

The study considered the household head or the most knowledgeable adult in a selected household an eligible respondent. To collect data, a pre-tested standardized questionnaire was used that included questions on household demographics, education, expenditure, and durable goods, episodes of illness, care-seeking behavior, and self-reported total health-related expenditures. The instrument was pre-tested among 30 participants in one of the wards of Rajapur Municipality of Bardiya district adjacent to the targeted study site, Kailali, Nepal. A face-to-face interview was conducted among 1048 respondents after obtaining their written consent. Seven trained enumerators were involved in data collection under the direct supervision of the author. Enumerators also had previous experience in data collection of large-scale surveys. A simulation exercise among the enumerators was conducted in order to minimize the plausible error. The respondents were informed about the purpose of the study and were assured about the confidentiality of their responses.

Variables

The dependent variable in this study is the self-reported health care expenditure of ill individuals. It is also called out-of-pocket (OOP) health expenditure, which is the direct payment made by households at the point of service use and the payment comprise fee for registration, diagnosis, consultation, surgery, medicine, and transportation cost (Ghimire, Ayer, & Kondo, 2018; You & Kobayashi, 2011). The independent variables include different characteristics such as individual, household, community, and health care need factors as suggested by earlier research (Beogo, Huang, Gagnon, & Amendah, 2016; Mahumud et al., 2017; Masiye & Kaonga, 2016; Wang, Temsah, & Carter, 2016). Economic status of the household was constructed by summing all

food as well as non-food expenditures and consumer durable items (Deaton & Zaidi, 2002).

Data analysis

First, background characteristics of study participants and the levels of health care expenditure have been presented by means of descriptive statistics. Second, bivariate analysis has been carried out between each of socio-demographic factors and health care expenditure. While performing bivariate analysis, the normality of health expenditure was tested using Kolmogorov-Smirnov (K-S) test. The K-S test was applied because the sample size was more than 50 in this study and the test was significant ($p < 0.05$). Thus, it was confirmed that the data were non-normal. So, non-parametric test was employed to identify whether there were any group differences in health care expenditure. The Mann-Whitney U test was used if the grouping variable had only two groups and Kruskal-Wallis test was administered for the independent variable that contained more than two groups. Finally, a log-linear regression model was employed to find the most prominent determinants of health care expenditure.

Owing to the presence of right-skewed and a large number of observation with zeros, modeling the determinants of health care expenditures entails a number of methodological challenges commonly reported in the literature (Gregori et al., 2011). In other words, the distribution of health care expenditure normally shows a high density at zero and a right-skewed continuous distribution of positive amounts. Different models are available to address the skewness and excess zeroes, but no unique model is capable of dealing with all issues simultaneously (Mihaylova, Briggs, O'Hagan, & Thompson, 2011). In order to minimize this problem, we only modeled expenditure for individuals who were ill and visited a provider (Deaton & Zaidi, 2002). Out of 1439 people who reported their expenditures, only 55 individuals (3.8%) reported zero health expenditure. Thus, a sample of 1384 cases of positive expenditure was dealt while modeling the estimation of health care expenditure using multivariate regression analysis. Because of positively skewed expenditure data, the natural log of expenditure was computed to better approximate a normal distribution for inference. The variables which did not show significant association with health care expenditure at the bivariate level were not included at the multivariate level in order to eliminate the spurious relationship between the variables.

The log linear regression model

The multiple regression equation used in this article was empirically modeled as;

$$\ln(E_i) = \alpha X_i + \beta V_i + \epsilon$$

Where, the dependent variable, $\ln(E_i)$, is the natural log of the amount spent on a sick member of the household. The natural log of health expenditure was used to reduce the effects of the skewed nature of health expenditure variable. Only those individuals who had recently reported themselves ill and visited a health care provider have included in this equation The

X_i represents a set of observed individuals, households, community, and health care need characteristics that determine expenditure. V_i is the vector of dummy variables included in the model. The coefficients α and β represent a set of regression parameters to be estimated from this model. ϵ_i is the stochastic disturbance error term that may not be captured in the model.

Ethical approval

The study was supported by the University Grants Commission (UGC) Nepal under Ph.D. Fellowship. Ethical clearance was obtained from the Nepal Health Research Council (NHRC) and Pokhara University Research Center (PURC). The data collection consent was taken from SHSDC, Nepal. Likewise, the study was also approved by Kathmandu University School of Education (KUSOED).

Results

Descriptive statistics of the sample

Information on health care expenditure or out-of-pocket health expenditure was collected for all household members who received health care services in the month prior to the survey. Expenditure was reported in Nepalese Rupees (NPR). Out of 6480 individuals surveyed, 1590 (24.5%) reported illness in the month prior to the survey. Out of 1590 ill household members, 148 did not seek any care and 3 members did not know the associated cost of health care expenditure in the month prior to the survey. This process left an analytical sample of 1439 individual household members. The mean level of total monthly health care expenditure for a sample of 1439 ill household members was 4907 NPR (43.54 USD). Medicinal cost was the main driver of health care expenditure and its share was 86% to the total health care expenditure. Among the study samples (1439), more than half (56.5%) of individuals were female whereas 75.3% of participants were under the age group 5-59. Slightly more than two-fifths of the individuals did not have formal education and 54% of individuals were married. Slightly less than two-fifths of the individuals were unemployed. The second column of Table 1 and Table 2 shows the characteristics of variables included in the study.

Health care expenditure by individual and household characteristics

The mean and standard deviation (SD) of health care expenditure for each category of individual and household characteristics along with their associated p-values have been presented in Table 1.

Table 1: Monthly health expenditure (in NPR) among sick members by individual and household characteristics in the first piloted social health insurance program district of Nepal, N=1439

Characteristics	N (%)	Mean	(SD)	Median	p-value
Gender					0.5354 ^a
Male	626 (43.5)	4548	(9352)	1200	
Female	813 (56.5)	5184	(14899)	1200	
Age group in years					0.0001 ^b
Less than 5 years	174 (12.1)	1512	(2843)	525	
5 to 59 years	1084 (75.3)	5423	(14093)	1300	
60 or more years	181 (12.6)	5083	(9504)	1920	
Education level					0.0001 ^b
No formal education	631 (43.8)	5179	(10225)	1670	
Primary	256 (17.8)	3987	(9161)	1100	
Secondary	392 (27.2)	4854	(13694)	1100	
Tertiary	160 (11.1)	5440	(11351)	1492	
Marital status					0.0001 ^b
Never married	588(40.9)	2912	(10231)	688	
Currently married	775 (53.9)	6419	(14448)	1700	
Widowed and others	76 (5.3)	4933	(10281)	1850	
Occupation status					0.0001 ^b
Not working	534(37.1)	5399	(13187)	1615	
Informal work	462 (32.1)	4628	(12273)	1000	
Student	242 (16.8)	4103	(15074)	850	
Formal work	201 (14.0)	5211	(9440)	1500	
Household health insurance enrolment					0.0000 ^a
Enrolled	467 (32.4)	3238	(8403)	900	
Not enrolled	972 (67.6)	5710	(14360)	1500	
Household consumption quintiles					0.0001 ^b
1st or poorest	218 (15.1)	3116	(8245)	700	
2nd quintile	263 (18.3)	3421	(7330)	950	
3rd quintile	260 (18.1)	3936	(6836)	1500	
4th quintile	330 (22.9)	5742	(14001)	1225	
5th or richest	368 (25.6)	6969	(18551)	1532	

Table 1: contd ...

Characteristics	N (%)	Mean	(SD)	Median	p-value
Gender of household head					0.0099 ^a
Male	1279 (88.9)	4577	(11736)	1200	
Female	160 (11.1)	7552	(19062)	1450	
Caste/Ethnicity of household head					0.0002 ^b
Tharu	750 (52.1)	4223	(11074)	1000	
Brahamin/Chhetri	468 (32.5)	6514	(15402)	1677	
Other castes	221 (15.4)	5052	(14628)	1200	
Household size					0.0374 ^b
4 or Less	261 (18.1)	5082	(9284)	1600	
5 to 8	867 (60.2)	5125	(14742)	1100	

a= p value of a Mann-Whitney U test or Wilcoxon Rank Sum test, b= p value of a Kruskal-Wallis test

The median level of expenditure is also presented for its robustness. Non-parametric tests have been employed since the outcome variable; health care expenditure was skewed in nature. Health care expenditure by individual characteristics showed that the variables such as age, education level, marital status, and working status significantly affect expenditure. Senior sick members aged sixty or more years spent almost 3.4 times higher than that of children (5083 NPR vs. 1512 NPR, $p < 0.01$). Though there was no clear pattern between health care expenditure and educational attainment of sick members, individuals with a tertiary education spent 36% more compared to those with primary level of education (5440 NPR vs. 3987 NPR). Unmarried were on the bottom of individuals paying less for health care compared to their counterparts (mean: 2912 NPR and median: 688 NPR). Students incurred the least amount of health care expenditure compared to individuals of other occupation.

Health care expenditure was found to be associated with household characteristics. Moreover, insurance coverage was associated with lower health care expenditure. Household members with health insurance spent an average of 3238 NPR on health care compared to 5710 NPR spent by those without health insurance. In other words, uninsured sick individuals spent 76% more on health care in comparison with the insured members. Spending on health care was positively associated with the economic status of household. Members of the wealthiest households spent more than double on health care compared to poorest group (6969 NPR vs. 3115 NPR). Non-working individuals and individuals living in households headed by a female member, and Brahamin/Chhetri caste reported higher health care expense than their counterparts. However, no clear association was observed between health care expenditure and educational attainment of the household head.

Health care expenditure by community and need factors

The distribution of health care expenditure by community and need factors along with their associated p-values have been presented in Table 2. Monthly health care expenditure according to community characteristics showed that urban residents had higher out-of-pocket spending on health care than rural residents indicating the status of development. On average, urban residents spent 78% more on health care compared to rural residents (5544 NPR vs.3109 NPR). Access to health facility did not show any association with health care expenditure (p-value=0.7284). Health expenditure varied by disease experienced for seeking care. Of the 1439 persons who reported their expenditure, individuals with heart disease spent the most followed by gynecological problem. The average spending on health care was the least for common cold, cough, and fever (Mean=1263 NPR). Members with chronic illness spent almost four times higher than those with acute illness (Mean chronic= 8891 NPR and Mean acute= 2218 NPR). Perceived severity of illness was found to be positively associated with health care expenditure. Individuals who perceived that their illness was severe spent more than four times compared to the individuals who perceived their illness to be not severe at all 7552 NPR vs. 1872 NPR). Spending for health care was found to be positively correlated with a number of service providers visited in a month. Individuals who visited two providers spent almost four times as high as those who visited only one provider in a month (8774 NPR vs. 2159 NPR). On the contrary, individuals who visited three or more providers spent almost nine times as high as that of single provider (20003 NPR vs. 2159 NPR). This shows that sick people have a burden of health care expenditure due to treatment in multiple places and it may also be an indication of the Nepalese poor health system.

Table 2: Monthly health expenditure (in NPR) among sick members by community and health care need factors in the first piloted social health insurance program district of Nepal, N=1439

Characteristics	N (%)	Mean	(SD)	Median	p-value
Urban-Rural status					0.0000 ^a
Urban-Nagarpalika	1063 (73.8)	5544	(13981)	1500	
Rural-Gaunpalika	376 (26.2)	3109	(8298)	525	
Access to health facility					0.035 ^a
Within half an hour	933 (64.8)	4780	(11779)	1200	
More than half an hour	506 (35.2)	5143	(14467)	1200	

Table 2: contd ...

Characteristics	N (%)	Mean	(SD)	Median	p-value
Type of most recent last illness					0.0001 ^b
Cold/Cough/Fever	407 (28.2)	1263	(3940)	500	
Skin disease	92 (6.4)	3120	(5724)	1150	
Anemia	53 (3.7)	5893	(12496)	1500	
Arthritis/Rheumatism	120 (8.4)	6758	(11318)	1960	
Respiratory	103 (7.1)	3898	(5216)	2000	
Gastritis	152 (10.6)	4905	(9324)	1600	
Headache/Migraine	63 (4.8)	7532	(26375)	1100	
Other health problems	449 (31.2)	7830	(7916)	2575	
Chronic -Acute illness					0.0000 ^a
Chronic	380 (26.4)	8891	(18395)	3100	
Acute	1059 (73.6)	2218	(5257)	675	
Perceived severity of illness					
High severe	163 (11.3)	7552	(18195)	2300	
Severe	479 (33.2)	6113	(13652)	1800	
Little severe	599 (41.6)	4227	(11970)	1000	
Not severe at all	198 (13.8)	1871	(3709)	500	
Number of service providers visited in a month					0.0001 ^b
One place	933 (64.8)	2159	(5560)	560	
Two places	444 (30.8)	8574	(16666)	4065	
Three or four	62 (4.3)	20003	(28774)	10000	

a= *p*-value of a Mann-Whitney *U* test or Wilcoxon Rank Sum test *b*= *p*-value of a Kruskal-Wallis test

Results from log-linear regression analysis

This section presents the results from log-linear regression analysis for estimating magnitude of health care expenditure. Multivariate results of the estimation of health care expenditure equation are shown in Table 3. A number of factors are shown to be related with incurring health care expenditure. In many cases, after adjusting for other explanatory variables, the associations between health care expenditure and background characteristics are different from that of the unadjusted (bivariate) associations described in the previous sections. The relationship was insignificant at the multivariate level though it was significant at bivariate level.

Individual-level characteristics did not seem to be much of a determinant of expenditure. Neither marital status nor occupation status of the ill member was statistically significant determinant of health expenditure. On the other hand, less money was spent by individuals older than 60 years compared to younger people. This could be an indicator of the importance that parents place on the health of their family members aged less than 60 years. Interestingly, the higher educational attainment level of ill members, the fewer expenses was observed on health care. This could be the reason that higher education is likely to be positively associated with insurance enrollment, which ultimately averts high health expenditures.

With respect to household-level characteristics, enrollment in health insurance, household size and the economic status of household emerged as significant predictors of health care expenditure. Individuals with health insurance spent fewer amount than those without health insurance, other factors remaining the same ($p < 0.01$). Particularly, insured persons spent 36.5% less than uninsured. Family size was negatively associated with health care expenditure. In other words, households with few members tend to spend more. This result suggests that people living in a big household require more health care benefit (Halliday & Park, 2009).

The wealth status of the household was associated with high expenditure while other factors being the same. Compared with individuals from the poorest households, those from third, fourth and fifth wealth quintiles spent more. With respect to the location of the household, rural individuals spent significantly less on health care than urban dwellers. Access to modern health care facility was also seen as a significant predictor of the level of OOP health spending. For example, individuals with access to the modern health facility within half an hour spent few amounts compared to those who had to travel more than half an hour. People who reported cold, cough, and fever had less financial burden compared to the rest of illness conditions. Patients of chronic illnesses spent more amounts of health expenditures compared to those of acute illnesses. This result implies that the state should design the benefits package according to the type of illness experienced. The perceived severity of illness was positively associated with health care expenditure. The magnitude of health expenditure was highly associated number of service providers visited during a month.

Table 3: Log-linear regression analysis of determinants of health care expenditure in the first piloted social health insurance program district of Nepal, n=1384

Explanatory variables	Attributes or categories	Coefficient	S.E.
Age group in years	5 to 59 =R		
	0 to 4	-0.008	0.126
	60 or more	-0.287**	0.119
Education level	No formal education =R		
	Primary	-0.169	0.134
	Secondary	-0.210	0.128
	Tertiary	-0.280*	0.158
Marital status	Married =R		
	Unmarried	-0.119	0.119
	Widow or other	-0.091	0.154
Occupation status	Not working =R		
	Informal sector work	0.077	0.096
	Student	-0.039	0.135
	Formal sector work	0.074	0.124
Head's gender	Male =R		
	Female	0.153	0.117
Head's ethnicity	Tharu =R		
	Brahamin/Chhetri	0.245	0.092
	Other castes	0.033	0.109
Enrollment in insurance	Not enrolled =R		
	Enrolled	-0.365***	0.074
Household size	4 or less =R		
	5 to 8	-0.292***	0.087
	9 or more	-0.386***	0.111
Wealth status	Poorest =R		
	2nd quintile	0.057	0.108
	3rd quintile	0.269**	0.109
	4th quintile	0.431***	0.107
	Wealthiest	0.472***	0.113

Table 3: contd ...

Explanatory variables	Attributes or categories	Coefficient	S.E.
Urban rural status	Urban-Nagarpalika =R		
	Rural- Gaunpalika	-0.226***	0.080
Access to health facility	More than half an hour =R		
	Within half an hour	-0.178**	0.072
Type of illness experienced	Cold/Cough/Fever =R		
	Skin	0.319**	0.136
	Anemia	0.275*	0.179
	Arthritis/Rheumatism	0.448***	0.134
	Respiratory illness	0.203	0.134
	Gastritis	0.320***	0.121
	Headache/Migraine	0.288*	0.158
	Other health problems	0.481***	0.099
Acute or chronic illness	Acute =R		
	Chronic	0.572***	0.075
Perceived severity of illness	No severe =R		
	Little severe	0.205**	0.099
	Severe	0.423***	0.101
	High severe	0.433***	0.125
Number of providers visited in a month		0.978***	0.056
Total number of cases who reported health care expenditure		1384	

* ** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, R= Reference category, S.E.= Standard Error, R²= 0.5514.

Discussion

This survey relied upon respondents to recall the amount spent on health care service and also used respondent self-assessment of illness indicating the methodological constraints in health expenditure research. The reliance on self-recall may be somehow problematic. Respondents could not always recall the amount spent on different types of service accurately. Thus, the findings presented here should be treated with caution. Three noteworthy results were found. First, the mean health care expenditure was 4907 NPR. Second, insured patients appeared to incur low expenditure. Finally, medication was the single most expensive component of health care expenditure. Similar results have been found in Nepal and elsewhere. For example, the 2018 National Health Accounts reported that spending on medication continues to be the

major health care expenditure in Nepal (MoHP, 2018). The study found that the magnitude of health care expenditure was significantly associated with household economic well-being, enrollment status in health insurance, household size, type of residence, access to modern health care facility, type of illness experienced, severity of illness, chronic/acute illness, number of providers visited. In terms of household economic well-being, this study revealed that poorer households spent less in absolute term on out-of-pocket payments. This finding matches with other studies from a number of countries (Chuma & Maina, 2012; Rahman, Gilmour, Saito, Sultana, & Shibuya, 2013). There are many ways in which health care expenditure might be positively associated with household economic well-being. For example, individuals with fewer resources may have used a mode of transportation that does not cost money while the non-poor might have actually spent more on travel-related expense in search of facilities with better quality and care. Another possibility could be that when public health facilities run out of drugs, patients often have to buy drugs at pharmaceutical retail outlets. Patients are also often asked to have an investigation conducted at a private facility upon visiting a public health facility. In such a case, ability to pay is likely to influence the magnitude of OOP payments. As documented in the previous studies, the poor might not afford the cost of drugs at retail outlets or investigation in private facilities and are more likely to skimp on quality or quantity of services (Laokri et al., 2013). Health insurance coverage was associated with low expenditure for health care services. Studies in other countries have also shown that health insurance protected enrollees by reducing health expenditure (Acharya et al., 2013; Aggarwal, 2010).

Conclusions and policy implications

This study provides a picture of health care expenditure and its determinants in the first social health insurance program piloted district of Nepal. The most recent data was collected in 2018 that provides comprehensive information on the household consumption expenditure including health care. This study indicated that medicine related cost comprised the largest component of health expenditure. The study found that expenditure on health care depends on many factors; household economic status, health insurance coverage, and type of self-reported illness for their most recent last disease/symptom. Factor such as socio-economic status of sick individuals was one of the major drivers of the magnitude of health care expenditure. Individuals in poorer households spent less than those in wealthier households. Since health insurance coverage was associated with lower expenditure, findings from this study could inform policy in the ongoing national health insurance debate in Nepal and elsewhere. The health insurance is currently at initial stage, and if implemented effectively, may help financially vulnerable households by covering health care expense.

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