

RESEARCH ARTICLE

The Impact of Thailand's Universal Coverage Scheme on Household Catastrophic Health Expenditure

Natthani Meemon and Seung Chun Paek*

Mahidol University, Thailand

*seungchun.pak@mahidol.ac.th

Abstract: As Thailand faced rapid demographic changes with economic growth, single-person households (e.g., elderly people living alone) have become emerging types of family. Thus, this study, using single-person and non-single-person household factors, examined the impact of the Universal Coverage Scheme (UCS) on household catastrophic health expenditure with the national-level health survey data 2015. Specifically, defining household catastrophic health expenditure as out-of-pocket expenditure exceeding 40% of household disposable income, this study analyzed whether the selected factors were related to the catastrophic expenditure by performing binary logistic regression analysis. The study findings indicated that among all households which received the UCS inpatient services, around 2.78% experienced the catastrophic expenditure. Lower-income and single-person households were more likely to encounter catastrophic expenditure. Among the single-person households, those with lower socioeconomic conditions had a higher incidence of the catastrophic expenditure. Specifically, the elderly, female, low-educated, unemployed, or had any chronic diseases were more likely to encounter the catastrophic expenditure. To address the issue, in the short term, the current copayment rate, which is equally levied to beneficiaries, should be adjusted by socioeconomic conditions. Additionally, the UCS should consider a copayment ceiling as a supplementary policy intervention in the situations where the copayment rate adjustment is not sufficient to prevent catastrophic expenditure. In the long-term, the government's effort to expand the benefits package should be continued by health care needs on the demand side as well as the cost-effectiveness of the policy on the supply side.

Keywords: catastrophic health expenditure, Thailand, Universal Coverage Scheme

Relatively low public expenditure on health is a common feature in most transition countries, including those in South-East Asia. Accordingly, these countries have depended largely on out-of-pocket (OOP) expenditure as a major financing source for their health systems (Gottret & Schieber, 2006; O'Donnell et al., 2008; Xu et al., 2003). In 2015, of the total health expenditure in South-East Asian countries,

public expenditure accounted for around 48%, and OOP expenditure accounted for around 39%. The dependency on OOP expenditure was much higher than that in the Organisation for Economic Co-operation and Development (OECD) countries. For the OECD countries, public and OOP expenditures of total health expenditure in the same year accounted for around 73% and 21%, respectively (Table 1; World Bank, 2018).

OOP health expenditure has been used as a key indicator for evaluating health system performance because of the significance of health access and utilization, which can eventually influence people's health. When the health system comes to depend on OOP expenditure more and more, it increases the financial barrier to health access and utilization. Accordingly, it can cause people to delay, and even forgo needed health care. In addition, such high dependency can cause catastrophic health expenditure, which is a potential factor to push people, especially those in poorer socioeconomic circumstances, back into poverty. Due to these reasons, countries have developed policy interventions such as social health insurance program to protect their people from excessive OOP or catastrophic health expenditure (OECD, 2017; World Health Organization [WHO], 2014).

In 2002, Thailand implemented the Universal Coverage Scheme (UCS), which is the largest social insurance program covering around 75% of the entire population. By the UCS, 75% of beneficiaries have received health services for 30 Thai Baht, which is equal to around only US\$0.9. (Health Insurance System Research Office, 2012). However, the removal of copayment does not mean the elimination of catastrophic health expenditure. As the UCS still does not fully cover costly severe diseases and require a certain level of copayment for the diseases, it can cause financial catastrophe to people. Even though the required copayment is generally affordable, it may be critical, particularly for people who have lower socioeconomic conditions.

Some studies previously analyzed the impact of the UCS on household catastrophic health expenditure. Defining household catastrophic health expenditure as

Table 1

Health Expenditure Indicators Among South-East Asian Countries (Year 2015)

Countries	Total Health Expenditure (% of GDP)	Public Health Expenditure (% of THE)	Private Health Expenditure (% of THE)	OOP Health Expenditure (% of THE)
Brunei Darussalam	2.62	93.99	6.01	6.01
Cambodia	5.98	20.86	59.99	59.36
Indonesia	3.35	38.20	61.19	48.30
Lao PDR	2.81	35.21	47.83	45.37
Malaysia	4.00	52.07	47.89	36.67
Myanmar	4.95	23.00	73.91	73.91
Philippines	4.41	31.40	68.05	53.54
Singapore	4.25	51.88	48.12	36.74
Thailand	3.77	77.08	21.10	11.77
Timor-Leste	3.09	62.55	10.27	10.23
Vietnam	5.65	41.81	47.47	43.48
SEA 11 Average	4.08	48.00	44.71	38.67
OECD 36 Average	8.87	72.89	27.01	20.65

Note: SEA 11 = 11 South-East Asian countries; OECD 36 = 36 OECD member countries; GDP = gross domestic product; THE = total health expenditure; OOP = out-of-pocket.

OOP expenditure exceeding 10% or 40% of household disposable income (i.e., income after subtracting household's non-consumption expenditure from household's total income), these studies showed a significant decrease in the number of households encountering the catastrophic health expenditure after the UCS (Health Insurance System Research Office, 2012; Limwattananon, Tangcharoensathien, & Prakongsai, 2007; Somkotra & Lagrada, 2009). However, at the same time, some of these studies showed that the catastrophic expenditure still existed in some households. As expected, households with a member who received inpatient services or services out of the UCS benefits package were at greater risk of the catastrophic expenditure. Additionally, households with lower income level, those with an elderly member, and those with a member who had chronic diseases or disability conditions were more likely to encounter the catastrophic expenditure (Limwattananon et al., 2007; Somkotra & Lagrada, 2009).

Other studies conducted in international settings also showed a similar pattern. Some of the studies showed that removal of user fee significantly decreased the incidence of catastrophic health expenditure. However, despite the user fee removal, use of inpatient services or services out of insurance coverage (e.g., private health services) was still a major cause of catastrophic health expenditure. Additionally, lower-income households, those with an elderly member, and those whose head had lower education level were more likely to encounter catastrophic expenditure (Masiye, Kaonga, & Kirigia, 2016; Xu et al., 2006).

The other studies, regardless of different policy settings across the studies (e.g., some settings included policy interventions such as social health insurance program but others did not), consistently showed that use of inpatient services was significantly related to a higher incidence of catastrophic health expenditure. Also, lower-income households, female-headed households, households with a child, households in a rural area, and households whose head were unemployed were more likely to encounter catastrophic health expenditure (Amaya Lara & Ruiz Gomez, 2011; Cleopatra & Eunice, 2018; Li et al., 2012; Pandey, Ploubidis, Clarke, & Dandona, 2018; Yang et al., 2016). Most of the previous studies set 40% of household disposable income as a threshold to define catastrophic expenditure.

The previous studies in the Thai setting investigated catastrophic health expenditure around the period of the UCS implementation. In fact, the UCS has continuously included costly services and medications (e.g., renal replacement therapy in 2008, and heart and liver transplantations in 2012) in the benefits package (National Health Security Office, 2014; Rousseau, 2014). In this sense, it may be meaningful to investigate which households still experience catastrophic health expenditure and whether the incidence pattern is different from previous findings.

More importantly, Thailand, like many other countries, has faced rapid demographic changes (e.g., fertility decline and life expectancy increase) together with economic growth. Subsequently, single-person households such as elderly people living alone have become emerging types of family (Peek, Im-em, & Tangthanaset, 2015; Teerawichitchainan, Knodel, & Pothisiri, 2015). For instance, a previous study showed that the prevalence of elderly people living alone has more than doubled within the last 20 years. Specifically, it increased from 3.6% in 1994 to 8.6% in 2011 (Peek et al., 2015). Thus, this study, considering previous findings and such emerging types of family, attempted to investigate the impact of the UCS on household catastrophic health expenditure.

Methods

Data Source and Study Sample

The Health and Welfare Survey (HWS) 2015 data was used as the main data source in this study (National Statistical Office of Thailand, 2019). The HWS data, which is a national-level health survey data, consists not only of demographic and socioeconomic characteristics but also health access and utilization information (e.g., health-seeking behavior and OOP expenditure). The National Statistical Office of Thailand releases the data annually or biannually.

Regarding the study sample, the unit of analysis of this study was the household. Thus, households with any members who have received the UCS inpatient services within the last one year were selected as the study sample. We initially planned to conduct both inpatient and outpatient analyses. However, the preliminary analysis that we conducted showed that among all households with any members who have received the UCS outpatient services, no households

faced catastrophic health expenditure. Thus, only inpatient analysis was performed in this study.

Variables and Statistical Analysis

Household catastrophic health expenditure, the dependent variable for the analysis, was measured as a dichotomous variable (yes and no). By applying the proposed method by the WHO (2005), if the total amount of OOP health expenditure that a household has spent within the last one year was greater than 40% of the household disposable income, then it was classified into the "yes" group. In the opposite case (smaller than 40%), it was classified into the "no" group. The household disposable income was estimated from subtracting non-consumption expenditure (e.g., taxes and contributions) from total income in each household.

In addition, a total of eight independent variables were selected by considering the previous studies and emerging types of family. The independent variables were (1) household income, (2) household location, (3) single-person household, (4) age of single-person householder, (5) gender of the single-person householder, (6) education level of the single-person householder, (7) employment status of single-person householder, and (8) chronic disease status of single-person householder.

Regarding measurement, household income was measured in a quintile rank ranging from 1 to 4. Higher quintile indicates a higher income level. Household location (rural and urban) and single-person household (yes and no) were measured as dichotomous variables. The rest of the variables were measured as categorical variables with three or four levels. Specifically, the age of single-person householder was classified into younger than 65, 65 or above, and not single-person household. Gender of the single-person householder was classified into male, female, and not single-person household.

The education level of the single-person householder was classified into low, middle, high, and not single-person household. Low meant "below primary school," middle meant "primary school," and high meant "secondary school or above." Lastly, for employment and chronic disease status of the single-person householder, they were classified into yes, no, and not single-person household. Particularly for chronic disease status, a total of 32 diseases, such as hypertension and diabetes, were specified as chronic

and congenital diseases in the HWS 2015 data. If householders had any one of the specified diseases, then we classified them into the group "yes." In the opposite case (if not have any one of the specified ones), we classified them into the group "no."

For statistical analysis, descriptive statistical analysis was performed to produce a summary of the study variables. For inferential statistical analysis, because the dependent variable, household catastrophic health expenditure, was dichotomous (yes and no), binary logistic regression (BLR) model was developed to analyze the association between the dependent variable and selected independent variables (Hosmer & Lemeshow, 2000). The statistical significance in the BLR model was determined with p -value < 0.05 , and IBM SPSS Statistics version 20 software was utilized for all statistical analyses conducted in this study.

Results

Descriptive Statistical Analysis

The results of descriptive statistical analysis for a summary of the study sample and variables are shown in Table 2. For household catastrophic health expenditure, among all households with any members who have received the UCS inpatient services within the last one year, around 2.78% were confronted with the catastrophic health expenditure. The incidence rate appeared to be higher among households in lower socioeconomic circumstances in general.

Specifically, lower-income households had a higher incidence rate of catastrophic expenditure than higher-income ones. The incidence rate in the lowest income quintile Q1 (4.77%) was around six times larger than that in the highest quintile Q4 (0.80%).

For the household location, the incidence rate of the catastrophic expenditure was higher among households in rural areas (3.05%) than those in urban areas (2.45%). Single-person households had a higher incidence rate of catastrophic expenditure. The incidence rate among single-person households (6.10%) was more than two times larger than that among non-single-person households (2.60%).

Furthermore, among the single-person households, the higher incidence rate of catastrophic expenditure was found among householders with lower socioeconomic conditions. Specifically, elderly and

Table 2
Results of Descriptive Statistical Analysis (%)

Variables	Overall	Household Catastrophic Health Expenditure	
		Yes	No
Household Catastrophic Health Expenditure			
Yes	2.78		
No	97.22		
Household Income			
Q1	25.28	4.77	95.23
Q2	25.31	3.21	96.79
Q3	24.91	2.27	97.73
Q4	24.50	0.80	99.20
Household Location			
Rural	54.87	3.05	96.95
Urban	45.13	2.45	97.55
Single-Person Household			
Yes	5.24	6.10	93.90
No	94.76	2.60	97.40
Age of Single-Person Householder			
Less than 65	2.63	4.67	95.33
65 or above	2.61	7.55	92.45
Not single-person household	94.76	2.60	97.40
Gender of Single-Person Householder			
Male	2.19	4.49	95.51
Female	3.05	7.26	92.74
Not single-person household	94.76	2.60	97.40
Education of Single-Person Householder			
Low	2.39	6.19	93.81
Middle	2.24	6.59	93.41
High	0.61	4.00	96.00
Not single-person household	94.76	2.60	97.40
Employment of Single-Person Householder			
Yes	2.61	3.77	96.23
No	2.63	8.41	91.59
Not single-person household	94.76	2.60	97.40
Chronic Disease of Single-Person Householder			
Yes	3.64	6.76	93.24
No	1.60	4.62	95.38
Not single-person household	94.76	2.60	97.40

female householders (7.55% and 7.26%) had higher incidence rates of the catastrophic expenditure than non-elderly and male householders (4.67% and 4.49%), respectively. For education level, lower-educated householders had a higher incidence rate. Specifically, the incidence rate among householders with primary school (6.59%) or below (6.19%) education level was larger than that among those with secondary school or above (4.00%) education level.

For employment status, the incidence rate of catastrophic expenditure among unemployed householders (8.41%) was more than two times larger than that among employed ones (3.77%). Lastly, for chronic disease status, householders with any specified chronic diseases (6.76%) had a higher incidence rate of catastrophic expenditure than those without any specified ones (4.62%).

Binary Logistic Regression Analysis

The results of the BLR analysis are shown in Table 3. In the BLR model, all variables except one variable (household location) were found to be statistically significant. Specifically, lower-income households were significantly related to a higher incidence of catastrophic health expenditure. The odds ratios specifically indicated that households in the income quintile Q1, Q2, and Q3 were 6.18, 4.09, and 2.87 times more likely to encounter the catastrophic expenditure than those in the quintile Q4. For a single-person household, it was positively related to the catastrophic expenditure. The odds ratio indicated that single-person households were 2.44 times more likely to encounter catastrophic expenditure than non-single-person ones.

Among the single-person households, like the results of the descriptive statistical analysis, householders who were elderly, female, low-educated, unemployed, or had any specified chronic diseases were more likely to encounter the catastrophic health expenditure. Specifically, for age and gender, the odds ratios among elderly and female householders (3.06 and 2.94) were higher than those among non-elderly and male householders (1.84 and 1.77). For education, lower educated householders were more likely to encounter catastrophic health expenditure than higher educated ones. The odds ratios of catastrophic expenditure among householders with primary school (2.65) or below (2.48) education level were higher than those with secondary school or above (1.56) education level.

For employment and chronic disease status, unemployed householders and householders with any specified chronic diseases had higher odds ratios of the catastrophic health expenditure (3.45 and 2.72) than employed householders and householders without any specified ones (1.47 and 1.82). Lastly, for household location, like the results of the descriptive statistical analysis, households in rural areas were more likely to encounter catastrophic health expenditure than those in urban areas, but the relationship was not statistically significant.

Discussion

Due to rapid demographic changes together with economic development, single-person households such as elderly people living alone have become emerging types of household in Thailand. Thus, this study, considering both single-person and non-single-person household factors, investigated the impact of the UCS on household catastrophic health expenditure with the nationwide HWS 2015 data. Specifically, by employing the method proposed by the WHO, we measured household catastrophic health expenditure as OOP expenditure exceeding 40% of household disposable income and examined whether the selected factors were associated with catastrophic expenditure.

The study findings indicated that among all households with any members who have received the UCS inpatient services within the last one year, around 2.78% were confronted with catastrophic expenditure. The incidence rate was relatively lower than that in previous studies, though analytical approaches differ slightly across the studies (Health Insurance System Research Office, 2012; Limwattananon et al., 2007). For instance, Limwattananon et al. (2007) used 10% of household disposable income as the threshold for catastrophic expenditure and indicated that the incidence rate of the catastrophic expenditure in 2004 was around 7%–11%. The decreased incidence rate, as expected, might be partly due to the continuous expansion of the UCS benefits package.

Despite the decreased incidence rate, households are still at greater risk of catastrophic expenditure, particularly in poorer socioeconomic circumstances. Specifically, for non-single-person household factors, lower-income households significantly had a higher incidence of catastrophic expenditure, as previous studies have consistently shown. For single-person

Table 3*Results of BLR Analysis: Household Catastrophic Health Expenditure Yes (vs. No)*

Variables	OR	95% CI
Household Income		
Q1	6.18	(2.91, 13.12)*
Q2	4.09	(1.88, 8.90)*
Q3	2.87	(1.28, 6.45)*
Q4 ^a	1.00	
Household Location		
Rural	1.25	(0.85, 1.83)
Urban ^a	1.00	
Single-Person Household		
Yes	2.44	(1.35, 4.42)*
No ^a	1.00	
Age of Single-Person Householder		
65 or above	3.06	(1.45, 6.47)*
Less than 65	1.84	(0.73, 4.61)
Not single-person household ^a	1.00	
Gender of Single-Person Householder		
Male	1.77	(0.64, 4.91)
Female	2.94	(1.45, 5.96)*
Not single-person household ^a	1.00	
Education of Single-Person Householder		
Low	2.48	(1.06, 5.79)*
Middle	2.65	(1.13, 6.21)*
High	1.56	(0.21, 11.67)
Not single-person household ^a	1.00	
Employment of Single-Person Householder		
Yes	1.47	(0.53, 4.08)
No	3.45	(1.69, 7.02)*
Not single-person household ^a	1.00	
Chronic Disease of Single-Person Householder		
Yes	2.72	(1.39, 5.33)*
No	1.82	(0.56, 5.88)
Not single-person household ^a	1.00	

Note: * = significant at 0.05; OR = odds ratio; CI = confidence interval; a = reference.

household factors, single-person households were more likely to encounter catastrophic health expenditure than non-single-person ones. Additionally, among the single-person households, householders with lower socioeconomic conditions had a higher incidence of catastrophic expenditure. Specifically, householders, who were elderly, female, low-educated, unemployed, or had any specified chronic diseases, were more likely to be confronted with catastrophic expenditure.

Based on the findings, we propose two policy interventions: copayment rate adjustment and copayment ceiling. First, the current copayment rate, which is equally levied to beneficiaries, needs to be adjusted according to their socioeconomic conditions. As previous studies and this study showed, the removal of copayment and the expansion of the benefits package significantly decreased the incidence of the catastrophic health expenditure. However, the UCS still does not fully cover or partly covers costly severe diseases and require a certain level of copayment for the diseases. Even though the required copayment might be affordable in general, it still appeared to be a considerable financial burden to lower socioeconomic households, such as lower-income or single-person households. Additionally, if we consider that the number of single-person households has increased drastically (Peek et al., 2015) and the increase is expected to continue at a faster rate, the copayment rate adjustment should be an urgent policy consideration for such households.

Particularly for single-person households, poor elderly householders are our main concern. As this study indicated, among the single-person households, householders who were elderly and unemployed had higher odds ratios of the catastrophic health expenditure than any other groups. These people, especially those without a regular connection and support from families and relatives, probably depend only on monthly subsidies from the universal pension, which is even insufficient for their minimum living costs such as food and room rent. Furthermore, they tend to be chronic patients with a certain level of mobility constraints who need intensive care and support on a regular basis (Osornprasop & Sondergaard, 2016). In this sense, these people, due to their much greater needs of health care but poorer economic conditions, may be most vulnerable to catastrophic health expenditure. Thus, poor elderly people who live alone should be the first target group for the copayment rate adjustment.

Second, the UCS needs to consider a copayment ceiling as an additional policy intervention, particularly for long-stay patients in cases where the copayment rate adjustment is not sufficient to protect them from catastrophic expenditure. Such copayment ceiling policy has been implemented in some of the OECD countries, whereby the policy sets a maximum ceiling amount of copayment, and patients are responsible for paying copayment only up to the maximum ceiling amount. The maximum ceiling amount is also differential by socioeconomic conditions and types of diseases (National Health Insurance Service, 2015).

As mentioned, the incidence rate of the catastrophic expenditure found in this study was lower than that found in previous studies. We believe that it may be partly due to the government effort to expand the UCS benefits package, though a systematic examination of how the expansion could decrease the incidence of the catastrophic expenditure should be further performed. It suggests that our proposed policy interventions should be accompanied by government effort. The expansion of the benefits package should be based on health care needs on the demand side, as well as cost-effectiveness of the policy on the supply side.

Limitations of the Study

First, the HWS data included only the primary hospitalization record of respondents. If a respondent has been hospitalized multiple times within the last year, the data recorded only the primary one. For this reason, the policy impact shown in this study (i.e., the incidence rate of the catastrophic expenditure and related factors) was possibly underestimated. The National Statistical Office of Thailand should consider the issue to improve the survey for capturing a whole range of hospitalization records, rather than a snapshot.

Second, this study was unable to explore which types of disease were related to catastrophic health expenditure due to unavailability of such clinical information in the HWS data. Previous studies have cited three groups of factors as important determinants of catastrophic health expenditure, which are socioeconomic factors (e.g., household income), health system factors (e.g., health insurance status), and clinical factors (e.g., types of diseases; Puteh & Almualm, 2017). Thus, the future study needs to consider merging the HWS data with other data sources comprising such clinical information (e.g., medical

claims data) for a more comprehensive analysis and assessment of the policy impact.

Third, this study, like previous studies, measured catastrophic health expenditure for only households that received health services. Accordingly, we could not consider the cases where households, particularly lower-income households, might decide not to receive any health services rather than become impoverished. Because of this measurement issue, the policy impact might not be fully captured in this study. To address the methodological issue, qualitative methods would be necessary considerations for future study.

Lastly, although this study found that single-person households were at greater risk of catastrophic health expenditure, detailed types of single-person households (e.g., poor elderly householders or female elderly householders) still need to be further examined. As one of the study objectives was to explore overall household patterns of catastrophic expenditure, we selected all households as the study sample without a clear separation between single-person and non-single-person households. For this reason, the analysis focused more on comparing single-person to non-single-person households. As mentioned, single-person households were found to be more vulnerable than non-single-person ones, and such types of households have become emerging due to rapid demographic changes. Thus, by selecting only single-person households, such detailed household types and their associations to catastrophic expenditure should be further investigated.

Conclusion

Although the UCS has significantly reduced OOP health expenditure and improved health utilization for beneficiaries, it may be hardly expected to achieve further improvement without adequacy of public-sector health resources, which has long been cited as an important determinant of health utilization (Sakunphanit, 2006; Sakunphanit & Suwanrada, 2011; World Bank, 2007). Especially among single-person households, the elderly and unemployed householders are our main concern due to their much greater needs of health care but poorer economic conditions, as this study showed. For these people, even though the UCS eliminates all financial burdens of health utilization, there is still a doubt of improvement of health utilization due to non-medical costs and supports (e.g., affordable transportation and caretakers).

In general, elderly people tend to have not only a certain level of mobility constraints but also chronic diseases, which require intensive care and support on a regular basis. If they live alone without any connections and supports from families and relatives, such mobility constraints, together with lack of caretakers, are a critical barrier to health utilization. Furthermore, these people tend to live on public pension subsidies alone, which are not enough for their minimum living costs. They do not have additional resources for health care and even for traveling to health facilities. Particularly for those in rural and remote areas where public transportations (e.g., taxis or public buses) are not readily available, such poor economic situations may be a more critical barrier to health access and utilization (Osornprasop & Sondergaard, 2016).

It may imply that health policy alone without any collaborations with other social welfare policies may bring a limited effect and success because one social issue is interrelated with other social issues. Such collaboration may be more important, especially given the aging population. Thus, the government should make an effort to shift from the current health and social welfare policies, which are implemented independently, to an integrated approach, which can comprehensively address such interrelated social issues. For that, restructuring and combining such separate policies and program according to the goals and functions should be the first step.

Declaration of ownership

This report is our original work.

Conflict of interest

None.

Ethical clearance

The study was approved by the institution.

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