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Original Research Article

Catastrophic health expenditure: a community-based study in Sarawak, Malaysia

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ABSTRACT

Background: Accessing health services can lead to individuals having to pay catastrophic proportions of their available income and push many households into poverty. The aim of the study was to estimate the catastrophic health expenditure in respect of household expenditure and to determine the factors affecting it in Sarawak, Malaysia.
Methods: We collected household expenses based on a recall period of one month through a face-to-face interview. We calculated the catastrophic health expenditure in terms of 10% of household expenditure and 40% of the capacity to pay. A binary logistic regression analysis was done to determine the factors associated with catastrophic health expenditure. Data analysis was done by IBM SPSS version 27.0.
Results: The analysis revealed that one-quarter (25.7%) of the household expenditure was on food, equivalent to MYR 373.562, and 18.83% of the total household expenditure was on health (MYR 292.83). About two-fifths (37.4%) of the households had incurred catastrophic health expenditure on 10% of household consumption and 15.6% catastrophic health expenditure on 40% of household expenditure. Multivariate analysis with forward and backward linear regression methods revealed that age, gender, family size, socioeconomic status, and chronic illness appeared to be potential predictors of 10% catastrophic health expenditure ($p<0.05$). In contrast, socioeconomic status and level of education appeared to be potential predictors for 40% catastrophic health expenditure ($p<0.05$).
Conclusions: Subsidised health care may not protect against the occurrence of catastrophic health expenditure among the household in the lower socioeconomic status. Family size and age also could affect household catastrophic health expenditure.

Keywords: Household expenditure, Catastrophic health expenditure, Sarawak, Malaysia

INTRODUCTION

Accessing health services can lead to individuals having to pay catastrophic proportions of their available income and push many households into poverty.[1,2] Catastrophic health expenditure (CHE) is defined as "the household health expenditure exceeding more than 40 per cent of the remaining income after the subsistence needs had been met".[3] Another definition by Doorsaler et al stated that "catastrophic health expenditure occurred when the heath expenditure was more than 10% of household consumption".[4] The WHO identified three major factors that lead to catastrophic payments, such as- (a) the availability of health services requiring out-of-pocket payments; (b) low household capacity to pay; and (c) lack of prepayment mechanisms for risk pooling.[5]

This occurred in countries with used Out-of-Pocket (OOP) expenditure for health and countries with universal coverage or free health facilities.[6,7] The increasing cost of

health care and the socioeconomic factors could lead to catastrophic health expenditure.[8,9]

The Malaysian state of Sarawak is located on the island of Borneo. Similar to its counterpart in West Malaysia, the health system consists of both public and private health facilities.[10] Health care services in public facilities are highly subsidised, and this applies to both outpatient care and hospital care. The Malaysia Household Expenditure survey in May 2016 reported that the household expenditure per month for Sarawak was MYR 3,118.00. This is an increment from the previous figure of MYR 2,826.31 in May 2014. The survey also reported that the health expenditure was MYR 47.00 in May 2016. an increase from the previously recorded data of MYR 39.26 in May 2014.[11] The Total Expenditure on Health (TEH) for Malaysia between 1997 to 2017 increased from MYR 8,550 million in 1997 to MYR 57,361 million in 2017. Meanwhile, TEH as a share of Gross Domestic Product (GDP) for the same period ranged from 3.03% to 4.24% of GDP.[12] The per capita expenditure on health in nominal value ranged from MYR 393 in 1997 to MYR 1,790 in 2017. In constant values, per capita, health expenditure ranged from MYR 706 in 1997 to MYR 1,790 in 2017.[12]

The costs associated with healthcare is becoming a major worry for many Malaysians with the increasing incidence of financial distress.[13] The primary healthcare treatment or a first-line treatment via public healthcare would incur a fee ranging from MYR 1 to MYR 5 per visit. In contrast, the costs for accessing similar services at private clinics and hospitals vary from MYR 30 to MYR 125 for general practitioner visits and between MYR 80 to MYR 235 for specialist consultation. This variation is significantly much higher in cases of critical illness.

Gotsadze et al reported that in Georgia (country), 11.7% of households had CHE.[14] Further analysis revealed that among the most disadvantaged quintile, 17.7% of them incurred CHE. In addition to that, it was reported that households located in the capital city had the highest incidence of CHE (14.8%). Meanwhile, in India, after analysing the World Health Survey 2003 and National Health Survey, CHE was 33.9% when calculated based on the proportion of the capacity to pay [15]. In general, the higher the OOP share in the total health expenditure, the more likely the household would face financial catastrophe. Due to the dual health system in Sarawak, the study findings will be useful in informing policy options for national health financing. We aimed to determine the amount of CHE among the households in Sarawak and also to identify predictors for the occurrence of CHE.

METHODS

Study setting and sampling

This was a cross-sectional study conducted in Sarawak. A multi-stage cluster sampling technique was used to select the respondents. A total of 1094 households from three administrative divisions were selected randomly. The three divisions were Kuching, Sibu, and Limbang. Kuching is located in the southern region of Sarawak, Sibu in the central region, while Limbang is in the northern region of Sarawak. From the three divisions, four districts were randomly selected. Four enumeration blocks (EBs) from each district were randomly selected with the help of the department of statistics, Sarawak. The households within the EBs were selected by systematic random sampling. From each EB, 53 households were selected by systematic random sampling. Out of the 1094 households approached, 934 households agreed to have participated in the study giving a response rate of 85.4%. Malaysians who lived in Sarawak, aged 18 years old and above, who could understand English or Malay language and consented to participate were recruited to be the respondents in this study. Only one respondent, preferably the head of the family, was chosen from each household.

Instrument development and data collection procedure

The head of the family or a responsible family member was interviewed by a face-to-face interview using a semi-structured questionnaire. The questionnaire was adopted and adapted from a previous study (Onwujekwe et al, 2010). The questionnaire was divided into several components. The asset list was adopted from the survey done by the Department of Statistics, Sarawak. The amount of expenditure was calculated based on the amount of money spent over a period of one month. The back-to-back translation was done first, and then the translated instrument was checked by content experts. A pre-test of the questionnaire was done in the non-sample area for the suitability of the questionnaire. A minor change was done after the pre-test of the questionnaire.

Data processing and analysis

Data from a total of 934 respondents were analysed. Data entry was done by Microsoft Excel and then transferred to IBM SPSS version 22.0 for analysis (IBM SPSS, 2013). First, data cleaning was done, and any missing value was imputed by SPSS missing value analysis.[16] Exploratory data analysis was done first to obtain descriptive information. Two methods based on Xu et al and Doorslaer et al were used to obtain threshold household catastrophic health expenditure.[3,4] Household capacity to pay, as described by Xu et al was calculated as the total household expenditure less subsistence expenditure.[17] Subsistence expenditure was defined as the mean food expenditure of households between the 45th and 55th percentile of the total sample.

A household was classified as having catastrophic when its OOP for health was 40% or more of the capacity to pay. The other classification by Doorslaer et al defined CHE as those where the proportion of OOP expenditure was 10% or more of the total household expenditure.[4] Using the WHO definition, the OOP include the outpatient cost, hospital bills, laboratory, over the counter medications,

and traditional medications.[17] In this analysis, the socioeconomic status was determined using Principal Component Analysis (PCA) by SPSS.[18] The status was divided based on the assets that were available in the house of the respondent. Those in the 1st quintile would be the poorest and the richest in the 5th quintile. Hence, the middle class was in the 3rd quintile. This method was similar to the research done by Onwujekwe et al for defining socioeconomic status.[19] A binary logistic regression with forward and backward linear regression analysis was done to determine the potential predictors for catastrophic health expenditure. The analytic concept was adapted from Tabachnick et al.[20] A p value less than 0.05 was considered as statistically significant.

Ethical consideration

The Technical Review Committee of the Faculty of Medicine and Health Science (FMHS), Universiti Malaysia of Sarawak (UNIMAS), approved the study proposal. Informed written consent was taken from each respondent before the interview. They were briefed about the objectives of the study and were assured of data confidentiality and privacy.

RESULTS

Socio-demographic characteristics

The mean (SD) age of the respondents was 36.6 (12.9) years (Table 1). About three-fifths (58.8%) of the respondents were female. The majority of the respondents were Bumiputra Sarawak (61.6%) apart from Malays, which constituted 24.7%. More than one-third (35.2%) of the respondents were working in the government sector. Another 17.2% were employed in a private job, while more than one-fourth (27%) were unemployed. Just slightly over half (52.9%) of the respondents were from the urban areas, and the rest (47.1%) were from rural areas. The mean family size (SD) was 5.32 (2.41). About three-fifths (58.4%) of the respondents had five-or-less family members, and 41.6% had a family size of more than 5.

Most (87%) of the respondents were married, and the rest (13%) were single. One-third (36.9%) had secondary level of education, followed by 32.3% tertiary level of education, and 22.7% had the primary level of education. The majority (62.6%) of the respondents were Christians, and one-third (31.5%) were Muslims. One-fifth (20%) of the respondents were those in the higher class at the fourth and fifth quintiles. About 38% of the respondents were in the first and second quintiles of the lower economic status. The middle class made up 20.7% of the household (Table 1).

Household expenditure

The sum of the household expenditures for the past month in this study was MYR 1,449,505 (Table 2). About one-quarter (25.7%) of the household expenditure was on food, equivalent to MYR 373,562. Eighteen per cent (MYR 270,226) of the total household expenditure was on health. The health cost for the household was inclusive of the out of pocket health expenses, indirect cost, and health promotion (Table 2). The detailed cost of health expenditure is shown in Table 3. In our analysis, 63.9% of the households had spent OOP for curative and treatment in the preceding month. The other 37.9% did not devote any expenditure on health during the study period (Table 3).

Catastrophic health expenditure

Catastrophic health expenditure among the households was calculated using two models, providing two thresholds that are regularly used in studies on catastrophic health expenditure. Model-1 was calculated on the OOP at 10% of the total household expenditure as per Doorslaer et al.[4] In model-2, a household would be classified as having catastrophic health expenditure if the OOP for health had a total sum of 40% or more than the capacity to pay.[17] The percentages of households experiencing CHE based on models 1 and 2 were 20.2% and 9.0%, respectively (Table 4).

Factors influencing catastrophic health expenditure: binary logistic regression

Table 5 shows the results of a binary logistic regression to examine the socio-demographic factors affecting the catastrophic health expenditure. The dependent variable was dichotomised into yes versus no. These two models of analysis were done in which model 1 consisted of 10% catastrophic health expenditure, and model 2 consisted of 40% catastrophic health expenditure capacity to pay. All the variables such as age, gender, ethnicity, occupation, residence, family size, marital status, level of education, religion, socioeconomic status, health insurance and chronic illness were entered into the model. A forward and backward linear regression analysis was done. The full model 1 showed that it was statistically significant χ^2(df, N)=70.158 (11, 934); p<0.001, indicating that the model was able to distinguish between respondents having catastrophic health expenditure. This model contains the five independent variables which explained between 7.2% (Cox and Snell R square) and 11.4% (Nagelkerke R squared) of the variance in the catastrophic health expenditure. It was also able to classify 79.3% of the cases. The goodness of fit indices was not statistically significant [Chi square (df)=9.711(8); p>0.05], which indicated a well-fitted model. Analysis indicated that age, gender, family size, socioeconomic status, and chronic illness appeared to be potential predictors for catastrophic health expenditure. The analysis showed that the CHE was 1.699 times high among the household having family members five and above. Similarly, CHE was 5.066 times likely to be high among the poorest segments, 3.48 times more likely for poor, 3.17 times for middle and 2.24 times than the wealthiest group. However, the CHE decreased with the increased age of the respondents. It was 1.64 times

likely to be high among respondents having chronic diseases and 1.67 times more likely to be high among households with family size five-and-above. It was 1.45 times higher among the male respondents compared to females (Table 5). On the other hand, model 2 contained two independent variables, which explained between 7.1% (Cox and Snell R square) and 15.7% (Nagelkerke R squared) of the variance in the catastrophic health expenditure. It was also able to classify 91% of the cases. The goodness of fit indices was not statistically significant [Chi square (df)=5.468(8); p>0.05], which indicated a well-fitted model. The analysis revealed that only socioeconomic status and level of education appeared to be significantly associated with 40% of CHE. The CHE was 11.25 times more likely to be high among the poorest, followed by 4.39 times for poor and 3.50 times higher for the middle-class group than the wealthiest group. In contrast, it was 3.83 times higher among the respondents having no formal education, followed by 2.64 times higher for the respondents who had a primary level of education compared to the tertiary level of education.

Table 1: Socio-demographic characteristics of the respondents (n=934).

Characteristics	N	Percentage/ mean (SD)	95% CI	
			Lower limit	Upper limit
Age in years	934	38.64 (12.9)	37.80	39.45
Gender				
Male	385	41.2	38.0	44.5
Female	549	58.8	55.5	62.0
Ethnicity				
Malay/Melanau	231	24.7	21.8	27.6
Bumiputra Sarawak	604	64.7	61.6	67.6
Others (Chinese, Indian etc.)	99	10.6	8.8	12.5
Occupation				
Not working	252	27.0	24.1	29.9
Government	329	35.2	32.1	38.2
Private	161	17.2	15.0	19.7
Others	192	20.6	18.0	23.1
Residence				
Urban	494	52.9	49.6	56.0
Rural	440	47.1	44.0	50.4
Family size				
≤5	545	58.4	55.2	61.3
>5	389	41.6	38.7	44.8
Marital status				
Single	121	13.0	10.8	15.1
Married	813	87.0	84.9	89.2
Level of education				
No formal education	75	8.0	6.4	9.6
Primary school	212	22.7	20.0	25.4
Secondary school	345	36.9	33.7	39.9
Tertiary education	302	32.3	29.4	35.4
Religion				
Islam	294	31.5	28.6	34.6
Christian	585	62.6	59.5	65.6
Others	55	5.9	4.5	7.4
Socio-economic status				
1st quintile (poorest)	186	19.9	17.1	22.5
2nd quintile (poor)	181	19.4	16.9	21.8
3rd quintile (middle)	193	20.7	17.9	23.2
4th quintile (rich)	187	20.0	17.6	22.8
5th quintile (richest)	187	20.0	17.6	22.6
Health insurance				
No	790	84.6	82.3	86.7
Yes	144	15.4	13.3	17.7
Chronic illness				
None	664	71.1	68.0	74.0
Yes	270	28.9	26.0	32.0

Table 2: Distribution of household expenditure for the past one month (n=934).

Expenditures (MYR)	Sum	Mean	SD	Min	Max	Median	Inter-quartile		(%)
							Q1	Q3	
Food	373,562	399.96	312.7	50	2000	300	200	500	25.77
Health	270,226	289.32	429.63	0	4100	150.5	50	350	18.64
House	199,730	213.84	397.3	0	4000	0	0	350	13.78
Car	190,074	203.51	375.01	0	3500	0	0	380	13.11
Education	105,305	112.75	171.99	0	1500	50	0	200	7.26
Electric bill	59,436	63.64	64.33	0	500	50	15	90	4.10
Gas	30,916	33.1	29.58	0	500	30	28	32	2.13
Rent	29,977	32.09	102.51	0	700	0	0	0	2.07
Telephone bill	29,255	31.32	56.94	0	500	0	0	50	2.02
Internet bill	22,820	24.43	43.93	0	420	0	0	50	1.57
Maid	22, 207	23.78	125.08	0	2400	0	0	0	1.53
Water bill	21,763	23.3	34.49	0	500	15.5	0	30	1.50
Magazine	12,119	12.98	66.99	0	1000	0	0	0	0.84
Other services	82,115	87.82	197.82	0	2000	0	0	100	5.67
Total	1,449,505	289.32	429.63	0	4100	150.5	0	500	100.00

Table 3: Distribution of household health expenditures (MYR) for the past one month (n=934).

Health expenditures	Sum	Mean	SD	Min	Max	Median	Inter-quartile		%
							1st	3rd	
Out-of-pocket									
Outpatient cost	40,858	43.75	105.49	0	1500	0	0	50	15.1
Hospital bills	17,515	18.75	83.19	0	1200	0	0	0	6.5
Traditional	4,785	5.12	38.13	0	1000	0	0	0	1.8
Dental	6,037	6.46	47.7	0	1200	0	0	0	2.2
Pharmacy	16,789	17.98	55.61	0	1200	0	0	10	6.2
Laboratory, X-ray	3,734	4	29.44	0	500	0	0	0	1.4
Subtotal	89,718	96.09	207.26	0	2300	0	0	100	33.2
Indirect									
Transport	5,153	5.52	26.42	0	400	0	0	0	1.9
Health investment									
Health products	72,333	77.44	143.83	0	2000	30	0	100	26.8
Health insurance	33,385	35.74	133.88	0	2000	0	0	0	12.4
Subtotal	105,717	113.18	216.94	0	2400	50	0	120	39.2
Disease prevention									
Physical activities	14,318	15.33	48.1	0	500	0	0	0	5.3
Supplements	33,185	35.53	79.6	0	720	0	0	50	12.3
Massage	8,811	9.43	43.66	0	600	0	0	0	3.3
Health screening	7,569	8.1	44.95	0	700	0	0	0	2.8
Immunisation	4,150	4.44	33.93	0	500	0	0	0	1.5
Health seminar	1,605	1.72	14.97	0	200	0	0	0	0.6
Subtotal	69,638	74.56	152.75	0	1500	0	0	0	25.8
Total	270226	289.32	429.63	0	4100	150.5	50	350	100.00

Table 4: Incidence and mean amount (MYR) of catastrophic health expenditures (n=934).

Catastrophic health expenditures	Model 1		Model 2	
	N (%)	Mean	N (%)	Mean
Yes	189 (20.2)	310.85	84 (9.0)	290.69
No	745 (79.8)	41.56	850 (91.0)	76.82

Table 5: Factors affecting catastrophic health expenditure: binary logistic regression analysis.

Characteristics	Model 1 (10% CHE)				Model 2 (40% CHE)			
	β	Adj. OR	95% CI		β	Adj. OR	95% CI	
			Upper limit	Lower limit			Upper limit	Lower limit
Age in years								
<25 (RC)		1						
25-34	-0.457	0.633	0.336	1.192		NI		
35-44	-0.847**	0.429	0.252	0.728				
45-54	-0.700*	0.497	0.285	0.866				
≥55	-0.709**	0.492	0.289	0.838				
Gender								
Male	0.373*	1.452	1.002	2.103		NI		
Female (RC)		1						
Family size								
≤5		1						
>5	0.530**	1.699	1.212	2.382		NI		
Socio-economic status								
1st quintile (poorest)	1.623***	5.066	2.705	9.488	2.421***	11.253	3.301	38.366
2nd quintile (Poor)	1.250***	3.489	1.842	6.607	1.480*	4.394	1.231	15.688
3rd quintile (middle)	1.146***	3.147	1.676	5.910	1.252*	3.499	0.967	12.665
4th quintile (rich)	0.807*	2.242	1.165	4.314	1.013	2.755	0.727	10.435
5th quintile (richest)		1				1		
Chronic illness								
None (RC)								
Yes	0.498**	1.646	1.144	2.369		NI		
Level of education								
No formal education		NI			1.343**	3.832	1.586	9.258
Primary school					0.971*	2.640	1.211	5.755
Secondary school					0.544	1.722	0.803	3.696
Tertiary education						1		
Constant	-2.377	0.093			-4.471	0.011		
Model Chi-square (df, N)		70.158 (11, 934); p<0.001				65.921 (7, 934); p<0.001		
Hosmer and Lemeshow GOF (df)		9.711 (8); p>0.05				5.463 (8); p>0.05		
Classification		79.3%				91%		

Note: CI=Reference category, NI=Not included, CI= Confidence interval, *p<0.05, **p<0.01, ***p<0.001.

DISCUSSION

This study found that the percentage of households having CHE was 20.2% and 9.0% (Table 4) based on model 1 and model 2, respectively. Therefore, the availability of a government-subsidised health care system could not protect the households from having CHE, which is similar to findings in other countries with a similar system.[4,7,9] However, the capacity-to-pay rate in this study showed a higher propensity than a study done in Brazil, which was 12%.[6] Knaul et al reported a varying proportion of catastrophic health expenditure from 1% to 25% in the Caribbean countries.[21] Khan et al in Bangladesh reported that 14.2% of households faced CHE based on the 10% threshold level model.[22] It was 16.5% to the poorest and 9.2% to the wealthiest families. In contrast, Pandey et al in India reported a reverse phenomenon whereby CHE was higher in the high (30.3%) and higher-middle (27.4%), low (21.8%) and lower-middle (19.0%) groups.[23] In our study, the proportion of household expenses spent on health is lower in Sarawak (18.64%) than in Brazil (28.8%). This might be the effects of different health care systems and different perspectives. The incidence was lower in India when compared to this study. The figure was 31.9% when compared with the households in Sarawak and when using the proportion of consumption, it was at 20.9%, which was higher. This study showed that the proportion of CHE was much higher in Sarawak when compared with the literature. In this study, the cost had included the cost for health products such as prostheses and equipment. In other studies, they used the data in a national survey or world health survey.[1,7,14] Therefore, the items included could cause a difference in total health expenditure due to the items listed were different from the interview-based questionnaire and national data. Despite the different items included in the study, the calculations for CHE used the same method by Xu et al and Doorslaer et al.[1,4] The result also could be an underestimate of the cost because the

indirect costs, such as transport costs, were not included in this study.

The predictors that were noted to be significant in the study were age, family size, and socioeconomic status. This study found that those in the 1st quintile were 3.15 times more likely to have CHE based on the 10% and nine times higher based on the 40% capacity. This was different from the result reported in Thailand (Somkotra and Lagrada, 2009) and India (Pandey et al, 2018), which predicted that those in the fifth quintile were more likely to have CHE. Another study in India reported that those in poor economic status were more likely to have incurred CHE, especially coronary heart disease, which needed a large amount of money for the treatment.[24] Another study revealed that those in the wealthiest quintile were four times less likely to incur CHE than the poorest quintile.[4] Thus, this study finding was consistent with other studies.

It has been reported that age had significant predicting values for CHE at the 10% proportion of household consumption. The younger the age group, the less likely it will be the risk for CHE. An Iranian study showed that age had a significant impact on the occurrence of the CHE.[25] In contrast, in Thailand, the household head was not determining CHE among the households.[7] In this analysis, those younger age groups (55 years or less) were unlikely to be financially catastrophic due to health. The finding of this study was similar to that done in China, which mentioned that having elderly household members greatly increases the likelihood of incurring catastrophic health spending.[8] This may be due to those in the older age group not having any consistent income and protection from health spending. This finding indicates the need for affordable elderly care in the health system to view the country's demographic changes.

As mentioned in model 1, household size had a significant value in predicting CHE. The previous studies also showed the influential impact of family size on CHE. Those having family members of 5 or fewer were more likely to incur catastrophic health expenditures.[25-28] Li et al in China reported that a large family with at least one young member appeared to be a protective factor.[8] However, our study found a likelihood of CHE with a family size five and above at the 10% level. This might be a fact that large families with low income faced more CHE, i.e.; low-income households are at high risk of financial hardship from healthcare payments.[29] Among the CHE at 40% of the capacity to pay, a government employee was less likely to have CHE than those working in other sectors. This was expected since those in the government service were exempted from any fees in the public hospitals in this country. Therefore, the risk of having CHE was much lower.

Our study found that catastrophic health expenditure was more likely to be high among males than females, which is consistent with Moradhvaj et al and Liu et al.[28,30] The possible explanation might be the type of illness like chronic disease and duration of hospitalisation. A similar finding was reported in Iran, with a significant relationship between chronic disease and catastrophic health expenditure.[31] Our analysis found that the catastrophic health expenditure was 1.6 times more likely to be high with chronic disease at the 10% level. In our study, households with no formal education or education at a primary level were more likely to have catastrophic health expenditures at 40% than the secondary and higher education groups. This might be related to the low wealth quintile with a low level of education potentiated with the disease. Our finding is consistent with Kang et al in Korea and Liu et al in China.[28,32]

Although the study was designed with a large sample size covering most of the ethnic groups in Sarawak still, most of the ethnic groups in the study were from rural areas, and the urban and Chinese populations were under-reported. Thus, the results might have limited generalisability. Another limitation of this study is that it did not include the indirect costs of healthcare among households. The study only recorded direct expenditure on health. Expenditure on accommodation and transport were not included in the health expenses. There could also be recall bias since most respondents did not have proper records of the bills and charges. It was based on their capability to recall the events which might not be accurate. Furthermore, some of the respondents required guided questions, and thus, it could be leading questions. The number of hospital admissions was limited due to the short recall period used in this as the admission rarely occurs in a household.

CONCLUSION

The study showed that the socioeconomic status had a significant role in determining the CHE level in both the 10% proportion and 40% proportion of capacity to pay. The study had also identified in the 10% proportion that age and family size are significant determinants for CHE occurrence. It also reported that government employees were less likely to incur CHE. Thus, from our study, CHE can still occur among the households despite subsidised public healthcare. Therefore, further research is required to investigate the cause of this regarding health-seeking behaviour and perception towards the service.

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