

RESEARCH ARTICLE

Factors Associated with Unmet Need for Healthcare Among Older Adults in Thailand

Natthani Meemon and Seung Chun Paek
Mahidol University, Thailand
seungchun.pak@mahidol.ac.th

Abstract: Although Thailand's Universal Coverage Scheme (UCS) has provided almost free healthcare access, there is still a concern of unmet healthcare need especially for older adults due to their mobility limitations. Thus, this study investigated factors associated with unmet healthcare need among older adults under the UCS context. Descriptive and binomial logistic regression analyses with the nationwide Health and Welfare Survey 2015 data were performed to explore socioeconomic characteristics of older adults, and investigate whether the socioeconomic characteristics were associated with unmet healthcare need. The results indicated that mobility limitation was a major reason for the unmet need. Additionally, long wait-time in and long distance to healthcare facilities were significantly associated with the unmet need. For socioeconomic conditions, older adults, as compared to younger ones, generally had low income and education levels, were unemployed and chronically ill, and lived without a spouse. Such socioeconomic conditions were even worse for the older adults who experienced the unmet need than those who did not. By the results, policy interventions must set priorities of older adults according to their vulnerability. Specifically, older adults who have a mobility limitation and live alone without a regular connection or support must be the first target group. In the short term, the current village health volunteer program should assist the urgent needs of older adults through home care and emergency van arrangement services. In the long-term, the government should continue the investments for the current limited healthcare resources through the National Health Development Plan.

Keywords: unmet need for healthcare, older adults, Universal Coverage Scheme, Thailand

Thailand, like many other countries in the world, has become an aging society (Knodel, Teerawichitchainan, Prachuabmoh, & Pothisiri, 2015; United Nations [UN], 2015; World Health Organization [WHO], 2011). In 2015, approximately seven million people, which accounts for approximately 11% of the entire population, were older adults aged 65 or older. The older adult population is projected to increase to approximately 17 million by 2040, which accounts for approximately 25% of the entire population. It means

that one in every four Thais will be an older adult. The current and projected numbers are far higher than those of most countries in South-East Asia (Table 1; UN, 2017).

The increase of the older adult population includes a variety of social health issues in general, and unmet need for healthcare (i.e., people do not receive healthcare when they need it) may be one of the issues for the population. The decline in physical function, which is a common feature of older adults, can limit

the ability to care for themselves (Sibbritt, Byles, & Regan, 2007; Wunderlich & Kohler, 2001). When the older adults become dependent and need someone to take them to healthcare facilities, healthcare utilization is expected to decrease. This situation may be more critical for those who have low socioeconomic status.

Indeed, such physical function decline of older adults has been found to be associated with unmet healthcare need. Previous studies have shown that healthcare utilization (or unmet need for healthcare) among older adults who were older was significantly lower (or higher) than among those who were younger. In the studies, a mobility limitation was identified as a significant factor. Additionally, individual factors

(e.g., low income or onset of chronic illness) and system factors (e.g., healthcare cost or transportation) were also related to the low utilization (or the high unmet need for healthcare), though some of the factors are not particularly for older adults (Doetsch, Pilot, Santana, & Krafft, 2017; Herr, Arvieu, Aegerter, Robine, & Ankri, 2014; Taylor & Hoenig, 2006; Wandera, Kwagala, & Ntozi, 2015).

In Thailand, after the first introduction of the Universal Coverage Scheme (UCS) in 2002, approximately 75% of the entire population have had almost free access to healthcare (Health Insurance System Research Office [HISRO], 2012). As previous studies have shown, the UCS significantly

Table 1

Estimated Proportion of the Older Adult Population of South-East Asian Countries (%)

Countries	Years				
	2015	2020	2030	2040	2050
South-East Asia	5.92	6.89	9.82	12.85	15.51
Brunei Darussalam	4.07	5.62	10.22	16.15	21.83
Cambodia	4.12	4.85	6.72	8.72	12.18
Indonesia	5.10	5.77	8.27	11.15	13.75
Laos	3.89	4.27	5.55	7.56	10.62
Malaysia	5.86	6.99	9.65	12.40	16.29
Myanmar	5.32	6.43	8.63	10.91	13.06
Philippines	4.57	5.17	6.73	8.29	9.82
Singapore	11.69	15.04	23.25	29.67	33.59
Thailand	10.56	12.86	19.38	25.76	28.99
Timor-Leste	3.46	3.62	3.99	4.91	4.71
Viet Nam	6.74	8.05	12.39	16.99	21.51
World	8.29	9.36	11.66	14.06	15.82
Africa	3.46	3.61	4.11	4.81	5.96
Asia	7.57	8.89	11.76	15.28	17.82
Europe	17.60	19.25	23.08	25.87	27.85
Latin America and the Caribbean	7.61	8.83	11.90	15.46	19.40
Northern America	14.79	16.79	20.67	21.96	22.50
Oceania	11.92	12.98	15.42	17.07	18.17

Note: The older adult population = people aged 65 or older.

increased healthcare utilization, and the increase was more significant in low income and older adults (Gruber, Hendren, & Townsend, 2014; HISRO, 2012; Limwattananon et al., 2015; Meemon & Paek, 2018). However, the UCS can be seen as a policy intervention only for decreasing costs of healthcare; thus, unmet need for healthcare may still exist due to other issues rather than costs.

Several recent studies examined barriers of healthcare utilization of older adults in the Thai setting. Like the previous studies conducted in international settings, the lack of caretakers was found to be a significant barrier to healthcare utilization due to mobility limitation issues. Also, low income, limited transportation (particularly in a remote area), and long wait-time in healthcare facilities (particularly in an urban area) were significant barriers (Kullanit & Taneepanichskul, 2018; Osornprasop & Sondergaard, 2016; Thammatacharee et al., 2012). However, the previous studies were conducted with relatively small sample size, in a particular geographical location, or without a clear separation between older and younger adult populations.

Therefore, combining these points with the previous studies, this study, with a nationwide survey data and a focus on older adult population, would add to the body of knowledge on unmet healthcare need of older adults. The purpose of this study was to investigate the prevalence of and factors associated with unmet need for healthcare among older adults under the UCS context. The specific objectives of the study were (i) to explore socioeconomic characteristics of older adults, (ii) to estimate the prevalence of and profile reasons for unmet need for healthcare, and (iii) to investigate whether socioeconomic characteristics were associated with unmet need for healthcare.

Policy Context: Universal Coverage Scheme

In 2002, Thailand implemented the UCS and accordingly achieved universal healthcare coverage. As the largest social health insurance program in the country, the UCS currently provides health insurance for approximately 47 million people, which accounts for 75% of the entire population. The beneficiaries are people in the informal employment sector who are neither formal private-sector employees (16%) nor government-sector employees including their dependents (9%; HISRO, 2012).

For healthcare delivery and copayment, the UCS offers a comprehensive benefits package, which includes curative, rehabilitation, annual health check-up, disease prevention services, and health promotion activities. The service package is available in designated facilities (i.e., healthcare facilities designated by the UCS insurance) for only 30 Thai Baht (THB), which is equivalent to approximately US\$0.9. The designated facilities are primary care facilities playing the role of gatekeepers to secondary and tertiary care facilities. If beneficiaries bypass their designated facilities, they must pay 100% out-of-pocket (OOP) costs (Paek, Meemon, & Wan, 2016).

As mentioned previously, the UCS has increased healthcare utilization. Specifically, after the UCS, utilization of designated facility care (i.e., receiving healthcare services from designated facilities) significantly increased, and simultaneously, utilization of private facility care (i.e., receiving healthcare services from private hospitals or clinics) and informal care (i.e., purchasing over-the-counter drugs or traditional medicines) significantly decreased. The increased utilization of designated facility care was found to be more significant in low income and older adults (Gruber et al., 2014; HISRO, 2012; Limwattananon et al., 2015; Meemon & Paek, 2018). Additionally, because the UCS increased utilization of designated facility care requiring only minimal OOP costs and decreased utilization of private facility care and informal care requiring 100% OOP costs, the UCS has been found to reduce individual-level OOP or household-level catastrophic healthcare expenditures (HISRO, 2012; Limwattananon, Tangcharoensathien, & Prakongsai, 2007; Somkotra & Lagrada, 2009; Tangcharoensathien et al., 2013).

Methods

Data Source and Sample

This study employed a cross-sectional design with the Health and Welfare Survey (HWS) from the year 2015 (National Statistical Office of Thailand [NSO], 2018). The HWS is a nationwide survey data, which includes a nationally representative sample of Thailand with a wide array of information on socioeconomic status and healthcare utilization. The NSO conducts the HWS on an annual or biannual basis. The purpose of the study was to investigate the prevalence of and factors associated with unmet need for healthcare

among older adults under the UCS context. Older adults have been generally defined as people aged 65 or older (Organisation for Economic Co-operation and Development [OECD], 2017; UN, 2015; WHO, 2011); thus, this study ultimately selected UCS beneficiaries aged 65 or older as the study sample.

Variable Selection and Measurement

Unmet need for healthcare, which is the dependent variable in this study, was defined as the situation where people did not receive healthcare when they needed it. It was measured as a binary variable (yes and no). The HWS 2015 included two specific questions regarding the dependent variable. The questions were (i) "During the last 12 months, have you ever needed a healthcare but not received it?" and (ii) "If you did not receive it, then please choose one among the given reasons."

The given reasons for the question (ii) included "Cannot afford treatment," "Cannot afford transportation," "Wait time too long," "Too far to travel," "Too busy to seek care," "Bad impression or low confidence of hospital/hospital services," "Do not know where to go for care," "Could not find anybody who can take me to hospital," "Hospital was not available in the area or hospital beds were full," and "Others." Among the reasons, the reason "Could not find anybody who can take me to healthcare facility" was used as a proxy measure of the mobility limitation. We expected that the reason is one of the significant barriers to healthcare utilization for the older adults.

In addition, Andersen's behavioral model for health services use was employed to select independent variables. Andersen's model categorizes factors related to healthcare service utilization into three groups, which are predisposing, enabling, and need-for-care factors (Aday & Andersen, 1974; Bradley et al., 2002). In this study, three demographic variables (age, gender, and marital status) were used as predisposing factors. Three individual-level resource variables (income, education, and employment) and one community-level resource variable (region) were used as enabling factors. Lastly, one variable (chronic disease) was used as a need-for-care factor for the study analysis.

Regarding measurement, income was measured as a standardized income per single-person household. Specifically, it was estimated by dividing the household-level monthly income by the square root of the total number of household members (OECD,

2009). As the income variable was positively skewed, a log-transformed income was used for the analysis. Gender was measured as a binary variable (male and female). Education was measured as an ordinal variable with three levels which are low, middle, and high. Low represents "primary school or below," middle represents "middle or high school," and high represents "college or above."

For marital status, it was measured as a nominal variable with three levels, which are single, married, and divorced/widowed/separated. Employment was measured as a binary variable (yes and no). For chronic disease, it was measured as a binary variable (yes and no). The HWS 2015 specified 32 types of disease (e.g., hypertension or diabetes) as a chronic or congenital disease. The "yes" and "no" groups were classified by whether or not beneficiaries had at least one of the specified diseases. Lastly, region was measured as a binary variable (urban and rural). According to the definition of the NSO, we classified municipal and non-municipal area into urban and rural areas, respectively.

Statistical Analysis

Descriptive analysis was conducted to summarize the study sample and variables. The descriptive analysis was for the study objective (i) and (ii). In addition, because the dependent variable, unmet need for healthcare, was a binary variable, binomial logistic regression (BLR) analysis was performed to investigate whether the selected independent variables were associated with the unmet need (Hosmer & Lemeshow, 2000). Specifically, two BLR models were separately developed, which are outpatient and inpatient care models. The BLR analysis was for the study objective (iii). Additionally, although this study focused on the older adult population aged 65 or older, the younger one aged 65 or younger were also analyzed for comparison purpose. The statistical significance level was fixed at 0.05, and we used IBM SPSS Statistics 20.0 software for all statistical analyses.

Results

Descriptive Analysis

Descriptive statistics of the study variables are presented in Table 2. In the table, there are two different samples, which are the sample over the age of 65 (older adults) and the sample under the age of 65 (younger adults), for a comparison purpose. For the unmet need

for healthcare, among the older adults, approximately 2.52% and 0.41% reported unmet need for outpatient and inpatient care, respectively. The prevalence was much larger than that among the younger adults. Specifically, the unmet-need prevalence of the younger adults was approximately 1.53% and 0.13% for outpatient and inpatient care, respectively.

For socioeconomic factors, the older adult group, as compared to the younger one, included a relatively large proportion of low income, less educated, single or divorced/separated/widowed, unemployed, and chronically ill individuals. Additionally, among the older adults, people who experienced unmet healthcare need had a larger proportion of low income, single

Table 2

Descriptive Statistics of the Study Variables (%)

Variables	Sample Aged 65+			Sample Aged 65-		
	Overall (n = 13,027)	Unmet Need		Overall (n = 60,261)	Unmet Need	
		OP (n = 328)	IP (n = 53)		OP (n = 925)	IP (n = 81)
Unmet Need for OP						
Yes	2.52			1.53		
No	97.48			98.47		
Unmet Need for IP						
Yes	0.41			0.13		
No	99.59			99.87		
Income	5868.99	4899.87	5442.69	8287.44	7250.00	6350.00
Gender						
Male	42.44	46.65	45.28	47.20	46.92	41.98
Female	57.56	53.35	54.72	52.80	53.08	58.02
Education						
Low	95.90	96.04	96.23	62.20	75.14	77.78
Middle	3.68	3.96	3.77	33.97	22.81	18.52
High	0.41			3.83	2.05	3.70
Marital Status						
Single	3.65	2.74		19.18	14.05	19.75
Married	53.85	48.17	52.83	70.62	69.51	62.96
Divorced	42.50	49.09	47.17	10.20	16.43	17.28
Employment						
Yes	29.25	25.00	28.30	79.42	77.73	60.49
No	70.75	75.00	71.70	20.58	22.27	39.51
Chronic Disease						
Yes	58.70	72.56	90.57	19.12	45.51	70.37
No	41.30	27.44	9.43	80.88	54.49	29.63
Region						
Urban	49.51	47.87	47.17	49.76	48.65	41.98
Rural	50.49	52.13	52.83	50.24	51.35	58.02

Note: Aged 65- = aged from 18 to 64; OP and IP = outpatient care and inpatient care; Income = median income; Education Low, Middle, and High = primary school or below, middle or high school, and college or above; Divorced = divorced, separated, or widowed.

or divorced/separated/widowed, and chronically ill individuals than those who did not, though the proportions slightly varied between the samples for outpatient care and inpatient care.

In sum, the descriptive analysis showed that the older adults experienced unmet need for healthcare much more significantly than the younger adults. For inpatient care, the unmet-need prevalence of the older adults was three times larger than that of the younger ones, and for outpatient care, it was almost two times larger. In addition, the older adults, who experienced unmet need, had the lowest socioeconomic conditions. Specifically, the older adults, regardless of unmet-need experience, generally had low income and education levels, were unemployed, chronically ill, and lived without a spouse. Additionally, such socioeconomic conditions were even lower for the older adults who experienced unmet need than those who did not.

Table 3 presents the prevalence of specific reasons for unmet need for healthcare. An interesting pattern was observed between the older and younger adults. For the older adults, a mobility limitation, as expected, was one of the major reasons for the unmet need, whereas for the younger adults, a time constraint was one of those. Among the older adults, approximately

17.68% for outpatient care and 22.64% for inpatient care reported that “they could not find anybody who can take them to healthcare facilities.” The prevalence was four times larger than that among the younger adults. Specifically, the prevalence of the mobility limitation among the younger adults was 4.17% and 6.17% for outpatient and inpatient care, respectively.

Meanwhile, among the younger adults, approximately 29.08% for outpatient care and 18.52% for inpatient care reported a time constraint (“too busy to seek care”) as a major reason for the unmet need. The prevalence was four times larger than that among the older adults, which was 7.93% and 5.66% for outpatient and inpatient care, respectively. It may be because the younger adult group included a larger proportion of employed people (79.42%) than the older adult group (29.25%). For employed people, time constraint during the daytime might be a significant barrier of healthcare utilization together with limited service hours of healthcare facilities (Paek et al., 2016).

Aside from the two reasons (mobility limitation and time constraint), a similar pattern was observed between the older and younger adult groups, though the proportions slightly differed between the groups. That is, long-wait time in and long distance to a healthcare

Table 3

Prevalence of Reasons for Unmet Need for Healthcare (%)

Reasons for Unmet Need	Sample Aged 65+		Sample Aged 65-	
	OP	IP	OP	IP
Cannot afford treatment	1.52	3.77	2.70	9.88
Cannot afford transportation	3.66	1.89	2.70	6.17
Wait time too long	25.30	7.55	29.41	11.11
Too far to travel	22.56	22.64	10.92	17.28
Too busy to seek care	7.93	5.66	29.08	18.52
Bad impression or low confidence of hospital	4.88	9.43	3.68	12.35
Do not know where to go for care	0.61	-	0.97	1.23
Could not find anybody who can take me to hospital	17.68	22.64	4.97	6.17
Hospital was not available in the area or hospital beds were full	-	1.89	-	2.47
Others	15.85	24.53	15.57	14.81
Total	100.00	100.00	100.00	100.00

Note: Aged 65- = aged from 18 to 64; OP and IP = outpatient care and inpatient care.

facility (“wait time too long” and “too far to travel”) were the major barriers of healthcare utilization for both the older and younger adults. Additionally, for inpatient care, “bad impression or low confidence of healthcare facility or healthcare facility services” was a frequently cited reason for the unmet need, regardless of the older and younger adults.

Binomial Logistic Regression Analysis

The results of BRL analysis are presented in Table 4. In the outpatient care model for the older adults (the sample aged 65 or older), a significant relationship was found in four variables, which are income, gender, marital status, and chronic disease. Income was negatively related to the unmet need with the coefficient equal to -0.28. It indicated that lower-income people were more likely to report the unmet need than higher income people.

For gender, the negative coefficient (-0.18) indicated that the unmet need was significantly larger in male than female. For marital status, single or divorced/separated/widowed individuals were more likely to report the unmet need than married ones. Lastly, chronic disease was positively related to unmet need with the coefficient equal to 0.32. It means that people with any defined chronic or congenital diseases were more likely to report the unmet need than those without any.

In the inpatient model for the older adults, one variable, which is a chronic disease, was significantly associated with the unmet need. The positive coefficient (0.98) indicated that the unmet need was more likely to be reported by people with any defined chronic or congenital diseases than those without any. A similar pattern was also found in the BLR models for the younger adults (the sample aged 65 or younger).

Table 4

Results of Binomial Logistic Regression Analysis

Variables	Sample Aged 65+				Sample Aged 65-			
	OP		IP		OP		IP	
	CE	SE	CE	SE	CE	SE	CE	SE
Income (log transformed)	-0.28*	0.07	-0.05	0.17	-0.11*	0.05	-0.09	0.16
Age	<0.01	0.01	0.02	0.02	0.01	<0.01	0.01	0.01
Gender Female (vs. Male)	-0.18*	0.06	-0.12	0.15	-0.07*	0.03	-0.08	0.12
Education Low (vs. Others)	-0.05	0.15	0.03	0.37	0.14*	0.05	0.06	0.16
Marital Status Married (vs. Others)	-0.15*	0.06	-0.02	0.16	-0.09*	0.04	-0.17	0.12
Employment Yes (vs. No)	<0.01	0.07	0.14	0.17	0.02	0.04	-0.30*	0.12
Chronic Disease Yes (vs. No)	0.32*	0.06	0.98*	0.24	0.59*	0.04	1.06*	0.14
Region Rural (vs. Urban)	0.03	0.06	0.07	0.14	<0.01	0.03	0.17	0.11
Hosmer-Lemeshow Goodness-of-Fit								
Chi-Square (DF)	9.98 (8)		7.65 (8)		9.63 (8)		5.46 (8)	
p-value	0.27		0.47		0.29		0.71	

Note: * = statistically significant at 0.05; CE = coefficient estimate; SE = standard error; Aged 65- = aged from 18 to 64; OP and IP = outpatient care and inpatient care; Education Others = middle (middle or high school) or high (college or above); Marital Status Others = single or divorced/separated/widowed; DF = degree of freedom.

For outpatient care, the unmet need was significantly higher among lower income, male, lower educated, single or divorced/separated/widowed, or chronically ill individuals. For inpatient care, the unmet need was higher among people with any defined chronic or congenital diseases.

Discussion

This study, by using the nationwide HWS 2015 data, investigated the prevalence of and factors associated with unmet healthcare need of older adults. The study results indicated that older adults experienced the unmet need much more significantly than younger adults. Particularly for inpatient care, the unmet-need prevalence of older adults was three times larger than that of younger ones. A mobility limitation, as this study expected as well as the previous studies showed, was a major reason for the unmet need. Additionally, long wait-time in and long distance to healthcare facility were significant barriers to healthcare utilization for them.

For socioeconomic conditions of older adults, we found that older adults, who experienced the unmet need, were the most socially vulnerable population. Specifically, older adults, as compared to younger ones, generally had low income and educational levels, were unemployed and chronically ill, and lived without a spouse, regardless of their unmet-need experience. Furthermore, such socioeconomic conditions were even worse for the older adults who experienced the unmet need than those who did not.

Particularly for mobility limitation, this study found that among the older adults who experienced the unmet need, approximately 20% reported that “they could not find anybody who can take them to healthcare facilities” as a major barrier of healthcare access. Probably, these people were more likely to be chronic patients who needed intensive care and support on a regular basis. However, they might face difficulties in access to healthcare facilities due to their mobility limitations and unavailability of caretakers (e.g., family members and relatives). Especially for those who were frail and bedridden, unavailability of caretakers might be a more critical issue, though the degree of mobility limitation was not considered in this study. A similar discussion was also presented in a previous study (Osornprasop & Sondergaard, 2016).

We believe that the unmet-need barriers are mostly because of inadequate healthcare resources in the public sector that previous studies have pointed as a potential negative factor for healthcare utilization. Insufficient healthcare infrastructure with low private-sector involvement and the movement of skilled physicians from the public to private sectors have long been supply-side issues of the public healthcare sector. Long wait-time in healthcare facilities, as well as limited public transportation options, especially in the remote area, have been cited as well-known barriers of healthcare utilization (Osornprasop & Sondergaard, 2016; Sakunphanit, 2006; Sakunphanit & Suwanrada, 2011; World Bank, 2007).

For the issues, the Thai government has continuously set and implemented the National Health Development Plan (NHDP) which is a part of the efforts to achieve the Sustainable Development Goals. The NHDP has been planned and implemented in every five-year period since 1960, and the government has invested in various healthcare interventions and programs to promote population health under the plan. Healthcare-related infrastructure and human resource developments are one of the key indicators in the plan. At present, the 12th NHDP (2017–2021) is in progress. In fact, the UCS was part of the achievements of the 9th NHDP (2002–2006). We do expect that the government effort would address the unmet healthcare need issue in the long term (Pagaiya & Noree, 2009; WHO, 2017).

In addition, the government should strengthen the current village health volunteer (VHV) program, especially for the mobility limitation issue. We performed a post hoc analysis to explore whether the unmet-need prevalence due to the mobility limitation (“Could not find anybody to take me to healthcare facility”) differed between rural and urban areas. The analysis did not show a significant difference. Specifically, the prevalence for outpatient care was higher in rural (20.47%) than the urban area (14.65%), whereas inpatient care was higher in urban (28.00%) than the rural area (17.86%).

Considering the existing imbalance of healthcare resources and transportation options between rural and urban areas (Osornprasop & Sondergaard, 2016; Sakunphanit & Suwanrada, 2011), the post hoc analysis implies that healthcare resource developments may have a limited impact on older adults with a mobility limitation. Also, this study showed that older adults were more likely to live without a spouse, though

a secondary data analysis that this study used did not clearly show whether they were more likely to live alone or not. Assuming that the single-person households among older adults are steadily increasing in Thailand (Knodel et al., 2015), older adults who do not live without spouse may have a higher chance to live alone. In this sense, a policy instrument to bridge them to healthcare facilities such as a caretaker may be a more practical assistance for those with a mobility limitation.

The VHV program, as a formal part of the primary healthcare system in Thailand, has been implemented to promote community-level healthcare access since the 1960s. VHVs, who are community members, bridges between the community and healthcare facilities. Main duties of the VHVs are, but not limited to, provision of essential health information and knowledge to villagers, provision of basic healthcare services to villagers, health survey and surveillance, and referrals of villagers to healthcare facilities. In 2007, there were a total of approximately 750,000 VHVs, in which each VHV is responsible for 5 to 15 households in every community (Kowitt, Emmerling, Fisher, & Tanasugarn, 2015; WHO, 2007).

The government should continue the effort to strengthen the VHV program. Especially for older adults with a mobility limitation, the program should focus more on home care services as well as physical exercise and health promotion activities. Particularly for those who need facility-based services, the program should support emergency van or transportation arrangement services in close cooperation with local administrative organizations in communities. Additionally, the insignificant difference between rural and urban areas, found in our post hoc analysis, suggests that the recommendations for the VHV program should not only be for older adults in rural or remote area but also for those in the urban area.

Indeed, transportation cost has been identified as a significant barrier of healthcare access for older adults with mobility limitation, especially those who do not have their own transport and live outside major cities where public transportations (e.g., taxis or public buses) are readily available. As this study showed, older adults who experienced unmet need had the poorest economic conditions. Particularly for those who live alone without a regular connection or support from family members and relatives, monthly allowance from a universal pension may be the only

source of income, which is not even enough to pay for living and food expenses (Kullanit & Taneepanichskul, 2018; Osornprasop & Sondergaard, 2016). The cost of renting private vehicles is not simply affordable for them. Furthermore, the issue may be more critical for those who face emergency circumstances. Thus, such transportation support may be an important policy intervention for the issue.

Last, we must acknowledge the limitations of the study. The HWS allowed respondents to select only the primary reason for unmet healthcare need. Because of that, this study may include over- or under-interpretations of the study results. In fact, the reasons for the unmet need would be more diverse and occur simultaneously in multiple ways. For instance, mobility limitation and long distance to healthcare facilities might be direct barriers, whereas long wait-time in and bad impression/low confidence of healthcare facilities might be indirect limitations of healthcare utilization. Nevertheless, this study, which used secondary data analysis, limited our investigation to such details. Thus, qualitative study approaches, such as an in-depth interview or case study, are necessary to fill the methodological gap.

In addition, this study defined the unmet need in a binary way (yes and no), and the simplistic definition may not reflect actual and diverse situations of unmet healthcare need among older adults. In this regard, a future study needs to consider more various types of unmet healthcare need such as delayed care and even care satisfaction. Also, a clinical measurement such as activities-of-daily-living (ADL) score should be included in the future analysis for a better understanding of how the degree of mobility limitation decrease healthcare utilization among older adults. Lastly, the results of this study were consistent with those of previous studies, in which a mobility limitation was significantly related to unmet need for healthcare among older adults. Like the previous studies, long distance to and long wait-time in healthcare facilities were significant factors for the unmet need (Kullanit & Taneepanichskul, 2018; Thammatacharee et al., 2012; Osornprasop & Sondergaard, 2016).

Although the previous studies showed that the unmet need of older adults was more significant in the rural area, this study (both main and post hoc analyses) did not show a significant difference between rural and urban areas. It may be because of our crude categorization of the region (urban and

rural) could not capture such difference. We initially expected that the mobility limitation issue would be more critical for older adults living in a remote area. However, unavailability of such information in the HWS did not allow us to analyze it. This issue should be taken into consideration in a future study. Nevertheless, analytical methods across this study and other previous studies differ significantly; thus, the future study needs to conduct a systematic examination to assess the difference for a better understanding of the geographical variation of the unmet need.

Conclusion

By the study results, policy interventions to improve healthcare access for older adults need to set priorities of the older adults according to the degree of their vulnerability. Specifically, older adults who have a mobility limitation and live alone without a regular connection or support must be the first target group. In the short term, the VHV program should be actively utilized to assist the urgent needs of older adults through home care and emergency van arrangement services. For that, administrative supports from local administrative organizations in communities are necessary. In the long-term, the government should continue the investments for the current limited healthcare resources in the public sector through the NHDP.

More importantly, the unmet need for healthcare is merely one of the social health issues that older adults have encountered. The decline in physical function of older adults generally reduces social participation and activities. Together with a system change such the increase of single-person households and downsized families (Knodel et al., 2015), the reduced social activities become even lower. It can cause negative emotional symptoms such as loneliness or depression, and such symptoms would negatively affect the social and psychological well-being, and even the quality of life of the older adults. It means that the current healthcare system for older adults needs to be redesigned for an integrated care system which can comprehensively cover the physical, social, and psychological well-being of the older adults. For that, the current fragmented social health policies and interventions for older adults need to be first readjusted and rearranged by the goals and functions.

Ethical clearance

The study was approved by the institution.

Conflict of interest

None.

References

- Aday, L. A., & Andersen, R. M. (1974). A framework for the study of access to medical care. *Health Services Research, 9*(3), 208–220.
- Bradley, E. H., McGraw, S. A., Curry, L., Buckser, A., King, K. L., Kasl, S. V., & Andersen, R. (2002). Expanding the Andersen model: The role of psychosocial factors in long-term care use. *Health Services Research, 37*(5), 1221–1242. doi: 10.1111/1475-6773.01053
- Doetsch, J., Pilot, E., Santana, P., & Krafft, T. (2017). Potential barriers in healthcare access of the elderly population influenced by the economic crisis and the troika agreement: A qualitative case study in Lisbon, Portugal. *International Journal for Equity in Health, 16*, 1–17. doi: 10.1186/s12939-017-0679-7
- Gruber, J., Hendren, N., & Townsend, R. M. (2014). The great equalizer: Health care access and infant mortality in Thailand. *American Economic Journal: Applied Economics, 6*(1), 91–107. doi: 10.1257/app.6.1.91
- Health Insurance System Research Office. (2012). *Thailand's universal coverage scheme: Achievements and challenges. An independent assessment of the first 10 years (2001-2010)*. Nonthaburi, Thailand: HISRO. Retrieved from <http://www.social-protection.org/gimi/gess/ShowResource.action?resource.ressourceId=28441>
- Herr, M., Arvieu, J. J., Aegerter, P., Robine, J. M., & Ankri, J. (2014). Unmet health care needs of older people: Prevalence and predictors in a French cross-sectional survey. *European Journal of Public Health, 24*(5), 808–813. doi: 10.1093/eurpub/ckt179
- Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York, NY: Wiley.
- Knodel, J., Teerawichitchainan, B., Prachuabmoh, V., & Pothisiri, W. (2015). *The situation of Thailand's older population: An update based on the 2014 survey of older persons in Thailand* (Report 15-847). Ann Arbor, MI: University of Michigan, Institute for Social Research, Population Study Center. Retrieved from <https://www.psc.isr.umich.edu/pubs/pdf/tr15-847.pdf>
- Kowitt, S. D., Emmerling, D., Fisher, E. B., & Tanasugarn, C. (2015). Community health workers as agents of health promotion: Analyzing Thailand's village health

- volunteer program. *Journal of Community Health*, 40(4), 780–788. doi: 10.1007/s10900-015-9999-y
- Kullanit, A., & Taneepanichskul, N. (2018). Transportation barriers on healthcare utilization among elderly population living in Mahasarakham Province, Thailand. *Journal of Health Research*, 31(Suppl.2), S233–238. Retrieved from <https://www.tci-thaijo.org/index.php/jhealthres/article/view/114558>
- Limwattananon, S., Neelsen, S., O'Donnell, O., Prakongsai, P., Tangcharoensathien, V., Doorslaer, E. V., & Vongmongkol, V. (2015). Universal coverage with supply-side reform: The impact on medical expenditure risk and utilization in Thailand. *Journal of Public Economics*, 121, 79–94. doi: 10.1016/j.jpubeco.2014.11.012
- Limwattananon, S., Tangcharoensathien, V., & Prakongsai, P. (2007). Catastrophic and poverty impacts of health payments: Results from national household surveys in Thailand. *Bulletin of the World Health Organization*, 85(8), 600–606. doi: 10.2471/BLT.06.033720
- Meemon, N., & Paek, S. C. (2018). Health-seeking behavior of the uninsured before and after the Universal Coverage Scheme in Thailand. *Asia-Pacific Social Science Review*, 18(1), 1–14.
- National Statistical Office of Thailand. (2018). *Health and welfare survey 2015* [Data file and codebook]. Bangkok, Thailand: NSO. Retrieved from http://web.nso.go.th/en/survey/hw/hw_11.htm
- Organisation for Economic Co-operation and Development. (2009). *What are equivalence scales?* OECD Publishing. Retrieved from <http://www.oecd.org/eco/growth/OECD-Note-EquivalenceScales.pdf>
- Organisation for Economic Co-operation and Development. (2017). *Health at a glance 2017: OECD indicators*. Paris: OECD Publishing. http://dx.doi.org/10.1787/health_glance-2017-en
- Osnorprasop, S., & Sondergaard, L. M. (2016). *Closing the health gaps for the elderly: Promoting health equity and social inclusion in Thailand (English)*. Washington, DC: World Bank Group. Retrieved from <http://documents.worldbank.org/curated/en/148431468299339382/Closing-the-health-gaps-for-the-elderly-promoting-health-equity-and-social-inclusion-in-Thailand>
- Paek, S. C., Meemon, N., & Wan, T. T. (2016). Thailand's universal coverage scheme and its impact on health-seeking behavior. *Springerplus*, 5, 1–16. doi: 10.1186/s40064-016-3665-4
- Pagaiya, N., & Noree, T. (2009). *Thailand's health workforce: A review of challenges and experiences (English)* (HNP Discussion Paper 54633). Washington, DC: World Bank. Retrieved from <http://documents.worldbank.org/curated/en/453661468171879780/Thailands-health-workforce-a-review-of-challenges-and-experiences>
- Sakunphanit, T. (2006). *Thailand: Universal health care coverage through pluralistic approaches*. ILO Subregional Office for East Asia. Retrieved from http://www.ilo.org/secsoc/information-resources/publications-and-tools/Workingpapers/WCMS_SECSOC_6612/lang--en/index.htm
- Sakunphanit, T., & Suwanrada, W. (2011). The universal coverage scheme. In ILO, SU/SSC, & UNDP (Eds.), *Sharing innovative experiences: Successful social protection floor experiences* (pp. 385–400). New York, NY: UNDP. Retrieved from http://www.ilo.org/secsoc/information-resources/publications-and-tools/books-and-reports/WCMS_SECSOC_20840/lang--en/index.htm
- Sibbritt, D. W., Byles, J. E., & Regan, C. (2007). Factors associated with decline in physical functional health in a cohort of older women. *Age and Ageing*, 36(4), 382–388. doi: 10.1093/ageing/afm017
- Somkotra T., & Lagrada, L. P. (2009). Which households are at risk of catastrophic health spending: Experience in Thailand after universal coverage. *Health Affairs (Millwood)*, 28(3), w467–w478. doi: 10.1377/hlthaff.28.3.w467
- Tangcharoensathien, V., Pitayarangarit, S., Patcharanarumol, W., Prakongsai, P., Sumalee, H., Tosanguan, J., & Mills, A. (2013). Promoting universal financial protection: How the Thai universal coverage scheme was designed to ensure equity. *Health Research Policy and Systems*, 11, 1–9. doi: 10.1186/1478-4505-11-25
- Taylor, D. H., Jr., & Hoenig, H. (2006). Access to health care services for the disabled elderly. *Health Services Research*, 41(3 Pt 1), 743–758. doi: 10.1111/j.1475-6773.2006.00509.x
- Thammatacharee, N., Tisayaticom, K., Suphanchaimat, R., Limwattananon, S., Putthasri, W., Netsaengtip, R., & Tangcharoensathien, V. (2012). Prevalence and profiles of unmet healthcare need in Thailand. *BMC Public Health*, 12, 1–8. doi: 10.1186/1471-2458-12-923
- United Nations. (2015). *World population ageing 2015 (ST/ESA/SEA.A/390)*. New York: UN, Department of Economic and Social Affairs, Population Division. Retrieved from http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf
- United Nations. (2017). *World population prospects: The 2017 revision, volume I: Comprehensive tables (ST/ESA/SER.A/399)*. New York: UN, Department of Economic and Social Affairs, Population Division.
- Wandera, S. O., Kwagala, B., & Ntozi, J. (2015). Determinants of access to healthcare by older persons in Uganda: A cross-sectional study. *International Journal for Equity in Health*, 14, 1–10. doi: 10.1186/s12939-015-0157-z

- World Bank. (2007). *Health care financing in Thailand: Modeling and sustainability*. Washington, DC: World Bank. Retrieved from <http://documents.worldbank.org/curated/en/875351468305329741/Health-care-financing-in-Thailand-modeling-and-sustainability>
- World Health Organization. (2007). *Role of village health volunteers in avian influenza surveillance in Thailand*. New Delhi, India: WHO, Regional office for South-East Asia. Retrieved from <http://www.who.int/iris/handle/10665/205876>
- World Health Organization. (2011). *Global health and aging*. Geneva: WHO. Retrieved from http://www.who.int/ageing/publications/global_health/en/
- World Health Organization. (2017). *WHO country cooperation strategy, Thailand: 2017–2021*. New Delhi, India: WHO, Regional Office for South-East Asia. Retrieved from <http://www.who.int/iris/handle/10665/255510>
- Wunderlich, G. S., & Kohler, P. O. (2001). *Improving quality in long-term care*. Washington, DC: National Academy Press, Division of Health Care Services.