Health Literacy and Long-Term Care Needs among Thai Elderly in Rural Communities

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Background: Factors related to long-term care needs have been studied widely, but there is limited research about the influence of health literacy on long-term care needs among the elderly in rural communities where the social context and care environment are uniquely different.

Objective: To examine factors influencing long-term care needs among Thai elderly in rural communities.

Materials and Methods: The present study used the cross-sectional design. The study sample included 477 elderly persons, who were members of the communities in Nakhon Ratchasima Province. Multi-stage random sampling was used to select participants. They were interviewed using the demographic and health information questionnaire, the Thai Geriatric Depression Scale (TGDS), the health literacy scale of Thai adults and long-term care needs questionnaire. The selected factors examined as independent variables included some demographic factors, depressive symptom, and health literacy.

Results: The present study results revealed significant positive relationships existing between long-term care needs with age and depressive symptom, while negative relationships between income and health literacy were reported. A hierarchical multiple regression analysis indicated that four of nine determinants of long-term care needs: age, depressive symptom, health knowledge and understanding, and ability managing their health condition significantly predicted long-term care needs at a level of 18% (R^2 adjusted=0.18, p<0.001).

Conclusion: The present study results showed associations between personal and health literacy factors with long-term care needs. These findings prove that it is vitally important for healthcare professionals to consider the rural elderly's mental health status and health literacy when providing care and planning treatment.

Keywords: Health literacy, Long-term care needs, Rural community

The problem of aging is becoming a global phenomenon both in developed and developing countries[1]. Thailand is now entering the demographic disruptive stage where a declining rate of fertility and a faster pace of an aging population are happening simultaneously[2]. The number of people age 60 and over in Thailand now stands at about 13 million[3]. Data from population estimates and projections conducted by the National Economic and Social Development Board (NESDB) indicate that Thailand will become a completely aged society by 2021, when one out of five Thais will be aged 60 years or older. It is further projected that Thailand will become a super aged society by 2031, when 28% of the population will be considered elderly[4].

According to the World Health Organization (WHO) data, total life expectancy in Thailand is 75.5. The increasing trend of the aging population will put pressure on healthcare spending over the long term[5]. As a result, healthcare spending in Thailand is forecasted to increase steadily. Thailand spent approximately 6.6% of its Gross Domestic Product (GDP) in 2018 on healthcare. Over the long-term,

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healthcare expenditure per GDP is projected to rise to 6.8% by 2021. This is largely affected by the aging population[6].

Aging is associated with an increased need for assistance, dependency, and long-term care (LTC)[7]. With aging, the likelihood of chronic medical illness and functional impairment increase, as does the need to plan for medical or LTC[8]. LTC is providing help needed to cope when physical and mental disabilities impair the capacity to perform daily activities[9]. The aged may require different levels of care depending on their dependency level. The dependency level can be assessed from the level of self-care[10]. LTC is defined as care for people needing support in many facets of living over a prolonged period of time[11]. LTC has been principally about managing and reducing functional impairments rather than managing disease processes[12]. People with long-term conditions reported more difficulties than the general population in understanding health information and actively engaging with healthcare providers[13]. In addition, persons who have low health literacy may contribute to their poor health status because their limited knowledge of health and healthcare issues are likely to be associated with and contributing to poor self-management of long-term conditions[14].

The application of a broad set of skills to access, comprehend, evaluate, communicate, and act on health information for improving health and well-being is called health literacy[15]. The health literacy concept has many implications in health care, health education, and health promotion and is strongly correlated with the social determinants of health, health behaviors, and health outcomes[16]. Health illiterate people have a poorer understanding of treatment and their own health, adhere less to medical regimens, have increased health care costs, and engage less in health promoting behaviors[17]. Therefore, the Ministry of Health in Thailand has developed a health literacy assessment tool for Thai people based on three principles promoting and maintaining good health in terms of food and exercise, emotions, and smoking and drinking alcohol. It consists of six domains, health knowledge and understanding, accessing information and services, communicating for added professionals, managing their health conditions, obtaining media and information literacy, and making good and appropriate health decisions to practice[18]. At the patient population level, good health literacy is the foundation to successful management and prevention of chronic disease[15]. Yet, while chronic disease prevalence increases, levels of health literacy remain low[19].

Elderly Thais live in rural areas make up to 16.86% of the total population, while those living in urban areas make up 14.71% of the total population[3]. In comparison to urban elderly, those living in rural areas are often disadvantaged in terms of having lower incomes, less education, lack of adequate housing, and less access to public transportation and to health services[20,21]. This population is also reported to have poorer mental and physical health status[22], which affects LTC needs[23]. Therefore, the present study focused on the rural elderly.

Previous studies have shown that limited health literacy is associated with underutilization of preventive healthcare services[24], poor physical and mental health[25], increasing use of emergency services[26,27], and higher hospitalization rates[28]. Studies showed that rural people had low health literacy[29,30]. A previous study suggested that it is important to identify groups of people with low levels of health literacy who are at greatest risk of poor or inequitable health outcomes[31].

Much of the research to date had established associations between low health literacy and health status among several groups of people[32]. The proportion of older people who are illiterate or have low literacy is high in rural areas[33]. Unfortunately, little is known about health literacy and LTC needs among rural elderly populations[34]. This may obscure important differences in the way health literacy can affect health. Paying specific attention to the rural elderly will be important in supporting the development of strategies for reducing adverse health implications due to their literacy difficulties. The current study was conducted to further understanding of health literacy and its effects on long-term health care needs of the rural elderly.

Objective
The present study was a cross-sectional design used to examine factors influencing LTC needs among Thai elderly in rural communities.

Materials and Methods
Research design
A cross-sectional design was used to examine factors influencing LTC needs among Thai elderly in rural communities. The research questions ask what are the most important factors affecting long-term healthcare needs of the rural elderly. The hypotheses of the present study were 1) key demographic characteristics (age and income) and depressive

symptom have direct effects on LTC needs, and 2) health literacy factors have a direct effect on LTC needs.

Population and sample

Participants in the present study were elderly persons from four rural communities. The study population included elderly males and females who were members of the communities in Nakhon Ratchasima Province, where the population of the elderly is the highest in rural Thailand. Therefore, the province was selected as the subjective area[35]. Multi-staged random sampling was used to select the study population using the following steps. First, one district was selected out of 32 districts in the selected province. Second, one sub-district was selected from the district. Finally, four villages were selected from the sub-district. The elderly in the communities were age 60 and over and from a sub-district with at least 1,850 persons[35].

Sample size

Sample size estimation from Krejcie and Morgan[36] table for determining sample size from a given population was 320 persons. The adjusted sample size was taken using the multi-staged random sampling design effect. It must be estimated by the nature of research problems. The rate of LTC needs in each area may have moderately different values. The design effect was set at 1.2[37]. The sample size was calculated as 384. With a sample size of 384 people, adding 25% to prevent the missing cases, the minimum sample size of the study was 480 persons. Therefore, 480 participants were selected.

Final participant selection criteria for the present study included the following seven conditions, Thai nationality, aged 60 years and over, had resided in the community for more than six months, able to answer questions, no problems speaking, listening, and communicating, willing to participate in the study voluntarily, and being able to sign the informed consent form.

Ethical approval

Approval was obtained, IRB No. 050/2018, from the Committee of Human Ethical Research, Maharat Hospital Nakhon Ratchasima. Prior to data collection, participants were informed of the objective of the present study, data collection process, the time data collection would be used, and the plans to maintain confidentiality. Additionally, they were informed of their right to decline or withdraw from the present study at any time and for any reason. Written consent forms were obtained from all participants prior to data collection. There was no harm or risk associated with participation in the present study. The study was performed in accordance with the Declaration of Helsinki.

Instrumentation

Each questionnaire used was addressed below. Permission for use was obtained for all copyrighted questionnaires.

Demographic and health information: Developed by researchers that included gender, age, highest education level, and average income.

Depressive symptom: The Thai Geriatric Depression Scale (TGDS), an assessment scale used to screen for depression by measuring the changing state of emotions such as sadness and unhappiness. Such feelings are physical, mental, and social and affect one's overall mental status. This tool was developed by the Train Brain Forum Thailand. It is a 30-item screening questionnaire to assess the level of depression in the elderly. Responses to questions were given a score of (0 or 1 point). Interpretation of results were as followed, 0 to 12 points was no depression, 13 to 18 points was slight depression, 19 to 24 points was moderate depression, and 25 to 30 points was severe depression[38]. The TGDS 30 is an acceptable screening test assessing mental health problems in the community with Cronbach's alpha coefficient 0.91 to 0.94, used in the previous studies with the Thai population[38]. Cronbach's alpha coefficient for the study was found to be 0.84.

Health literacy scale of Thai adults: This tool was developed by the Health Education Division, Department of Health Services and Support, and the Ministry of Health in Thailand[18]. Health literacy has been defined as the cognitive and social skills that determine the motivation and ability of individuals to gain access to, understand, and use information in ways to promote and maintain good health[32]. According to the five principles in promoting and maintaining good health in terms of A) food, B) exercise, C) emotions, D) smoking, E) alcohol consumption, one's health literacy can be assessed. The questionnaire consisted of six domains, which are Health knowledge and understanding (10 items), Accessing information and services (5 items), Communicating for added professionals (5 items), Ability managing their health condition (5 items), Getting media and information literacy (5 items), and Making appropriate health decisions to good practice

(5 items). Each of the 35 items in the six domains of health literacy of Thai adults is scored 0 to 4 with a possible rang score of 0 to 110. The interpretation of a score less than 60% of the total domain score and of each domain score indicates that there is poor health literacy, 60% to 79% of the total domain indicates moderate health literacy, and more than 80% of the total domain score indicates that there is good health literacy[18]. Cronbach's alpha coefficient 0.75 to 0.92 was used as a reference in the previous studies with the Thai population[39]. Cronbach's alpha coefficient for the study was found to be 0.87.

Long-term care needs: The screening tool used for the elderly who needed LTC consisted of the following five parts, social aspect (3 items), ability to see and hear (2 items), forgetfulness (2 items), vulnerability (5 items), and activities of daily living (ADL) (16 items). This tool was developed by the Ministry of Public Health Thailand[40]. An assessment giving (0 or 1 point) for 28 items was used to measure and test the elderly. Interpretation of results is as followed, 0 to 16 points indicates that there is no need for LTC but support is needed to promote health and disease prevention, 17 to 19 points indicates that repeat screening is needed within 6 to 12 months, 20 points or more indicates the need for LTC[40]. Cronbach's alpha coefficient for the study was found to be 0.89.

Data collection procedure

Data were collected between August and September 2018. The data collection process included seven steps. 1) Permission was submitted to the administrator of the Provincial Health Office who coordinated with the chair of the community. 2) The researcher coordinated with the community in each village. 3) The researchers trained the data collection team to use the questionnaires, obtain informed consent, and provide basic assistance to participants found to be at risk. 4) Researchers traveled to the areas to collect data. The village health volunteers assisted the research team with access to participants to collect data. 5) Results of all responses and information remained confidential and were used only for research and educational purposes. 6) Participants completed the questionnaire in an average of 45 minutes. 7) When the questionnaire was completed, the researcher verified the completeness of the information obtained from the responses before recording and analyzing the data.

Data analysis

IBM SPSS Statistics software, version 23.0 (IBM Corp., Armonk, NY, USA) was used for data analyses. Descriptive statistics were used to describe demographic characteristics. Hierarchical multiple regression was used to evaluate the predictive factors. Independent variable, the demographic variables in the equations are (a) age (entered as "age in years"), (b) education level (coded 1 for "primary school and lower level" or 0 for "does not belong to that level"), (c) gender (coded 1 for "males" and 0 for "females"), (d) income (entered as "income per month", health literacy (entered as "score of health literacy) and (e) depression (entered as "score of depression"). Dependent variable, LTC needs was entered as an interval scale (continuous variable). The confounding variable (demographic variable) was entered in the first step of the hierarchical multiple regression analysis followed by the psychosocial variables (depression, health literacy) in the second step. The assumptions of the multiple regression analysis tested included normality, linearity, homoscedasticity, multicollinearity, and autocorrelation. Non-significant variables (p>0.05) were removed from the equation and the regression was re-run without these variables to obtain the final prediction equation.

Results

Of the 477 participants completing the questionnaires, Table 1 shows that 60.6% were females and 39.4% were males. The average age was 71.73 (SD 8.53, range 60 to 97). Most of the participants had a primary school level education (86.0%), a monthly income of 5,000 Baht or less (83.4%), and a normal depressive symptom based on the TGDS screening (90.6%).

Table 2 shows the classification level of health literacy among the elderly in the rural community including the total score and scores in the six domains. Regarding health literacy among participants, 84.1% indicated that they had poor health literacy. Specifically, most had a poor level in terms of communicating for added professional skills, accessing information and services, and getting media and information literacy (92.5%, 91.8%, and 86.4%, respectively). Many of the participants had a poor level in health knowledge, health understanding and managing their health condition (78.0% and 44.2%, respectively). However, more than a half of the participants (61.1%) had a good level in making appropriate health decisions for good practice.

The classification level of LTC needs of the elderly in the rural community using three levels as a screening base for LTC needs. More than a half

Table 1. Demographic data and classification of depression of participants (n=477)

Variables	Male n (%)	Female n (%)	Total n (%)
Age (years)			
60 to 69	95 (50.5)	135 (46.7)	230 (48.2)
70 to 79	55 (29.3)	94 (32.5)	149 (31.1)
80 and more	38 (20.2)	60 (20.8)	98 (20.5)
Highest Education			
No education	1 (0.5)	4 (1.4)	5 (1.0)
Primary school	157 (83.5)	253 (87.5)	410 (86.0)
Secondary school	20 (10.6)	23 (8.0)	43 (9.0)
High school and higher	10 (5.4)	9 (3.1)	19 (4.0)
Income			
<5,000	143 (76.1)	255 (88.2)	398 (83.4)
5,000 to 10,000	24 (12.7)	22 (7.6)	46 (9.6)
10,001 to 15,000	6 (3.2)	2 (0.7)	8 (1.7)
>15,001	15 (8.0)	10 (3.5)	25 (5.3)
Depression			
Normal (score 0 to 12)	173 (92.0)	259 (89.6)	432 (90.6)
Mild depression (score 13 to 18)	15 (8.0)	25 (8.7)	40 (8.4)
Moderate depression (score 19 to 24)	0 (0.0)	4 (1.4)	4 (0.8)
Severe depression (score 25 to 30)	0 (0.0)	1 (0.3)	1 (0.2)

Table 2. Health literacy (n=477)

Health literacy	n (%)
Health knowledge and understanding	
Poor (score 0 to 5)	211 (44.2)
Moderate (score 6 to 7)	205 (43.0)
Good (score 8 to 10)	61 (12.8)
Accessing information and services	
Poor (score 0 to 12)	438 (91.8)
Moderate (score 13 to 15)	33 (6.9)
Good (score 16 to 20)	6 (1.3)
Communicating for added professional skills	
Poor (score 0 to 12)	441 (92.5)
Moderate (score 13 to 15)	27 (5.6)
Good (score 16 to 20)	9 (1.9)
Ability managing their health condition	
Poor (score 0 to 12)	372 (78.0)
Moderate (score 13 to 15)	52 (10.9)
Good (score 16 to 20)	53 (11.1)
Getting media and information literacy	
Poor (score 0 to 12)	412 (86.4)
Moderate (score 13 to 15)	37 (7.8)
Good (score 16 to 20)	28 (5.8)
Making appropriate health decisions for good practice	
Poor (score 0 to 12)	24 (5.1)
Moderate (score 13 to 15)	159 (33.8)
Good (score 16 to 20)	288 (61.1)
Total health literacy score	
Poor (score 0 to 66)	401 (84.1)
Moderate (score 67 to 87)	73 (15.3)
Good (score 88 to 110)	3 (0.6)

of participants (52.60%) needed LTC or repeated screening within 6 to 12 months.

The zero-order correlations ranged from 0.03 to 0.84 (Table 3). Results suggested that when age increased, income decreased, depressive symptom increased, health knowledge and understanding decreased, accessing information and services decreased, communicating for added professional skills decreased, ability managing their health condition decreased, getting media and information literacy decreased, making appropriate health decisions for good practice decreased, total health literacy score decreased, and LTC needs increased. Further, the correlations suggested that participants with higher age reported lower income. Participants who had higher depressive symptom reported lower income and lower health literacy. All domains had statistical significance except in making appropriate health decisions for good practice.

Hierarchical multiple regression analysis was performed to test the model predicting LTC needs (Table 4). The proposed variables including key demographic data (age and income), psychosocial determinants (depressive symptom), and health literacy (health knowledge and understanding, accessing information and services, communicating for added professional skills, ability managing their health condition, getting media and information literacy, making appropriate health decisions for good practice, and total health literacy score) were entered. In the first step, LTC needs were tested simultaneously with demographic variables including age and income. This model supported R^2 adjusted=0.11, F=30.09, p<0.001). In this model, the powerful variable that could explain LTC needs significantly was age (β=0.33, p<0.001). Secondly, the psychosocial determinants (depressive symptom) were entered. This model supported R^2 adjusted=0.15,

Table 3. Correlation matrix of long-term care need with other variables (n=477)

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Age	1										
2. Income	−0.21**	1									
3. Depressive symptom	0.08	−0.10*	1								
4. Health knowledge and understanding	−0.19**	0.08	−0.16**	1							
5. Accessing information and services	−0.16**	0.14**	−0.28**	0.21**	1						
6. Communicating for added professional skills	−0.08	0.10*	−0.38**	0.11*	0.64**	1					
7. Ability managing health condition	−0.21**	0.11*	−0.15**	0.24**	0.62**	0.36**	1				
8. Getting media and information literacy	−0.15**	0.18**	−0.13**	0.19**	0.53**	0.26**	0.61**	1			
9. Making appropriate health decisions for good practice	−0.06	0.06	−0.08	0.13**	0.10*	0.14**	0.12*	0.12*	1		
10. Total score health literacy	−0.23**	0.18**	−0.28**	0.37**	0.82**	0.61**	0.84**	0.79**	0.28**	1	
11. Long-term care needs	0.37**	−0.10*	0.21**	−0.23**	−0.11*	−0.04	−0.24**	−0.19**	−0.03	−0.24**	1

* p<0.05, ** p<0.001

Table 4. Multiple regression analysis for predicting the long-term care need (n=477)

Predictors	Unstandardized coefficients		Standardized coefficients	t	p-value	95% CI of B	
	B	Std. error	β			Lower bound	Upper bound
Age	0.20	0.03	0.29	6.56	0.00	0.14	0.26
Income	−2.83	0.00	−0.00	−0.08	0.93	0.00	0.00
Depressive symptom	0.26	0.06	0.21	4.55	0.00	0.15	0.37
Health knowledge and understanding	−0.37	0.15	−0.10	−2.38	0.02	−0.67	−0.06
Accessing information and services	0.19	0.10	0.12	1.82	0.07	−0.02	0.39
Communicating for added professional skills	0.11	0.09	0.07	1.22	0.23	−0.07	0.29
Ability managing their health condition	−0.18	0.06	−0.19	−3.13	0.00	−0.29	−0.07
Getting media and information literacy	−0.06	0.06	−0.06	−1.15	0.25	−0.17	0.05
Making appropriate health decisions for good practice	0.06	0.11	0.02	0.49	0.63	−0.17	0.28
Model: R^2 adjusted=0.18, df=6,461, F=12.76, p<0.001							

CI=confidence interval

F=27.73, p<0.001). In this model, the powerful variable that could explain LTC needs significantly was age (β=0.29, p<0.001). Then, health literacy factors (health knowledge and understanding, accessing information and services, communicating with added professionals, ability managing their health condition, getting media and information literacy, making appropriate health decisions for good practice, and total health literacy score) were entered. The overall model supported (R^2 adjusted=0.18, F=12.76, p<0.001). Four of the nine determinants of LTC needs analyzed were age, depressive symptoms, health knowledge and understanding, and ability in managing their health condition. These significantly predicted LTC needs at a level of 18%

(R^2 adjusted=0.18, p<0.001). In this model, age was the most powerful determinant contributing to LTC needs (β=0.29, p<0.001), followed by depressive symptoms (β=0.21, p<0.001), ability managing their health condition (β=−0.19, p<0.001), and health knowledge and understanding (β=−0.10, p<0.02).

Discussion

Most of the elderly participants in the present study were female and the average age was 71.73 (SD 8.53), mostly early elderly[41]. This supports the proportion of older people is increasing rapidly in Thailand. Forty-one percent of households have at least one member aged 60 and over[42]. Most of the participants (86.0%) had a primary school level

education. This is consistent with the Thailand Education Report that states the average academic year of the Thai elderly in the Northeast region was 5.05 years, indicating that many people did not complete primary school[43]. Regarding income, participants had a low monthly average income of 5,000 Baht or less per month. This is consistent for most rural elderly people in Thailand[44].

The results showed that more than half of the participants (52.6%) needed LTC and repeated screening within 6 to 12 months. The present study is consistent with a previous study that reported the need of support for the Thai elderly and that policy relevance of LTC organizations has increased considerably[8]. However, LTC institutions in rural areas are rare[44]. The results suggest that governments need to recognize the unique challenges of service delivery within rural communities. Specific considerations are geography, lower socio-economic status, and widely dispersed populations.

The health literacy among participants was 84.1%, indicating that they had poor health literacy. The results are consistent with previous studies that found people in rural communities having low health literacy[30,33]. Low levels of health literacy are associated with poor health outcomes and limited use of preventive care[45]. Since health literacy levels are low among the elderly, there are concern about the gaps in knowledge and comprehension and how it will impact their decision making regarding self-management and treatment adherence[15]. Healthcare providers need to be conscious of their patients' health literacy skills to ensure that health information is communicated effectively to help manage long-term conditions. Thus, the present study's results support the previous study suggestion that identifying groups with low health literacy skills is an important step in devising effective engagement, prevention, and intervention strategies[13].

The psychosocial determinant was regarded as depressive symptom and considered a significant factor influencing future LTC needs among the elderly in the present study. These findings are consistent with the previous study reporting a poor general health status was a significant factor for depression among the Malay elderly in the rural community[46]. Depression in the elderly often goes untreated because people think that it is a normal part of the aging process and natural reaction to chronic diseases, loss, and social conversion[47]. Immobility, poor medical compliance, and self-neglect accompanying depression can worsen concomitant medical illnesses[48]. Prevention

of mental health problems and promotion of positive mental wellbeing often receive limited attention in health improvement work and is not well integrated or acted upon like other priority public health issues such as tobacco, alcohol, or obesity[16]. Preparation for future care is related to improving coping ability as well as better mental and physical health outcomes among elderly people[49]. Results clearly show that health literacy and the ability to manage health conditions adequately are significant indicators that predict future LTC needs. The findings are congruent with previous studies that have reported that people who take a greater role in managing their own health and care, need to have both access to and understanding of information pertaining to their health[15]. A set of competencies is required to promote and maintain good health, function effectively in the healthcare context, and enable people to act on their health condition[16]. There is evidence that higher levels of activation are associated with better patient outcomes[50]. People who recognize the importance of self-managing their own health condition and have the necessary skills, knowledge, and confidence to take on this role, experience better health outcomes[50]. Therefore, educating and increasing the health literacy in Thai society is and will be the important and necessary challenge for the country.

Application of the present study, and the findings are especially important for public health practitioners and policy makers planning for the future LTC needs of aging populations. Limited health literacy is not an individual deficit, but a systematic problem that should be addressed by ensuring that health care and health information systems are aligned with providers' and the public's needs. Policy recommendations included strategic planning for health literacy development to meet basic informational needs in managing health, setting up a plan to develop health literacy in middle aged people before getting old, and developing a social network in rural areas to improve community-based long-term elderly care. In basic care, nurses can seek and monitor resources used by the elderly to provide support, quality care, and healthy aging.

For the social support network to exist and function properly, the community must be prepared for the task of caring for the elderly. The focus of previous studies was often on behavioral risk factors rather than health literacy and use of different measures of health literacy. Since the review of the health literacy instrument has been developed and validated, measuring a person's ability to obtain and

use health information is promising and will be helpful for future research of this topic. Informed patient engagement, greater health literacy, and concern for those who are at risk with depressive symptoms should be a vitally important priority for health policy makers and providers.

Integration and evaluation of health literacy within chronic disease management among the elderly should also be an important priority for them. The government will need to seriously consider research findings and the ever-present reality regarding the issues of healthcare services of an aging society. The country must have a good strategic plan and find effective ways to improve health literacy and promote good mental health to cope with increasing future needs. Caring for the elderly is a major need and responsibility, needing priority consideration in health and social policies in Thailand.

Limitation

The cross-sectional study was an observational study that assessed exposure and the outcome at one specific point in time in a sample population. However, by the fact that they are carried out at one time point and give no indication of the sequence of events whether exposure occurred before, after, or during the onset of the outcome. This being so, it is impossible to infer causality. The subjective area was selected using the highest number of elderly populations within the areas. By doing so, it made the prevalence of LTC needs higher. Since it is difficult to generalize about the prevalence of the whole country, the present study focused only on the subjective areas. The statistical analysis of the study had no weightage on the procedure for the adjusted design effect of this complexed survey. However, the authors were concerned about this issue and plugged in a design effect to calculate the sample size and process. Additionally, the questionnaire consisted of many items that could have some variance in the answers. The present study aimed to focus on psychosocial factors, therefore, the underlying diseases of the participants were not included in the present study. However, the underlying disease is an important factor for LTC needs that further study should concern.

Conclusion

The findings of the present study are especially important for public health practitioners and policy makers planning for the future LTC needs of aging populations. Limited health literacy is not an individual deficit, but a systematic problem that should be addressed by ensuring that health care and health information systems are aligned with providers' and the public's needs. Informed patient engagement, greater health literacy, and concern for those who are at risk with depressive symptoms should be a vitally important priority for health policy makers and providers. Integration and evaluation of health literacy within chronic disease management among the elderly should also be an important priority for them. The government will need to seriously consider research findings and the ever-present reality regarding the issues of healthcare services of an aging society. The country must have a good strategic plan and find effective ways to improve health literacy and promote good mental health to cope with increasing future needs. Caring for the elderly is a major need and responsibility, needing priority consideration in health and social policies in Thailand.

What is already known on this topic?

Rural elders have poor physical and mental health and need LTC. Rural elders have experienced worsening health care disparities.

What this study adds?

This study found a significant positive relationship existing between LTC needs with age and depressive symptom, and a negative relationship between income and health literacy in Thailand.

Conflicts of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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