

# **Factors Influencing Health Promotion Behaviors and Prevention of COVID-19 Among Elderly During the Second Wave of Pandemic in Chiang Mai, Thailand**

**Jukkrit Wungrath<sup>1</sup>, Nattapong Autorn<sup>2</sup>**

<sup>1</sup>Faculty of Public Health, Chiang Mai University, Thailand, E-mail: jukkrit.w@cmu.ac.th

<sup>2</sup>Doi Saket Hospital, Doi Saket District, Chiang Mai, Thailand

## **ABSTRACT**

The objective of this research was to investigate factors influencing health promotion and prevention behaviors of COVID-19 among the elderly. This cross-sectional research was conducted to study 127 elderly people at an elderly school in Choeng Doi Sub-district, Doi Saket District in Chiang Mai, Thailand during the new wave of outbreaks of COVID-19. Data was collected from December 2020 to January 2021. The research instruments consisted of 1) general information questionnaire for the elderly, 2) influencing factor assessment form and 3) health promotion behaviors in the prevention of COVID-19 assessment form, which had IOC of  $>.7$  for all and Cronbach's alpha coefficients of  $.87$  and  $.79$  respectively. The elderly had good health-promoting behaviors in the prevention of COVID-19 ( $M = 2.27$ ,  $SD = .54$ ), perceived self-efficacy variance was the most described ( $Beta = .252$ ,  $p = .001$ ), followed by situational influence ( $Beta = .224$ ,  $p = .001$ ), perceived benefit ( $Beta = .211$ ,  $p = .010$ ), interpersonal influence ( $Beta = .174$ ,  $p = .000$ ), and perceived obstacle ( $Beta = -.160$ ,  $p = .001$ ), can predict health promotion behaviors and prevention of COVID-19 among elderly of  $68.90\%$  ( $R^2 = .689$ ,  $Adjusted R^2 = .516$ ,  $p = .000$ ). The data obtained can be used to guide the development of health promotion behaviors and prevention of COVID-19 among the elderly to encourage the elderly to have perceived self-efficacy of health promotion behaviors and prevention of COVID-19 properly by using social support to contribute to the elderly to have healthier behavior and better quality of life.

**Keywords:** Health Promotion Behaviors, COVID-19, Elderly

## **INTRODUCTION**

Thailand is currently experiencing a new Coronavirus Disease 2019 or COVID-19. New cases have been detected in numerous areas around the country on an ongoing basis. According to the data from the Department of Disease Control, Ministry of Public Health,

from 1 to 5 January 2021, there were 7163, 7379, 7694, 8439 and 8966 gradual cases, the new cases were 279, 216, 315, 745, and 527 cases, cumulative deaths were 63, 64, 64, 65, and 65 respectively, and this trend is expected in this way for a while if there are no effective disease control measures and people in the country have an inadequate awareness, misuse of disease prevention and health promotion behaviors. However, in such a situation, the relevant agencies have continuously promoted Thai people to take care of themselves, especially for those who are susceptible to infection and are often vulnerable when infected, including pregnant women and children aged from 6 months to 2 years, chronic disease patients, elderly people with disabilities, thalassemia patients, or immunocompromised patients and obesity with a BMI of 35 kg / m<sup>2</sup> (WHO, 2020).

Transmission of the 2019 coronavirus is caused by the spread of droplets, coughing, sneezing, talking or breathing in which these can lead to infection. It was also found that these drops or droplets can fall on objects and surfaces such as tables, doorknobs, and handrails, etc. When it comes into contact with such objects or surfaces, touching them, eyes, nose, or mouth can potentially cause an infection. Staying at least 1 meter away from others, washing your hands regularly with soap, or cleaning them with handwashing alcohol are essential to prevent COVID 19 (WHO, 2020).

Elderly people are significantly vulnerable to getting COVID-19 rather than any other ages due to inferior physical conditions and negligible immunity by ages, especially elderly with underlying diseases such as diabetes, hypertension, lung disease, and cancer. This group is potentially at risk of getting COVID-19, if not properly monitored and prevented. The Department of Health, Ministry of Public Health (2020) has provided recommendations to prevent COVID-19 for the elderly besides the general public: wash the hands properly with soap and water or alcohol gel every time before eating, after going to the bathroom, avoid touching your face, eyes, mouth, and nose with your unsensitized hands, eating hot or freshly cooked food, using a private spoon, exercising regularly, getting enough rest, developing your mental health, and relieving stress by yourselves. If coughing or sneezing, then kindly proceed in the tissue and put the tissue in a plastic bag and seal the bag tightly before throwing it away, or cover your mouth and nose with your sleeves when coughing or sneezing. Finally, clean your hands with soap and water or an alcohol gel right away. Wear masks, avoid or stay close to people with cold symptoms, fever, cough, sneezing, runny nose. Try to avoid leaving your home during the wave of outbreaks or crowded areas. If necessary, wear a surgical mask or cloth mask for as little time as possible. Keep a distance of 1-2

meters away from other people. Avoid hugging, holding, or talking in close contact with other people, and switch to technology for the communication with others.

Based on previous research reviews with Pender's Health Promotion Model (Pender et al., 2006), it was found that there were 5 factors influencing the health promotion behavior of the elderly as follows: 1) perceived benefits of action is the belief of the person who expects the benefits of the behavioral health, both external benefits that make it be motivation. In an early practice, people perceive the outside benefits more, but the internal benefits result in a more persistent incentive to act. 2) perceived barriers to action are a person's perception of matters that will hinder their inability to perform healthy behavior of internal obstacles such as laziness, ignorance, lack of time, dissatisfaction, misunderstanding. Nevertheless, the external obstacles are such status, lack of support for behavior, perception of difficulties, weather, and inconvenience. These obstacles can be real or expected, but they affect their willingness to act and their motivation to avoid the acting. 3) Perceived self-efficacy is the assurance of one's ability to manage and act in health behaviors under various barriers or situations. Believing and recognizing that you can act under obstacles will influence the perceived reduction of the barriers. 4) interpersonal influences are behaviors, beliefs, or attitudes of others that influence a person's thinking through social impulses or commitment to a behavioral action plan such as family, friends, and health personnel, including norms and expectations or the beliefs of key people in a group or community that have established standards of conduct, social support where individuals perceive to have a social network of material, information, and emotional support, and seeing a role model that it comes from learning by observing other people doing that behavior. 5) Situational influences are people's perceptions of situations or contexts that can facilitate or hinder the practice of health-promoting behaviors. The individuals will discriminate against activities that feel consistent with their lifestyle, environment, safety, and security that are attracting or make individuals incentivized to practice health-promoting behaviors.

This study emphasized to study factors influencing health promotion behaviors and prevention of COVID-19 among elderly in elderly schools, Choeng Doi Sub-district, Doi Saket District, Chiang Mai Province during the second wave of pandemic that would be beneficial to continue to use as a guideline for enhancement of the health of the elderly in the prevention of COVID-19 in the community to an effective manner.

## **MATERIALS AND METHODS**

### **Population and Sample**

This research was structured as cross-sectional research. The population was elderly in the elderly school, Doi Saket District, Chiang Mai. Sample size calculated by G\* power program. The calculation of effect size was from research by Winthanyou B. et al. (2020). The effect size set for medium studies was  $f^2 = .15$ ,  $\alpha = .05$ , Power ( $1-\beta$  err prob) = .90, Number of predictors was equal to 5, and 116 samples were obtained. To prevent data loss or questionnaire responses, 10% of samples were added. The total sample size was 127 people. Simple random sampling was the drawing lots. The criteria for selection were Thai nationality, able to speak, able to communicate and provide information in Thai, be able to do various activities and travel outside the home, and not bedridden.

### **The Research Tools**

The research tools included a questionnaire created by the researcher based on the Health Promotion Model (Pender et al., 2006) in conjunction with the prevention of COVID-19 recommendations of the World Health Organization (WHO, 2020) and the recommendations for the elderly in the situation of the COVID-19 outbreak from the Department of Health, Ministry of Public Health, 2020, which had three parts as follows:

Part 1: The general information of the elderly consisted of 8 items, namely gender, age, religion, education level, current income, the sufficiency of income for life, congenital diseases, and their perceptions on their health.

Part 2: Factors influencing health promotion behaviors and prevention of COVID-19 were 35 items that covered perceived benefits of actions, perceived barriers to actions, factor perceived self-efficacy, interpersonal influence factor and situational influence factor. The rating scale questionnaire has 4 levels: Disagree, Partly Agree, Moderate, and Totally Agree. There are 3 levels of factor interpretation results: low influence (.00-1.00 points), moderate influence (1.01-2.00 points), and high influence (2.01-3.00 points). The alpha coefficient of Cronbach was tested to be .87.

Part 3: Health promotion behaviors and preventions of COVID-19 were 12 items, which asked the elderly behavior in the past 1 week. The rating scale questionnaire has 4 levels: non-practice, occasional practice, mostly practice, and regular practice. The interpretation of the perceived factor was divided into 3 levels: low behavior level (.00-1.00

points), moderate behavior level (1.01-2.00 points), and good behavior level (2.01-3.00 points). The alpha coefficient of Cronbach was tested to be .79.

All research tools had also been examined for the content validity by 3 experts. The results showed that the index of item objective congruent (IOC) was  $\geq .70$  for all.

### **Data Collection**

General data was analyzed by frequency, percentage, mean, standard deviation, maximum, and minimum. The relationship between factors influencing health-promoting behaviors in the prevention of COVID-19, was analyzed by Pearson Product-Moment Correlation, and data on the influence of the primary variable on the variable, followed by Multiple Regression Analysis.

### **Ethical Considerations**

Research was conducted in accordance with the Human Research Ethics and was approved by the Human Research Ethics Committee, Faculty of Public Health, Chiang Mai University, No.ET31/2563. Data collection was conducted from December 2020 to January 2021.

## **RESULTS**

### **1. General Information of the Sample**

The sample consisted of 127 elderly people. Most of them were female at 61.00%. The youngest was 60 years, the oldest was 98 years, and the average age was about 72 years (SD = 6.50). Buddhism was 98.70%. The highest education was at the elementary school at 81.30%. The current primary income was the main expenditure of the living at 56.70%. The elderly had sufficient income for living each month at 42.71% and had congenital disease at 86.47%. Their perceptions on their own health were still healthy at 51.22%.

### **2. Level of Factors Influencing Health Promotion Behaviors and Prevention of COVID-19 among Elderly**

The elderly had a high level of perceived benefits with the mean of 2.73 (SD =.56), perceived obstacle was low with the mean of .86 (SD =.74), perceived self-efficacy was high with the mean of 2.56 (SD =.61), interpersonal influence was moderate with the mean of 13.2 (SD =.47), situational influence was high with the mean of 2.13 (SD =.67), and the health

promotion behaviors and prevention of COVID-19 among elderly were at a good level with the mean of 2.27 (SD =.54) as shown in the Table 1.

**Table 1:** Level of Factors Influencing Health Promotion Behaviors and Prevention of COVID-19 among Elderly

Variables	Mean (SD)	interpretation
Perceived Benefit	2.73 (.56)	High
Perceived Obstacle	.86 (.74)	Low
Perceived Self-Efficacy	2.56 (.61)	High
Interpersonal Influence	1.32 (.47)	Moderate
Situational Influence	2.13 (.67)	High
Health Promotion Behaviors and Preventions of COVID-19	2.27(.54)	Good

## 2. Relationship between Factors Influencing Health Promotion Behaviors and Prevention of COVID-19 among Elderly

Perceived self-efficacy, situational influence, perceived benefits, and interpersonal influence were significantly associated with health promotion behaviors and prevention of COVID-19 among the elderly ( $r = .771, .713, .615, \text{ and } .569, p = .000$ ). Perceived obstacle was significantly negatively associated with health promotion behaviors and prevention of COVID-19 among the elderly ( $r = -.336, p = .000$ ) as shown in Table 2.

**Table 2:** Relationship between Factors Influencing Health Promotion Behaviors and Prevention of COVID-19 among Elderly.

Variables	1	2	3	4	5	6
1. Perceived Benefits	1.00					
2. Perceived Obstacle	-.174	1.00				
3. Perceived Self-Efficacy	.641*	-.163	1.00			
4. Interpersonal Influence	.378*	-.214*	.360*	1.00		
5. Situational Influence	.618*	-.262*	.650*	.280*	1.00	
6. Health Promotion Behaviors	.615*	-.336*	.771*	.569*	.713*	1.00

---

and Preventions of COVID-19

---

\*p < .05

### 3. Multiple Regression analysis between Health Promotion Behaviors and Prevention of COVID-19 among elderly

Perceived self-efficacy could explain variance the most (Beta =.252, p =.001), followed by situational influence (Beta = .224, p =.001), perceived benefits (Beta =.211, p =.010), interpersonal influence (Beta =.174, p =.000), and perceived obstacle (Beta = -.160, p =.001), respectively. These five factors could predict health promotion behaviors and prevention of COVID-19 among the elderly by 68.90% (F = 16.471, p = .000) as shown in Table 3.

**Table 3:** Multiple Regression Analysis between Health Promotion Behaviors and Prevention of COVID-19 among Elderly

Variables	b	SE	beta	t	p
Perceived Benefit	.239	.089	.211	2.630	.010
Perceived Obstacle	-.147	.056	-.160	-2.312	.001
Perceived Self-Efficacy	.372	.078	.252	3.671	.001
Interpersonal Influence	.278	.063	.174	3.126	.000
Situational Influence	.186	.075	.224	3.036	.001

---

R=.736, R<sup>2</sup>=.689, Adjusted R<sup>2</sup>=.516, F =16.471, p=.000

---

## DISCUSSION

This study investigated the factors influencing health promotion behaviors and prevention of COVID-19 among the elderly. Perceived benefits, perceived obstacles, perceived self-efficacy, interpersonal influence, and situational influence could explain variations in health promotion behaviors and prevention of COVID-19 among the elderly by 61.20%. The most influencing factor was factor self-efficacy that explained by the concept of health promotion that when individuals perceive their own good abilities, it will motivate them to do good and correct behavior (Pender et al., 2006). This was in accordance with the concept of self-efficacy Bandura (Bandura A., Freeman W., & Lightsey R., 1999). described that self-efficacy was the confidence or expectation of one's ability to perform a successful action or activity to achieve the desired outcome. This was a significant forecast of adaptation

and played a key role in behavioral changes, physical health, mental problems, and mental adaptation. This can affect how much the elderly can control and deal with stressful situations caused by COVID-19. From the previous studies, self-efficacy reduced the negative effects of stress and was useful in protecting and promoting physical and mental health in stressful situations (Lee K., Jeong G-C. & Yim J., 2020). Hence, self-efficacy was not only matter that affected because it also helped older people perceive themselves in stressful situations induced by COVID-19, and also helped to show the belief that they can overcome the difficulties (Bandura A., Freeman W., & Lightsey R., 1999, Lee K., Jeong G-C & Yim J. 2020). This is consistent with the Buck, H. G. et al. (2015) which reported that at each level of coma, self-efficacy was essential in the self-care process. This is because higher coma weakened the relationship between self-efficacy and self-care. Refinement interventions aimed at improving self-efficacy at different levels of co-disease may be a key factor affecting hospital admissions and quality of life. Likewise, Marini, C.M., Pless Kaiser, A., Smith, B. N., & Fiori, K. L. (2020) reported that self-efficacy was a key factor in promoting the overall health and mental health of American veterans to cope with the COVID-19 epidemic. It was found that the group veterans that had self-efficacy at a good level would have self-defense ability and the ability to research information related to disease prevention and promotion and to perform health promotion behaviors correctly and effectively (Marini C.M., Pless Kaiser A., Smith B.N., Fiori K.L., 2020).

Factor situational influences has influenced health promotion behaviors and prevention of COVID-19 among elderly that followed factor self-efficacy which resulted from published news, the global situation of the COVID-19 epidemic, including Thailand that affected health problems, morbidity, and death when infected such as daily presentation of the administrative center, and the situation of the epidemic of coronavirus infection 2019, etc. The elderly can easily access the information. Public relations information of central government agencies such as the Department of Health and the Department of Communicable Disease Control, the Ministry of Public Health, etc., local government agencies such as local government organizations, Sub-district Health Promoting Hospitals, etc., which were the medium for publicizing information on vulnerable groups of infection of Coronavirus 2019 and prevention methods were, therefore, important factors that motivate the elderly. This raises awareness of how to protect yourself against the 2019 coronavirus in accordance with the recommendations given but did not contradict lifestyle, as described by Pender's Health Promotion Model (Pender et al., 2006) in which individuals would practice



health-promoting activities when they were aware of their situation in promoting health behaviors. When considered, they can be adapted to their own lifestyle, thus a health promotion practice has been initiated. The studies involving factors influencing the situation on health promotion behaviors and prevention of COVID-19 among the elderly were few. However, the results of this study were consistent with Isalam (2014), found that factor situational influence impacted health-promoting behaviors of the Thai elderly of Koh Yao District, Phang Nga Province, and the study by Giena et al. (2018) found that factor situational influence influenced health-promoting behaviors of the elderly with hypertension in Indonesia.

Perceived benefits of action influence health promotion behaviors and prevention of COVID-19 among the elderly, this can be explained by the concept of health promotion that was explained when a person perceives the benefits of health promotion activities or was anticipated on what self-interest will be the motivation for health promotion activities (Pender et al., 2006). The benefit that older people can perceive by following the COVID-19 self-protection guidelines was their absence and risk of dying from COVID-19. The perceived benefit was the value assessment of the effectiveness of an individual in engaging in health-promoting behaviors to reduce the risk of disease (Jose R., Narendran M., Bindu A., Beevi N., Manju L., Benny P., 2020). If people believed that certain actions will reduce their susceptibility to a health problem or reduce the severity of the problem, they are more likely to engage in that behavior regardless of the objective facts about its effectiveness of acts (Jose R., Narendran M., Bindu A., Beevi N., Manju L., Benny P., 2020, Janz N.K., Becker M.H., 1984, Rosenstock I.M., 1974). This was in line with Shahnazi H. et al (2020), which studied preventive health behaviors from COVID-19 in the northern Iranian province of Golestan, the benefit was found as another factor in predicting preventive behaviors from COVID-19. In other words, the individuals perform better with the increasing perception of benefits. Perceptions, such as the effect of regular hand washing, the use of personal protective equipment such as face masks and disposable gloves, can lead to high benefits and a good motivation to take precautions against this disease. When considering the perceived level of the elderly's benefits was found to be at the highest, but the variations in health promotion behaviors and prevention of COVID-19 among the elderly were less than the self-efficacy factor and factor situational influence which could be explained by the characteristics of the elderly. Although the benefits of health promotion practices to prevent COVID-19 infection were recognized, but if the practice is the contrary to the lifestyle or

lacks confidence in one's ability to practice health promotion, it will prevent the practice from initiating or abolishing even when the benefits of the practice are recognized (Pender et al., 2006).

Factor interpersonal influences have influenced health promotion behaviors and prevention of COVID-19 among the elderly. It was found that various groups of individuals in society, whether they were family members, friends, neighbors, health personnel within the community, etc., can be considered the great influences on the elderly. These individuals were involved in raising awareness of the health care of the elderly as well as promoting and promoting various forms of health especially family members, in particular, played a role and influence on the behavior of the elderly (Eliopoulos C., 2013, Wungrath J., Saengyo S.& Ummee K., 2018). Elderly having a good relationship with others was important in life. It was found that the elderly who had good relationships and connections with the surrounding members were happier, had a good quality of life, and led to their physical and mental health. One of six behavioral cognitive aspects was reflected by the interpersonal influences of health promotion models. Interpersonal influences included expectations of family, friends, colleagues, and healthcare providers, emotional support and encouragement, and imagining participatory learning while observing others' behaviors (Pender et al., 1996). Expectations of others were significant through emotional and social support and observing others as channels of interpersonal influence. Cognitive behavior, beliefs, or attitudes may or may contravene reality, but this created individual reality. The main sources of interpersonal influence were family, friends, colleagues, and healthcare providers (Pender et al., 2006). This was consistent with Winthanyou Bunthan et al. (2020), it was found that interpersonal influence influenced health promotion behavior in preventing coronavirus 2019 infection among the elderly in Thailand.

Perceived barriers to action influences health promotion behaviors and prevention of COVID-19 among the elderly in which several physiological changes, such as deteriorating physical change, may hinder the performance of activities (Wungrath J, Mongkol P., 2020). Economic changes in which older adults were likely to have lower incomes from not working, (Eliopoulos C., 2013, Touhy T.A. & Jett K.F., 2013) perceived barriers to life in themselves, have implications for health care practices, and may lead to improper health-promoting behaviors (Wungrath J., Saengyo S.& Ummee K., 2018, Bayliss E.A, Steiner J.F., Fernald D.H., Crane L.A. & Main D.S., 2003). However, according to the results of this study, it was found that most older adults view their own health as being healthy and free of

the underlying disease. Therefore, the elderly perceived that they did not have barriers to access resources to protect themselves from COVID-19. When the elderly was not perceived as interfering with their own practice, health-promoting behaviors were established (Pender et al., 2006). This was consistent with previous studies showing that older adults perceived themselves as having no barriers to perform good health behaviors enabling them to practice health-promoting behaviors and activities whether it was eating well, exercising, controlling mood and stress, taking medication, and following the advice of healthcare professionals, etc (Wungrath J., Saengyo S.& Ummee K., 2018, Pongpanda P. & Wiangkham D., 2011, Meethien N., Pothiban L., Ostwald S.K., Sucamvang K. & Panuthai S., 2011).

## **LIMITATIONS**

This study was in only one group of elderly people, namely the elderly who were members and participating in activities in the senior school, Choeng Doi Sub-district, Doi Saket District, which shared the limitations on the diversity of thinking of elderly people may differ in each cultural context. Therefore, further research in the future should increase the study area to obtain information from the elderly with different social contexts and cultures, and more than 5 other relevant factors should be studied in this study.

## **CONCLUSIONS AND RECOMMENDATIONS**

The study found that the elderly had the appropriate prevention behaviors of COVID-19 depended on several factors, including perceived self-efficacy, situational influence, perceived benefits, interpersonal influence, and perceived obstacle. These factors could predict the prevention of COVID-19 in the elderly. In order to benefit the elderly, relevant healthcare professionals and public health personnel should be informed that they should develop programs to promote the appropriate prevention behaviors of COVID-19 that were relevant to the elderly lifestyle context, including to find ways to organize activities to stimulate the patient's awareness of their performance and to be confident that they can perform the correct prevention behaviors of COVID-19. These also require social support, which will cause older adults to optimize behavior, stay well-being, and result in better health and quality of life.

## **CONFLICTS OF INTEREST**

There are no conflicts of interest to declare.

## **ACKNOWLEDGMENT**

We sincerely thank all the participants and the research team for their valuable time in supporting the data collection for this study. We also thank the Faculty of Public Health, Chiang Mai University for the support to our study.

## REFERENCES

1. Bandura A., Freeman W., & Lightsey R. *Self-efficacy: The Exercise of Control*. Springer; 1999.
2. Bayliss E.A., Steiner J.F., Fernald D.H., Crane L.A., & Main D.S. (2003). Descriptions of Barriers to Self-Care by Persons with Comorbid Chronic Diseases. *The Annals of Family Medicine*, 1(1), 15-21.
3. Buck HG, Dickson VV, Fida R, Riegel B, D'Agostino F, Alvaro R, et al. Predictors of Hospitalization and Quality of Life in Heart Failure: A Model of Comorbidity, Self-Efficacy and Self-care. *International Journal of Nursing Studies*. 2015;52(11):1714-22.
4. Department of Disease Control, Ministry of Public Health. (2020). Coronavirus Disease Situation Report 2019 Issue 121 on 3 May 2020. Retrieved from <https://ddc.moph.go.th/viralpneumonia/file/situation/situation-no121-030563nn.pdf>
5. Department of Health, Ministry of Public Health. (2020). Suggestions for Elderly in a Viral Infection Epidemic Situation Corona 2019 (COVID-19). Retrieved from <http://covid19.anamai.moph.go.th/>
6. Eliopoulos C. *Gerontological nursing*: Lippincott Williams & Wilkins; 2013.
7. Giena VP, Thongpat S, Nitirat P. Predictors of Health-Promoting Behaviour among Older Adults with Hypertension in Indonesia. *International Journal of Nursing Sciences*. 2018;5(2):201-5.
8. Isalam T. Factors Affecting the Health Promoting Behaviors among the Thai Elderly in Kohyao District, Phang Nga Province. *Region 11 Medical Journal*. 2014:1-15.
9. Janz NK, Becker MH. The Health Belief Model: A Decade Later. *Health Education Quarterly*. 1984;11(1):1-47.
10. Jose R, Narendran M, Bindu A, Beevi N, Manju L, Benny P. Public Perception and Preparedness for the Pandemic COVID 19: A Health Belief Model Approach. *Clinical Epidemiology and Global Health*. 2020.

11. Lee K, Jeong G-C, Yim J. Consideration of the Psychological and Mental Health of the Elderly During COVID-19: A Theoretical Review. *International Journal of Environmental Research and Public Health*. 2020;17(21):8098.
12. Marini CM, Pless Kaiser A, Smith BN, Fiori KL. Aging Veterans' Mental Health and Well-Being in the Context of COVID-19: The Importance of Social Ties During Physical Distancing. *Psychological Trauma: Theory, Research, Practice, and Policy*. 2020.
13. Meethien N, Pothiban L, Ostwald SK, Sucamvang K, Panuthai S. Effectiveness of Nutritional Education in Promoting Healthy Eating among Elders in Northeastern Thailand. *Pacific Rim International Journal of Nursing Research*. 2011;15(3):188-202.
14. Pender N. *Health Promotion in Nursing Practice, II*. Appleton and Lange. 1996:115-44.
15. Pender NJ, Murdaugh CL, Parsons MA. *Health Promotion in Nursing Practice*. 2006.
16. Pongpanda P, Wiangkham D. The Relationship Between Personal Factors, Perceived Benefits Physical Activity and Perceived Barriers Physical Activity, with Physical Activity of Older Adults in Phayao Province. *Journal of Health Science Research*. 2011;5:7-16.
17. Rosenstock IM. Historical Origins of The Health Belief Model. *Health Education Monographs*. 1974;2(4):328-35.
18. Shahnazi H, Ahmadi-Livani M, Pahlavanzadeh B, Rajabi A, Hamrah MS, Charkazi A. Assessing Preventive Health Behaviors from COVID-19: A Cross Sectional Study with Health Belief Model in Golestan Province, Northern of Iran. *Infectious Diseases of Poverty*. 2020;9(1):1-9.
19. Touhy TA, Jett KF. *Ebersole & Hess' Toward Healthy Aging-E-Book: Human Needs and Nursing Response: Elsevier Health Sciences; 2013*.
20. Winthanyou B, Phatcharaporn W, Viparporn S. Factor Influencing to Health Promotion Behavior for Coronavirus Disease 2019 (Covid-19) Prevention of Older Adults. *Journal of Police Nurses*. 2020;12(2):323-37.

21. World Health Organization (WHO). (2020c). What is a Coronavirus? Retrieved from <https://www.who.int/news-room/q-a-detail/q-a-coronaviruses>
22. Wungrath J, Mongkol P. Effectiveness Of A Health Literacy Enhancement Program for Caregivers of Dependent Older Persons in a Community of the Northern Part, Thailand. *Journal of Public Health and Development*. 18(2):24-36.
23. Wungrath J, Saengyo S, Ummee K. Barriers to Health Care Practice that Impact to Glycemic Control among Elderly with Diabetes Mellitus. *Journal of Community Development and Quality of Life*. 2018;6:351-61.