Journal of Transcultural Nursing
1–8

DOI: 10.1177/1043659620921225
journals.sagepub.com/home/tcn
SAGE

Lifestyle and Cultural Factors Related to Longevity Among Older Adults in the Northeast of Thailand

Alchalee Jantapo, RN, MS, EdD[1], and Wichitra Kusoom, RN, MS[2]

Abstract

Introduction: Healthy longevity is important in older adults. The lifestyle and cultural background are likely related to longevity. This study explored lifestyles and Buddhist Thai culture relating to longevity, and evaluated activities of daily living (ADL), body mass index (BMI), and mental health. **Method:** A mixed method using concurrent embedded strategy was employed. Qualitative data collection included observation and in-depth interviews with 30 older adults aged 80 years and above from Northeastern Thailand. Quantitative data: Barthel ADL, BMI, and Thai Geriatric Mental Health Assessment (T-GMH-A) were assessed. Content analysis was applied using the Strauss and Corbin method. **Results:** Four major themes were, promoting physical activities, prevention and control of diseases, mental health management, and Buddhist socio-Thai culture. Means of Barthel ADL, BMI, and T-GMH-A were 19.0 (*SD* 1.1), 21.34 (*SD* 3.07), and 53.53 (*SD* 7.22), respectively. **Discussion:** These factors greatly influenced longevity and well-being. Culturally congruent care should be implemented to health care services.

Keywords

lifestyle, older adults, longevity, culture, Northeastern Thailand

Introduction

The global population aged 60 years or older totaled 962 million in 2017, more than twice as large as in 1980 when there were 382 million older adults worldwide (United Nations, 2017). Similar to the world's figures, older adults in Thailand represented 10.225,322 (15%) in 2017 (Department o Older Persons, 2017) and an increase in numbers to 10,666,803 (16.06%) in 2018 (Department of Older Persons, 2018). The Northeastern, or Isan region, is the largest region in Thailand with 20 provinces and the highest number of older adult populations at approximately 3.25 million people (Department of Older Persons, 2017).

Physiological and psychological changes occurred to older adults and led to multimorbidity including suffering from disability and dependency, which affects more than two-thirds of older adults (Dunlay & Chamberlain, 2016), such as diabetes mellitus, hypertension, heart disease, Alzheimer's disease, and so on. In Thailand, there are 9.2 million (95%) older adults suffering from chronic diseases, and more than a million older adults who are disabled and dependent. Moreover, 50% of the overweight and obese (Hfocus, 2015) are associated with increased heart disease, diabetes mellitus, lower extremity osteoarthritis as well as reduced physical and functional capacity (Australian Government, 2017; Fontana & Hu, 2014). The increasing number of the older adults who are dependent implies that the burden of support for them will become heavier. Lifestyle factors are associated with healthy longevity. Mental health is important because they are faced with physical health and psychosocial changes. Regarding cultural factors, spirituality and religiosity are associated with health and longevity in different ways, and some factors are positive, as expected, but some are negative (Haviva et al., 2018). In Thailand, Buddhism is the most common religion, with approximately 93.5% of the population following Buddhism (National Statistic Office, 2018).

Because of the prevalence of frailty, disability and dependency extend into the community-dwelling older adult populations and affect family and socioeconomic well-being. Unfortunately, there were no mixed method studies to understand lifestyles including cultural factors,

[1]Suan Sunandha Rajabhat University, Bangkok, Thailand
[2]Bangkokthonburi University, Bangkok, Thailand

Corresponding Author:
Wichitra Kusoom, RN, MS, Faculty of Nursing Science, Bangkokthonburi University, 16/10 Leabklong Taweewattana Road, Bangkok, 10170, Thailand.
Email: wichitra.kus@bkkthon.ac.th

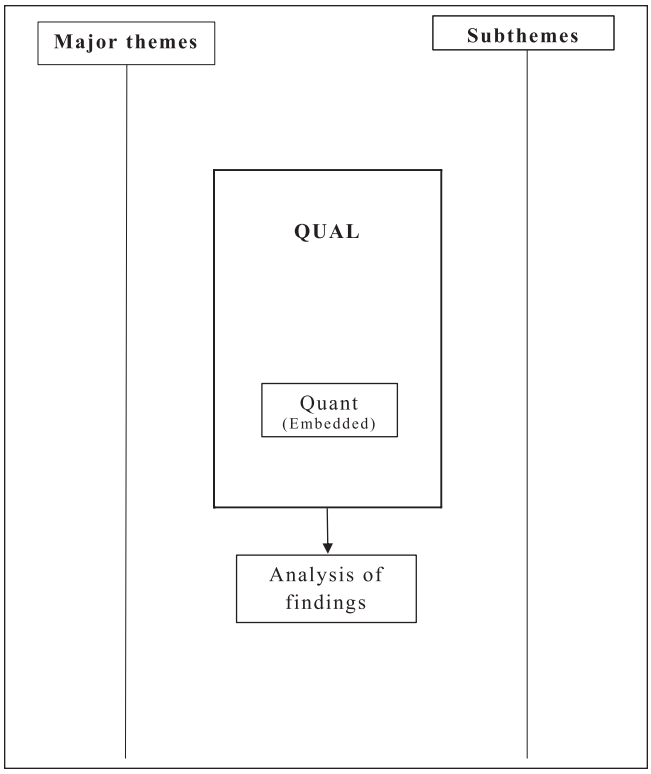

Figure 1. Concurrent embedded mixed method design (adapted from Creswell, 2009).

especially Buddhist beliefs relating to healthy longevity. Therefore, this study explored the knowledge of 34 participants (key informants) concerning the lifestyles, cultural factors, and healthy longevity. The study aimed to (a) explore lifestyles and Buddhist Thai culture relating to longevity of older adults aged 80 years or older and (b) evaluate functional activities of daily living (ADL), body mass index (BMI), and mental health related to longevity of older adults aged 80 years or older.

Method

Study Design

While a mixed method study using concurrent embedded strategy was employed, the qualitative part was emphasized more than the quantitative one (Figure 1). A qualitative procedure was based on a grounded theory and it explored lifestyles and cultural factors relating to longevity among older adults. For quantitative procedure, the embedded supportive data were BMI, Barthel ADL, and mental health status.

Sampling. Purposive sampling methods were used. Inclusion criteria were older adults aged ≥80 years who were physically active, not cognitively impaired, able to communicate, not suffering disabilities, and willing to provide rich information about their experiences in maintaining health. Exclusion criteria included physical dependence, difficulty in walking, cognitive impairment, and visual and hearing impairment. Participants (key informants) were 34 older adults. These were screened, and 32 were eligible. In grounded theory, the ultimate criterion for the final sample size is theoretical saturation (Strauss & Corbin, 1998), which relates to the development of theoretical categories and relates to grounded theory methodology (Saunders et al., 2018). Therefore, a sample size of 30 was used. The setting was participants' home of 18 communities in six provinces: Nakhonratchasima, Ubonratchani, Roi-et, Udonthani, Mukdahan, and Nakhonphanom provinces in the Northeastern region, Thailand.

Instruments. In-depth interviews using open-ended dialogue, field notes, reflective notes, and audio recording tape were used. Quantitative instruments: First, the Barthel ADL index assessment tool—Thai version was used to evaluate participants' functional ability ADL. It is a standard tool developed by the Ministry of Public Health, Thailand (Health Center 9 – Ministry of Public Health, n.d.). It consists of a 10-item questionnaire asking about activities daily living (e.g., feeding, grooming, mobility), and each item contains different score ranges (0-1, 0-2, 0-3), and the total score ranges from 0 to 20. The interrater reliability was .92. Its score ranges are grouped into: independency (12-20), moderate dependency (5-11), and severe dependency (0-4). Second, psychometric testing of Thai Geriatric Mental Health Assessment tool (T-GMH-A) was used, and it is a standard tool developed by Bureau of Mental Health Promotion and Development, Ministry of Public Health, Thailand (2017). It is composed of 15 items rated on a 4-point Likert-type scale (1-4). The measures are positive and negative aspects of older adults (e.g., "How is your self-efficacy?" "How do you feel happiness?"). The positive question score ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Negative question score ranged from 1 (*strongly agree*) to 4 (*strongly disagree*). A pilot testing was conducted, and the Cronbach's alpha coefficient was .86. The score ranges are grouped into: very good (51-60), normal (44-50), and poor mental health (43 and lower).

Data Collection

In this mixed method study, there were concurrent embedded strategies, including qualitative and quantitative data collection, both collected at the same time. Rapport and trust were established. The researcher reviewed the research procedure and obtain informed consent from older adults. Qualitative data was initially collected by observation and face-to-face in-depth interviews which were guided by the research questions. Some examples of questions were: "How is your health?"; "Could you describe your lifestyle such as eating habit, physical activity, stress management, spirituality, culture, religion beliefs"; and so on. Observations were focused on their

family members and environment. All interviews were tape-recorded with the key informants' permission. In total, 30 were interviewed in-depth. Each interview took approximately 50 to 70 minutes, two to three times until the data were saturated. The data saturation was reached when the information collected in the study became redundant (Glaser & Strauss, 1967; Kolb, 2012). Researchers always possess a perspective or viewpoint of reality (Brown et al., 2011). Regarding quantitative data, they were collected through Barthel ADL, BMI calculation, and T-GMH-A. During interviews, family members were with the key participants and research team. The study was conducted between March and June 2018.

Data Analysis

Qualitative content analysis was applied by using the Strauss and Corbin method. A grounded theory was chosen because it is highly useful for uncovering (Brown et al., 2011) real lifestyle behaviors among older adults in a specific group, culture, religion, and socially relating to healthy longevity.

The theory was derived from the words of the key informants, which were not derived from another theoretical framework. An iterative process of data analysis was used to develop a theoretical explanation of human behavior grounded (Harley et al., 2013). Also, it is useful in generating initial substantive knowledge that emerges from the grounded data through religion, culture, and social interaction. Content analysis was used and it was carried out in accordance with the techniques recommended by grounded theory researchers (Creswell, 2009; Strauss & Corbin,1998). The inductive involved a number of steps. First, the researchers gathered information, organized and prepared data for analysis by reviewing transcripts, fieldnotes, and images. Next, all collected data was read several times. Constant comparison and verification were done, compared with codes within the same interview, across interviews with same participant, and across participants. Differences and similarities in codes were noted and these assured that the findings were grounded in the data. There were 13 final codes or subthemes. Then themes were searched, mapped, and interrelated so that meaning of the themes were interpreted. Last, core categories or themes became woven into the whole of the study by linking all categories around selective coding. Quantitative data were analyzed by using descriptive statistics.

Rigor and Trustworthiness

Four criteria were considered—credibility, dependability, confirmability, and transferability, accumulatively contributed to trustworthiness (Lincoln & Guba, 1985). Rapport and trust were established and prolonged periods of time were spent on conducting fieldwork. The interviewer avoided using ideas to lead participants to express their lifestyles and culture. The reflexive data, which the research team had checked methods, were carefully collected to make confirmability. Dependability was enhanced through debriefing data collection and analysis including external consultants in older adults with Buddhist culture, sharing emerging ideas, codes, and interpretation. It was confirmed that the findings and conclusions were supported by the data collected.

Ethical Consideration

This study was approved by the Institutional Review Broad of Suan Sunandha Rajabhat University, Thailand, No COA 1-007/ 2018. All research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2008 (https://www.wma.net/wp-content/uploads/2018/07/DoH-Oct2008.pdf). All participants were informed and assured of confidentially, and they could withdraw from the study at any time without negative consequences. Confidentiality was held in all process of the study. Participants who agreed to participate in the study provided written informed consent.

Results

In this mixed method study, the qualitative and quantitative data were integrated in each major theme. Four major themes emerged: (a) promoting physical activities, (b) prevention and control of diseases, (c) mental health management, and (d) Buddhist socio-Thai culture (Figure 2).

Promoting Physical Activities

Although they were 80 to 105 years old, they were still able to perform ADL, the Barthel ADL was a normal level and the mean Barthel ADL was 19.0 (*SD* 1.11, total score 20) and none of them used diapers. Their BMI was normal and the mean BMI was 21.34 kg/m^2 (*SD* 3.07, normal BMI range 18.5-22.9 kg/m^2). Most of them took a bath with cold tap water or from the barrel of water (not warm water). They had various daily physical activities such as walking from home to temple 2 to 3 kilometers every day, swinging arms, Tai-Chi exercise (TC), bar slope dancing, Tang Wai exercise, traditional Thai-Isan dancing. Moreover, six of them worked in the backyard garden every day, and one man jogged in the early morning.

> I had worked with farming until 84 years, I still do some backyard gardening every day. (Female 85 years)

> I am a sport marathon and jogging man. I always jog every day. And I got many awards. (Male 90 years)

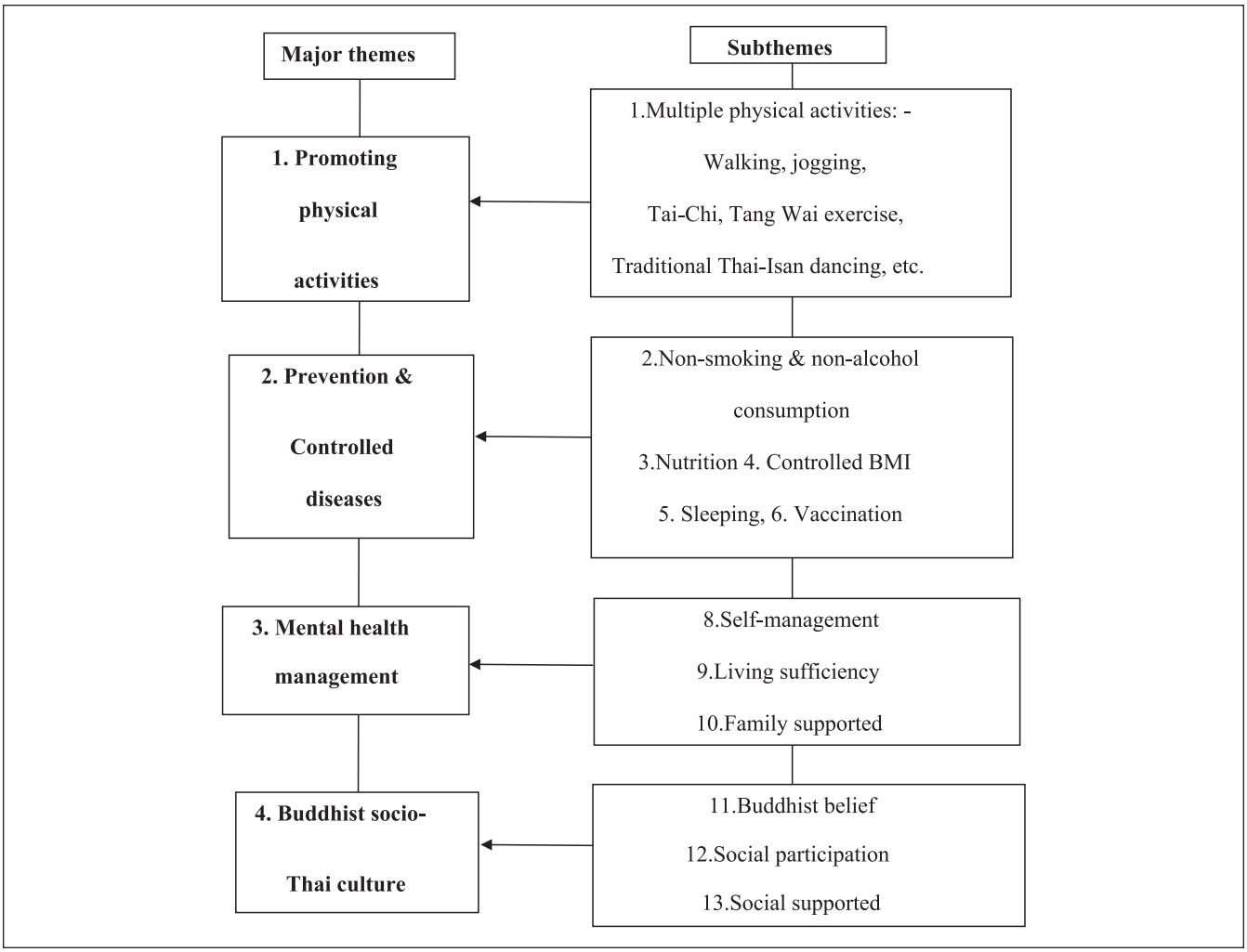

Figure 2. Major themes and subthemes related to longevity.
Note. BMI = body mass index.

> I always practice TC every day, I've got a lot of friends. (Female 86 years)

Prevention and Control of Diseases

Regarding the history of illness, present illnesses showed that most of participants had hypertension, two had diabetes mellitus and heart disease. They had medications and could manage their chronic diseases. Most of them had influenza vaccines, and three participants had both influenza and pneumonia vaccines. Regarding nutrition, they usually had folk-style foods or Isan-style foods which included more fish, whole grains, rice, steam cooking, papaya salad, no sugar, no fried food. Their quotes were also included to support the results.

> I always have fish foods with rice, only Isan-style but no spice, no salt, no sugar, lunch time I love to make papaya salad by myself, grilled fish with sticky rice. (Female 90 years)

> I've got vaccine from health center of local government. (Male 90 years)

Smoking and alcohol consumption: None of them smoked cigarettes. However, one male participant reported usually drinking beer or wine 3 to 4 glasses per week.
Sleep and rest: Most of them slept for 8 to 12 hours. One female participant had insomnia, and she took prescribed medicine for sleeping, as needed. Therefore, the lifestyle continued for a long time in adulthood to their later life.
Genetic: Most participants' parents or grandparents had life expectancies of 80 to 106 years. Parents of six participants died from infectious diseases, including small pox, malaria, and pneumonitis.

Mental Health Management

Their mental health was great (mean score 53.53, *SD* 7.22, range 46-60) and total score 60 (scores of each item is presented in Table 1). They had self-management skills: positive thinking, making merit, praying, and listening to *dharma*, because they were all Buddhists. They expressed satisfaction

Table 1. Participants' Mental Health ($n = 30$).

Item	*M*	*SD*
1. Self-efficacy	3.63	0.49
2. Happiness	3.53	0.50
3. Self esteem	3.53	0.50
4. Satisfaction of good relation with other persons	3.36	0.49
5. No anxiety	3.66	0.50
6. Acceptance to difficulty problem solving	3.50	0.50
7. Good relationship with neighbor	3.43	0.40
8. Most of problem can be solved	3.80	0.46
9. Sympathy to people who sufferer	3.70	0.44
10.Pleasure to other people's success	3.73	0.52
11. Assistance from friend and other people	3.06	0.47
12. Proudness of themselves	3.66	0.50
13. Family support	3.53	0.49
14. Provision of family caregiving	3.6	0.49
15.Relationship and attachment of family member	3.6	0.49
Total score	53.53	7.22

Note. Score of 50-60 = great, score of 43-49 = normal, and score ≤42 = poor (total 60). Source: Bureau of Mental Health Promotion and Development (2017).

with life, self-sufficient lives, and family support. In addition, they described that older adults should stay calm, practice meditation, focus on mindfulness, and read chanting book of Buddhism.

> I always make morning Buddhist praying, and meditation practice. Before bedtime I do same for about an hour. That makes me relax and sleep well. (Male 99 years)

Buddhist Socio-Thai Culture

Most of the participants were Buddhists. Except for one male participant, who was a Seventh Day Adventist and taught youth groups at a church every weekend. All females felt happiness in merit-making at the temple. They made merit 4 to 5 times per month, prayed, and meditated, especially on Buddhist holy days. According to family support, most of key participants were widowed. Meanwhile, they lived with their children and grandchildren. There were 3 to 6 family members, and their family always cooked for them. It was observed that the social environment was surrounded by nature. Their houses were located near the temple, farm, and river. They participated in social activities which were related to their Buddhist religion such as merit making, donation, and public volunteering.

Social Support. In the local government community, there were senior societies, education classes for older adults, health-promoting hospitals, and public health volunteer activities. They were supported by the local government and the Department of Provincial Social Development in Thailand.

Moreover, they were supported by using universal health care coverage expenditure by government. They said:

> I adhere the five precepts of Buddhism. I teach Buddhist doctrine, traditional Thai Isan and Thai culture to younger generation at school in community. These make me live happy life. (Male 85 years)

> If I have time to be mindful, I have time to pray. (Male 105 years)

> I have a lot of friends from the school for older adults. So, we have a meeting monthly. (Female 85 years)

> I always participate in ceremonies such as weddings, funerals of my friends, my relatives, and neighbors. (Male 85 years and female 84 years)

> When I got sick, I used universal healthcare coverage supported the expenditure by the government. (Male 90 years)

About Death. Although the data focused on the factors resulting in longevity, the study showed that five participants mentioned death through Buddhist teaching. Buddhists believed that birth, sickness, old age, and death were natural parts of the lifecycle. Moreover, death is an inescapable reality. They have prepared for death; they were not afraid or did not feel anxious about death. However, they did not have an idea to accelerate their death. They were ready to face death because all of them have prepared money for their funeral ceremonies in the future.

> I do not worry about anyone to do as I do not expect them to do or not. I can die in peace anyway. I have prepared myself so that my wife and my children will not get any trouble. I had finished my biography books as souvenirs for everyone who come to my funeral in the future. (Male, 80 years)

Income and Educational Status. Income was reported at 800 to 1000 Thai Baht (THB) per month from older adult welfare by the government, and it was not more than 30,000 THB per year. They focused on sufficiency economy, and they had no household debt. However, the seven participants were retired, and they had incomes of 10,000 to 45,000 THB. Twenty-three participants had completed their elementary education, and seven of them had completed certification or master's degree levels.

Discussion

Promoting Physical Activities

The rich insights found that they had multiple physical activities such as walking, TC, Tang Wai exercise, Thai-Isan dance, and bar slope. The physical exercises are recommended for older adults to maintain cardiovascular health, muscle strength and flexibility, glucose metabolism, and healthy

body weight. Also, they were consistently correlated with well-being and increasing life expectancy (Fave et al., 2018; Steptoe et al., 2015). TC and Tang Wai exercise are series of slow, gentle, and low-impact movements that integrate the breath, mind, and physical activity. These can increase cardio functioning, sleep enhancement, psychological well-being, body balance, and reduction of falls in older adults (Hosseini et al., 2018; Kittichittipanich & Kusoom, 2019). Regarding dancing as a physical activity, it may improve their physical function, muscular strength and endurance, and well-being in older adults (Hwang & Braun, 2015).

Prevention and Control of Diseases

These were supported by the previous studies in that nutritional status; controlled normal BMI and long-term calorie restriction with adequate intake of nutrients were associated with health and longevity (Al-Regaiey, 2016; Gezer, 2018; Lorenzini, 2014). Avoiding smoking and alcohol consumption can reduce morbidity and lead to a greater chance of living longer with healthier lives (Center for Disease Control and Prevention, 2017; National Drug Research Institute, 2018). Sleep and rest can improve overall health (Kara & Tenekeci, 2017; Wang et al., 2016).

Mental Health Management

Participants' mental health was at a great level as well as psychological well-being, which may be a protective factor in maintaining health. It reduced the risk of chronic physical illness and promoted longevity (Steptoe et al., 2015). Their physical health and independency were associated with psychological well-being and life satisfaction (Ohrnbergera et al., 2017; Sasiwongsaroj et al., 2015). They practiced self-management including positive thinking, practicing breath meditation, and physical exercising, which helped them increase functional mobility, reduce stress, including improve their sleep, mood, memory, and psychological well-being (Chételat et al., 2018; Innes et al., 2012). They had life satisfaction, sufficient lives, and family support. The family supported help endure and affected well-being (Kaur et al., 2015; Kejkornkaew et al., 2016; Thomas et al., 2017). As all of the above, it could be called as a sound mind in a sound body.

Buddhist Socio-Thai Culture

They felt happiness in merit-making at the Buddhist temple. Making merit and listening to Dharma meant doing good deeds which caused participants feelings of happiness, peace, attainment of meaning in life, and helping distressed persons (Thanakwang et al., 2014). The studies found that Buddhist doctrine and traditional local wisdom is another way to maintain the health of older adults and associated with greater levels of happiness (Boonswad et al., 2016; Winzer et al., 2018). Family members, friends, and religion are important to healthy older adults in the Isan-Thai culture (Manasatchakun et al., 2016). Social participation and social connections demonstrated associations of positive mental and physical health and well-being of older adults (Douglas et al., 2017; Wanchai & Phrompayak, 2019). As a result, social support may be considered a priority to improving well-being and maximizing health and functional capacity in older adults (Dai et al., 2016). Social support and longevity as well as Thai Buddhist beliefs and culture in the Northeast (Isan-Thai culture), are called Buddhist socio-Thai culture. This is a specific cultural group (Giger, 2017) and it plays a crucial role in the happiness level of specific populations. Therefore, culturally congruent care for older adults is essential (Cuellar, 2015), not only for the patients, but also for families and communities. In this study, income and education were not associated with longevity. The reason may be that the universal health care scheme covers health expenditure for the older adults so they can have access to care when necessary. It is clear that they were able to have sufficient living and self-reliance in spite of minimal income and little formal education.

Limitations and Recommendations

This study has a limitation by involving only 30 participants from 18 communities in 6 provinces in Northeastern Thailand. This homogeneous context of the study might not be representative of a wider area. Thus, it could not be generalized and applied widely for many situations and people, as believed by Creswell (as cited in Chong & Yeo, 2015). Further study should be conducted on a wider scale in Thailand, and should include a longitudinal study in quantitative research. Genetic factors, educational status, and income should be explored using quantitative research. Finally, this grounded theory should be developed to a grand theory.

Conclusions and Implications

The results supported 4 themes related to longevity, and these were—promoting physical activities, prevention and controlled diseases, mental health management, and Buddhist socio-Thai culture. This study adds a great emphasis on promoting physical activity through multiple strategies and Buddhist socio-Thai cultural knowledge. It should be applied and implemented culturally congruent care to health care services in clinical and community setting and further used in gerontological nursing education. Additionally, nurses can play a vital role in coordinating with the multidiscipline team to create community-based program tailored the older adults' needs.

Acknowledgments

The authors thank and show appreciation to all participants, Suan Sunandha Rajabhat University, and Bangkokthonburi University.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was funded by National Research Council of Thailand and Suan Sunandha Rajabhat University (Number 14570, Year 2018).

ORCID iDs

Anchalee Jantapo https://orcid.org/0000-0002-7396-1393

Wichitra Kusoom https://orcid.org/0000-0001-6065-0644

References

Al-Regaiey, K. A. (2016). The effects of calorie restriction on aging: A brief review. *European Review for Medical and Pharmacological Sciences*, *20*(11), 2468-2473.

Australian Government. (2017). *Australia's welfare 2017*. https://www.aihw.gov.au/getmedia/d18a1d2b-692c-42bf-81e2-47cd54c51e8d/aihw-australias-welfare-2017-chapter5-1.pdf.aspx

Boonswad, P., Sethabouppham, H., Lasuka, D., & Muecke, M. (2016). An ethnography: How does Buddhist doctrine, a local wisdom, affect older Thai villagers' well-being? *Pacific Rim International Journal Nursing Research*, *20*(3), 252-263.

Brown, J. W., Chen, S., Mefford, L., Brown, A., Callen, B., & McArthur, P. (2011). Becoming an older volunteer: A grounded theory study. *Nursing Research and Practice*, *2011*, Article 361250. https://doi.org/10.1155/2011/361250

Bureau of Mental Health Promotion and Development. (2017). *Thai Geriatric Mental Health Assessment Tool (T-GMHA-15 Mental Health)* http://www.sorporsor.com/happy2017/t_gmha15_index.php (in Thai)

Centers for Disease Control and Prevention. (2017). *Health effects of cigarette smoking*. https://www.cdc.gov/tobacco/datastatistics/fact_sheets/health_effects/effects_cig_smoking/index.htm

Chételat, G., Lutz, A., Arenaza-Urquijo, E., Collette, F., Klimecki, O., & Marchant, N. (2018). Why could meditation practice help promote mental health and well-being in aging? *Alzheimer's Research & Therapy*, *10*(1), Article 57. https://doi.org/10.1186/s13195-018-0388-5

Chong, C-H., & Yeo, K-J. (2015). An overview of grounded theory design in educational research. *Asian Social Science*, *11*(12), 258-268. https://doi.org/10.5539/ass.v11n12p258

Creswell, J. W. (2009). *Research design: Quantitative, qualitative, and mixed method approaches* (3rd ed.). Sage.

Cuellar, N. G. (2015). Providing culturally congruent health care to older adults. *Journal of Transcultural Nursing*, *26*(2),109. https://doi.org/10.1177/1043659615569540

Dai, Y., Zhang, C. Y., Zhang, B. Q., Li, Z., Jiang, C., & Huang, H. L. (2016). Social support and the self-rated health of older people: A comparative study in Tainan Taiwan and Fuzhou Fujian province. *Medicine (Baltimore)*, *95*(24), e3881. https://doi.org/10.1097/MD.0000000000003881

Department of Older Persons. (2017). *Demographic of older person in Thailand 2017*. http://www.dop.go.th/download/knowledge/th1533055363-125_1.pdf (in Thai)

Department of Older Person. (2018). *Demographic of older person in Thailand 2017*. http://www.dop.go.th/download/knowledge/th1550973505-153_0.pdf (in Thai)

Douglas, H., Georgiou, A., & Westbrook, J. (2017). Social participation as an indicator of successful aging: An overview of concepts and their associations with health. *Australian Health Review*, *41*(4), 455-462. https://doi.org/10.1071/AH16038

Dunlay, S. M., & Chamberlain, A. M. (2016). Multimorbidity in older patients with cardiovascular disease. *Current Cardiovascular Risk Reports*, *10*(1), 3. https://doi.org/10.1007/s12170-016-0491-8

Fave, A. D., Bassi, M., Boccaletti, E. S., Roncaglione, C., Bernardelli, G., & Mari, D. (2018). Promoting well-being in old age: the psychological benefits of two training programs of adapted physical activity. *Frontiers in Psychology*, *28*(9), 828. https://doi.org/10.3389/fpsyg.2018.00828

Fontana, L., & Hu, F. B. (2014). Optimal body weight for health and longevity: bridging basic, clinical, and population research. *Aging Cell*, *13*(3), 391-400. https://doi.org/10.1111/acel.12207

Gezer, C. (2018). Impact of dietary pattern on human life quality and life expectancy: A mini-review. *Research & Investigations in Sports Medicine*, *2*(5), 1-3. https://doi.org/10.31031/RISM.2018.02.000546

Giger, J. N. (2017). *Transcultural nursing assessment and intervention* (7th ed.). Elsevier.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Aldine.

Harley, A. E., Buckworth, J., Katz, M. L., Willis, S. K., Odoms-Young, A., & Heaney, C. A. (2013). Developing long-term physical activity participation: A grounded theory study with African American women. In J. W. Creswell (Ed.), *Qualitative inquiry & research design: Choosing among five approaches* (pp. 347-367). Sage.

Haviva, C., Zimmer, Z., Ofstedal, M. B., Jagger, C., Chiu, C. T., & Saito, Y. (2018). *A project summary: Linking spirituality and religiosity to life and health expectancy, A global comparative study*. https://globalagingandcommunity.files.wordpress.com/2018/07/spirituality-religiosity-life-health-expectancy.pdf

Hfocus. (2015). *Insight health status*. https://www.hfocus.org/content/2015/03/9583

Hosseini, L., Kargozar, E., Sharifi, F., Negarandeh, R., Memari, A-H., & Navab, E. (2018). Tai Chi Chuan can improve balance and reduce fear of falling in community dwelling older adults: A randomized control trial. *Journal of Exercise Rehabilitation*, *14*(6), 1024-1031. https://doi.org/10.12965/jer.1836488.244

Hwang, P. W., & Braun, K. L. (2015). The effectiveness of dance interventions to improve older adults' health: A systematic literature review. *Alternative Therapies in Health and Medicine*, *21*(5), 64-70.

Innes, K. E., Selfe, T. K., Brown, C. J., Rose, K. M., & Thompson-Heisterman, A. (2012). The effects of meditation on perceived stress and related indices of psychological status and sympathetic activation in persons with Alzheimer's disease and their caregivers: A pilot study. *Evidence-Based Complementary and Alternative Medicine*, *2012*, Article 927509. https://doi.org/10.1155/2012/927509

Kara, B., & Tenekeci, E. (2017). Sleep quality and associated factors in older Turkish adults with hypertension: A pilot study. *Journal of Transcultural Nursing*, *28*(3), 296-305. https://doi.org/10.1177/1043659615623330

Kaur, H., Kaur, H., & Venkateashan, M. (2015). Factors determining family support and quality of life of elderly population. *International Journal of Medical Science and Public Health*, *4*(8), 1049-1053.

Kejkornkaew, S., Sirapo-ngam, Y., Monkong, S., & Junda, T. (2016). A grounded theory study of the quality relationships between family caregivers and person with head and neck cancer. *Pacific Rim International Journal Nursing*, *20*(2), 161-173.

Kittichittipanich, B., & Kusoom, W. (2019). The effectiveness of Tai Chi exercise in improving balance and preventing falls among older adults. *Open Public Health Journal*, *12*, 465-471. https://doi.org/10.2174/1874944501912010465

Kolb, S. M. (2012). Grounded theory and the constant comparative method: Valid research strategies for educators. *Journal of Emerging Trends in Educational Research and Policy Studies*, *3*(1), 83-86.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.

Lorenzini, A. (2014). How much should we weigh for a long and healthy life span? The need to reconcile caloric restriction versus longevity with body mass index versus mortality. *Frontiers in Endocrinology*, *5*, 121. https://doi.org/10.3389/fendo.2014.00121

Manasatchakun, P., Chotiga, P., Roxberg, A., & Asp, M. (2016). Healthy ageing in Isan-Thai culture-A phenomenographic study based on older persons' lived experiences. *International Journal of Qualitative Studies on Health and Well-Being*, *11*, 1. https://doi.org/10.3402/qhw.v11.29463

Health Center 9 – Ministry of Public Health. (n.d.). Barthel activities of daily living. http://hpc9.anamai.moph.go.th/ewt_dl_link.php?nid=508&filename=old_kan_LTC (in Thai)

National Drug Research Institute. (2018). *National Alcohol Indicators Project 2018*. http://ndri.curtin.edu.au/publications-resources/project-reports-and-bulletins/national-alcohol-indicators-bulletins

National Statistic Office. (2018). *The survey of sociocultural situation and mental health BE 2561*. http://www.nso.go.th/sites/2014/Pages/News/2561/N21-09-61-1.aspx\ (in Thai)

Ohrnbergera, J., Ficherab, E., & Sutton, M. (2017, December). The relationship between physical and mental health: A mediation analysis. *Social Science & Medicine*, *195*, 42-49. https://doi.org/10.1016/j.socscimed.2017.11.008

Sasiwongsaroj, K., Wada, T., Okumiya, K., Imai, H., Ishimoto, Y., Sakamoto, R., Fujisawa, M., Kimura, Y., Chen, W. L., Fukutomi, E., & Matsubayashi, K. (2015). *Buddhist social networks and health in old age: A study in central Thailand. Geriatrics & Gerontology International*, *15*(11), 1210-1218. https://doi.org/10.1111/ggi.12421

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & Quantity*, *52*(4),1893-1907. https://doi.org/10.1007/s11135-017-0574-8.

Steptoe, A., Deaton, A., & Stone, A.A. (2015). Psychological well-being, health and ageing. *Lancet*, *385*(9964), 640-648. https://doi.org/10.1016/S0140-6736(13)61489-0

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Sage.

Thanakwang, K., Isaramalai, S., & Hattakit, U. (2014). Thai cultural understandings of active ageing from the perspectives of older adults: A qualitative study. *Pacific Rim International Journal Nursing*, *18*(2), 152-161.

Thomas, P., Lui, L., & Umberson, D. (2017). Family relationships and well-being. *Innovation in Aging*, *1*(3), igx025. https://doi.org/10.1093/geroni/igx025

United Nations. (2017). *World population ageing*. https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Highlights.pdf

Wanchai, A., & Phrompayak, D. (2019). A systematic review of factors influencing social participation of older adults. *Pacific Rim International Journal Nursing*, *23*(2), 131-140.

Wang, D., Li, W., Cui, X., Meng, Y., Zhou, M., & Chen, W. (2016). Sleep duration and risk of coronary heart disease: A systematic review and meta-analysis of prospective cohort studies. *International Journal of Cardiology*, *219*, 231-239. https://doi.org/10.1016/j.ijcard.2016.06.027

Winzer, L., Samutachak, B., & Gray, R. S. (2018). A study of religiosity, spirituality, and happiness in Thailand from the perspective of Buddhism. *Journal of Population and Social Studies*, *26*(4), 332-343. https://doi.org/10.25133/JPSSv26n4.023