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Editorial Note

The Interdisciplinary Research Review (IRR) was established with academic cooperation by The Royal Society of Thailand Committee of Interdisciplinary Research and Development, Rajabhat University (Western Group), and Rajamangala University of Technology Rattanakosin. This Issue, Volume 19 Number 2 (March – April 2024). This issue contains of four interesting articles in multidisciplinary fields: (1) Creating a voice for psychological pain in healthcare settings : Implications for nursing, (2) Impact of Organization Changes on Management Accounting Practices and Firm Performance in Thailand , (3) Influence of hot red pepper (capsicum frutescens l.) as a diet supplement for the growth of native chicken (Gallus gallus domesticus) , (4) Prevalence and Associated Factors of Dementia among the Older People in Chiang Mai Province , (5) Development of physical activity model of the elderly

The Editorial Board of the IRR encourages anyone to submit articles for evaluation and review. The processes of submission, review and publication of articles are described on the journal's website, https://www.tci-thaijo.org/index.php/jtir. The Editorial Board and Committees of the IRR sincerely thank all peer reviewers who have sacrificed their time to help us produce a better journal, and also wish to thank all teachers, researchers and other academicians for submitting their valuable research to this journal. Finally, we thank readers of our journal who help to spread the knowledge and benefits gained to others. With your feedback and suggestions, we will strive to improve the quality and relevance of the IRR.

Yongyudh Vajaradul
Editor
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CREATING A VOICE FOR PSYCHOLOGICAL PAIN IN HEALTHCARE SETTINGS: IMPLICATIONS FOR NURSING

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Abstract

This article attempts to lay down current knowledge and approaches to psychological pain in the context of nursing. Nurses, being the frontliners in several healthcare settings, can have a major role in formulating future interventions and innovations in addressing psychological pain and mental health, as a whole. This paper aims to provide a picture of what psychological pain can look and feel like and how it impacts the individual's overall health status across various dimensions and the healthcare system in general. A proposed model of nursing care that outlines direct, indirect, and collaborative nursing approaches is presented in this article. To further understand pain, cases based on real-life situations with proposed theoretical guiding frameworks are included. Reasons why a bold focus is recommended and needed for psychological pain are presented. Finally, challenges and future directions for nursing education, practice, and research are discussed.

Keywords: Psychological pain, nursing care for psychological pain, nursing, healthcare

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Psychological pain refers to the subjective mental or emotional discomfort, distress, or suffering that an individual experiences as a result of internal psychological struggles and conflicts, such as trauma, loss, or social isolation [1]. It is also referred to as "emotional pain", "inner pain", or "mental pain", which encapsulates a vast array of mental and emotional types of distress. It is complex and multifaceted, and within the context of modern nursing and psychological research, it can manifest in a wide range of symptoms, including anxiety [2], depression [3], shame and guilt [4], low self-esteem [5], loneliness [6], and emptiness and suicide ideation [7]. Psychological pain can be caused by a variety of issues, including traumatic experiences, relationship problems, mental health conditions, and life transitions [8].

Psychological pain has also been linked with physiological changes in the brain. It was found that areas of the brain involved in emotional processing and pain perception were activated when individuals experienced psychological pain [9]. Additionally, research by Galbally and colleagues [10] suggests that psychological pain can lead to changes in the expression of genes related to inflammation and immune function, potentially contributing to the development of various health conditions. In a meta-analysis, it was found that high psychological pain levels are associated with suicide ideation and acts [11] and are even considered as the core of suicidality [12]. Considering its health impacts, it is important to seek professional help if psychological pain persists and interferes with daily functioning. Currently, psychological pain assessments and interventions are provided by psychologists, psychotherapists, counselors, and very rarely, nurses [13], [14], [15].

This paper presents theoretical underpinnings, real-life cases of psychological pain, a proposed nursing care model for psychological pain, challenges in addressing psychological pain, as well as implications for

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nursing education, research, and practice. This article is an initial attempt to draw attention toward the roles of nurses, as primary healthcare frontliners, in the assessment and management of psychological pain.

2. Theoretical Underpinnings

Psychological pain can stem from a range of factors, including mental health disorders, such as depression and anxiety, past traumas, and stressful life experiences. Understanding the complexity of psychological pain is crucial in providing meaningful care to patients. Nursing theories have been instrumental in providing a framework to understand the nature of psychological pain and manage patient outcomes. A number of nursing theories have emerged to help nurses understand psychological pain on a deeper level, including Roy adaptation model, self-care requisites theory, theory of human caring, holistic and integrative nursing, and the transtheoretical (Stages of change) model.

The Roy Adaptation Model was developed by Sr. Callista Roy in the 1970s. The model stipulates that patients are dynamic beings that interact with their environment [16]. This approach encourages nurses to observe and identify factors that contribute to a patient's psychological pain while assessing patients within the context of their environment. Self-care theory is focused on helping nurses understand how a patient's self-care habits affect their health outcomes [17]. Nurses using the self-care requisites theory must prioritize patient education and teach patients how to take care of themselves physically and mentally [18].

The theory of Human Caring emerged from nursing theorist and philosopher, Jean Watson. The theory prioritizes the nurse's ability to connect with a patient on a personal level [19]. In the context of psychological pain, the theory of Human Caring approaches patients with empathy and love. This is especially important when caring for patients who have experienced past traumas, as the approach ensures the patient feels supported and valued, which can improve their psychological well-being.

In these contemporary times, the role of nurses in addressing psychological pain is further supported by a rising trend in Holistic and Integrative Nursing [20]. Since the 1700s, nursing has incorporated healing and natural therapies such as herbal oils, herbs, and teas [20], [21]. The foundation of nursing education has always been about the whole person addressing physical, psychological, emotional, cognitive, sociological, and spiritual aspects of the human being. Florence Nightingale, the founder of modern nursing, exemplified the holistic principles in her practice and teachings by emphasizing the role of clean air, clean water, and a safe and comfortable environment in optimizing health work as healthcare front liners, spending the majority of their time with patients in the provision of care [22].

Finally, the Transtheoretical Model (TTM) also known as Stages of Change can be a useful guide in nursing practice for addressing psychological pain [23]. Racal and colleagues [24], proposed nursing approaches for patients with mental health challenges according to TTM in order to provide interventions depending on the need and ‘readiness to change’ of the individual.

Nurses may use multiple nursing theories, such as the above, in their approach to delivering care while considering the complexity of psychological pain. This approach will ensure that patients with psychological pain receive the best possible care.

3. The Faces of Psychological Pain and Potential Theoretical Guiding Frameworks

CASE 1: The conflicted gender

James, 25 years old, has been on and off with antidepressant medications that he started taking three years ago. His depression and anxiety symptoms started when he got married three years ago. In the nurse’s conversation and assessment with James, it was revealed that he had been suffering emotionally for years because of something he could not really pinpoint until he got married. Being gay, realizing this has led him to feel depressed for years. He has also attempted suicide twice.

He fears coming out and revealing his preferred sensual preference since his very conservative family may not accept him.

Growing up a very religious man, he may no longer be accepted by his church once he comes out as gay. On top of this, he is currently married, and divorce is illegal in the country. While married, James got involved in an affair with another man. James has verbalized how he has suffered psychologically for years in regard to his situation. He has been and is in deep pain about his situation, and it is ruining his mental health and the life that he knows.

CASE 2: The 'empty-nest' syndrome

Mrs. Smith, 67 years old, is a mother of four children. Mrs. Smith lost her husband five years ago, and since then, she has lived alone at her home. Her children are currently working abroad and are busy with their families and personal lives. Mrs. Smith admits to feeling extremely lonely. In her loneliness, she found a boyfriend who is 30 years younger than her, and it appears he wants her money more than the relationship itself. Mrs. Smith is aware of this, however, having this man is her way to relieve emotional pain. After a year in this relationship, her son lost his job so he decided to stay with her. Mrs. Smith decided to cut the relationship with this man and focus more on her son. Her son, however, has been verbally and physically abusive to her which resulted in bringing her more emotional suffering. Two years later, Mrs. Smith was admitted to a hospital due to chest pain, loss of appetite, cold clammy skin, and weakness. Upon admission, it was found that Mrs. Smith suffered from a heart attack. When the nurse asked her perception of the cause of this condition, Mrs. Smith, without a doubt replied, "I am sad, I am hurt…I have suffered all my life. I cry every day. My life is so hard."

CASE 3: The traumatic childhood experience

Janice, 37 years old, has been in and out of relationships. She badly wanted to get into a healthy relationship, get married, and have a family of her own. She does not understand why her previous relationships did not work. She swings from being too needy to totally avoiding one. She does not understand why it is so hard for her to trust someone in a relationship. When she is heartbroken, which sadly happens often, she would sleep with different men to relieve her pain. Janice went to a psychotherapist, and in one of the sessions, it was revealed that Janice had been sexually abused as a child by her own father. Her mother knew about it, but she stayed silent to keep the family intact. Janice has repressed these horrible memories, and she has realized how painfully traumatic her childhood experience was, which is possibly affecting her current relationships.

In the real-life cases presented above, it can be inferred that psychological pain caused by different life events is related to and may lead to mental health problems, such as depression and suicide ideation (case 1), physical illness (case 2), and psychological trauma (case 3). The following paragraphs present potential theories that can serve as guiding frameworks in addressing the cases presented above.

For case 1, one of the theories appropriate to apply in nursing care for someone experiencing psychological pain due to gender conflict and confusion is Jean Watson's Theory of Human Caring [25]. Firstly, Watson's theory underlines the critical essence of a caring relationship that is built on mutual respect and empathy [25]. Nurses must understand the unique experiences of individual grappling with gender identity issues by actively listening to their concerns and validating their emotions. An environment of trust can foster open dialogue about their feelings and concerns, allowing for appropriate and tailored care interventions. Secondly, the theory highlights the importance of nurturing individual beliefs and practice of caring-healing, which would involve aligning care strategies with patients' needs and their perspective of health [25]. For instance, simply asking patients about their preferred gender pronouns and adequately addressing them as such can validate their identity and minimize feelings of isolation and anxiety [26].

For case 2, The Roy Adaptation Model (RAM) is a useful theoretical framework for assessing and supporting individuals undergoing psychological pain due to psychosomatic illness brought on by stressful family environments and the loneliness associated with losing a spouse. This model proposes that health is reached through positive responses to environmental changes or stressors [16]. Firstly, RAM dictates the assessment of behavior in four modes: physiological, self-

concept, role function, and interdependence [27]. This assessment includes identifying the internal and external stimuli affecting the patient, such as losing a spouse or living in a stressful family environment. Understanding their effects on the patient's psychosomatic symptoms would provide insights into adaptive responses necessary to restore balance [28]. In terms of self-concept mode, the loss of a spouse could lead to a change in the person's identity and feelings of worthlessness and loneliness. Nursing interventions should aim to rebuild the patient's self-concept, perhaps through therapies that encourage self-expression and validation of the patient's feelings. The role function mode emphasizes the individual's social roles and can be negatively impacted by social isolation after losing a spouse and stressful family dynamics. Adaptive strategies here may include social support groups or family therapy allowing for expression of feelings and understanding of each person's role in the family dynamic. In the interdependence mode, the focus is on the importance of relationships and support systems. Nurses could encourage maintaining relationships with supporting and caring individuals and participating in grief counseling.

For case 3, Sigmund Freud's psychoanalytic theory and trauma theory are typically used as frameworks in understanding and treating the psychological impacts of childhood sexual abuse leading to relationship and sex addictions [29]. Psychoanalytic theory suggests that traumatic experiences like childhood sexual abuse can profoundly impact a person's mental state, often leading to manifestations like addictions. Applying psychoanalytic theory, a nurse may, for instance, explore the patient's unconscious thoughts and feelings that originated from past abuse, thereby assisting in bringing to light potential psychological conflicts affecting their current behaviors. Trauma theory also supplements psychoanalytic theory in this context. Childhood sexual abuse is a critical traumatic event causing dysfunction in numerous realms, including relationships and sex addictions [30]. Nurses may use interventions based on this model like Trauma-focused Cognitive Behavioral Therapy, which helps recognize unhealthy behaviors and develop more adaptive responses, and Eye Movement Desensitization and Reprocessing Therapy in the holistic treatment planning [31]. Ultimately, nursing care using these theories should involve a non-judgmental and empathetic stance, and provide a safe environment aiming at the healing, acceptance, and empowerment of the individual.

In addition to the real-life cases and potential use of theories presented above, the next section presents a proposed guide of nursing care for psychological pain based on existing and current nursing practice (figure 1). Nursing care recommendations for psychological pain can be divided into three categories: direct, indirect, and collaborative (figure 1).

Direct nursing care involves the utilization of core concepts in nursing including, but not limited to, the use of the nursing process which includes assessment, diagnosis, planning, intervention, and evaluation, can be effectively used to manage psychological pain. Initially, nurses conduct comprehensive assessments to recognize the signs and symptoms of psychological pain, fetching information about the patient's perception of pain, history, physical and mental health symptoms, and coping mechanisms. Nurses can use standard screening tools or clinical interviews to determine potential mental health issues. Based on the gathered information, they formulate a nursing diagnosis identifying the patient's specific mental health needs. Subsequently, nurses develop individualized care plans detailing interventions tailor-fit to the patient’s unique condition. These interventions could include therapeutic communication, counseling, cognitive-behavioral techniques, psychoeducation, or referral to psychiatric professionals [32]. Finally, by continually evaluating the patient's response to interventions, nurses can adjust the care plan as required to ensure optimal outcomes [33].

4. Proposed Guide of Nursing Care for Psychological Pain

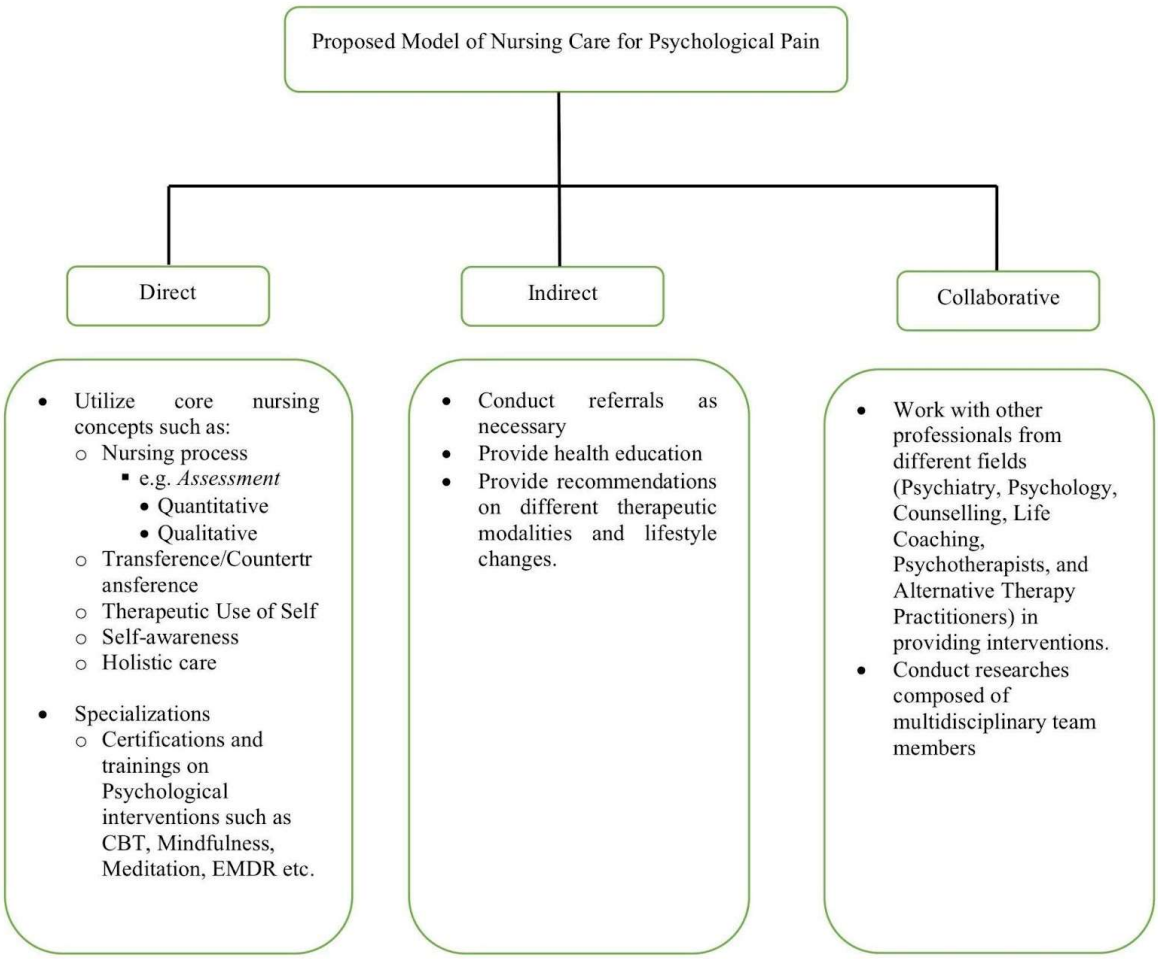

Figure 1. Proposed Model of Nursing Care for Psychological Pain

Under the assessment process, individuals with psychological pain can benefit from both quantitative and qualitative pain assessment. Several instruments can be used in quantitative psychological pain assessment which can be adopted from existing physiologic pain assessment tools. For instance, the common tools used for symptom assessment of physiologic pain are 1**.** (OLD CARTS)- Onset, Location, Duration. Characteristics, Aggravating factors, Relieving factors, Treatments (and response), and Severity; and 2**.** The Pain, Enjoyment of Life, and General Activity (PEG) Scale [34**]**. These tools can be adjusted for use in psychological pain assessment.

As for the qualitative assessment of psychological pain, this can be more difficult since the process can be abstract. It can range from identifying how the psychological pain can look and feel to empathetically tuning in to how the individual feels. For the latter, a core skill and role that the nurse needs to develop is "holding space". "Holding space" means being physically, mentally, and emotionally present for someone. It means putting your focus on someone to support them as they feel their feelings [35**]**. In nursing, holding space is under the umbrella of the term "Therapeutic Use of Self". The caveat of this process, however, is that this may trigger transference and countertransference in both the nurse and the individual. This transference and countertransference elicited reactions may aggravate the psychological pain experience, such as when a catharsis occurs. In such cases, self-awareness

is of primary importance. Self-awareness does not only include 'understanding the self', but also processing one's own psychological pain experiences [36].

In addition to these core nursing concepts, nurses can also go for further studies, and achieve specializations whereby they can provide direct interventions to individuals with psychological pain. Courses and certifications on modalities that have been found in several studies to be efficient in alleviating psychological pain can be a good addition to the existing nursing license. This includes, but not limited to, Cognitive Behavioral Therapy (CBT) [37], Yoga with meditation [38], Acceptance and Commitment Therapy (ACT) [39], and integrative nursing [40].

Indirect nursing care does not involve direct intervention from nurses. This rather includes referrals, providing health education and options, and recommendations to individuals who seek relief from psychological pain. Nurses can also act as consultants and healthcare managers as they oversee the entire therapeutic regimen for the client. The documentation, advocacy, and care coordination may help individuals suffering from psychological pain by developing a therapeutic environment that aids patient recovery. Detailed and accurate documentation can ensure that the healthcare team fully comprehends the patient's condition and mental health needs. Advocacy can ensure that patients can access the necessary resources, while care coordination can assure a seamless continuum of interventions tailored to patients' unique mental health needs.

In collaborative nursing care, nurses can work with other disciplines to address the holistic needs of the client in relation to the psychological pain experience. Nurses can collaboratively prepare a plan of care, and hold educational seminars, workshops and research with a multidisciplinary team. It involves the combined efforts of a diverse team of healthcare professionals. This approach allows for a comprehensive understanding of a patient's psychological pain and the development of a multifaceted care plan that addresses physical, psychological, and psychosocial facets of recovery [41].

5. Challenges in Addressing Psychological Pain

Challenges in addressing psychological pain include, but is not limited to, a) limited time: nurses often have tight schedules that require them to attend to several patients simultaneously, limiting the time they have to address psychological pain; b) limited training: though significant strides have been made in nursing education, some programs do not prepare nurses extensively to handle psychological pain; c) social stigma: patients may feel reluctant to talk about their psychological pain because they fear that the nursing staff may judge them negatively or label them as weak or unworthy; d) communication barriers: nurses may have trouble assessing a patient's psychological pain if the patient speaks a different language or has hearing or speech impairments; e) lack of resources: nurses may be unable to provide comprehensive psychological care due to limited resources, such as mental health professionals, medications, or facilities; and f) countertransference: consoling patients who experience severe loss can test the nurses' emotional fortitude, particularly when countertransference occurs. Addressing psychological pain is a challenge for nurses because it requires them to be compassionate, patient, and emotionally stable while keeping up with other essential care duties.

6. Future Directions for Nursing Education, Nursing Practice and Nursing Research

One change that can be made in nursing education, practice, and research is to address psychological pain in patients by incorporating modules on the assessment and management of psychological pain in the curriculum. In terms of nursing practice, one change can be made by creating a standardized nursing practice guideline, such as in Figure **1**, and formulating standardized assessment and screening tools for psychological pain that nurses can use in all healthcare settings. In addition, nurses can also focus on increasing the use of non-pharmacological interventions for psychological pain management. Non-pharmacological interventions, such as music therapy and mindfulness-based interventions, can be effective in reducing psychological and physiological pain in patients. Implementing these interventions in practice can lead to better pain management outcomes and an overall improvement in patient well-being [42].

7. Summary and Conclusion

Psychological pain, also called emotional pain, is the type of pain that affects one's mental, emotional, and even physical well-being. It can be caused by a variety of reasons, including trauma, grief, anxiety, and depression. As nurses, it is important to recognize and understand psychological pain and to provide the best care possible for patients.

One of the biggest challenges of treating psychological pain is that its symptoms are often not visible or measurable. Unlike physical pain, which can be quantified through medical tests, psychological pain must be identified through communication and observation. Nurses must develop skills in active listening and empathy, as well as effective communication strategies to help their patients identify and express their emotional struggles.

A crucial element in helping patients manage psychological pain is to provide a safe and supportive environment. Nurses must offer reassurance, validation, and empathy to patients, as well as create a space where patients feel comfortable and heard. This may involve listening to patients' stories, creating opportunities for patients to express their emotions, or simply being present with patients in their pain.

In addition to offering emotional support, nurses can also utilize a range of interventions to help manage psychological pain. These may include cognitive-behavioral therapy, relaxation techniques, mindfulness practices, and medication management. Nurses may work closely with mental health professionals to create individualized treatment plans and provide ongoing support and guidance.

Nurses may also play a role in helping patients build resilience and cope with psychological pain in a healthy way. This may involve education in stress management, lifestyle changes, and self-care techniques. Nurses can also help patients identify their strengths and build a sense of purpose and meaning in their lives, which can be powerful tools for overcoming emotional struggles.

In conclusion, psychological pain is a complex and challenging issue that affects millions of people worldwide. As nurses, it is critical that we understand the causes and symptoms of psychological pain, as well as the most effective interventions and strategies for managing it. By offering compassionate care and support, utilizing evidence-based practices, and helping patients build resilience, nurses can make a meaningful impact in the lives of those struggling with emotional pain.

Conflict of Interest

The author has no conflict of interest.

References

[1] P. Medeiros *et al.*, "Physical, emotional, and social pain during COVID-19 pandemic-related social isolation," *Trends in Psychology*, Mar. 01, 2022. http://dx.doi.org/10.1007/s43076-022-00149-8 (accessed Mar. 16, 2023).

[2] R. L. Woodgate, P. Tennent, S. Barriage, and N. Legras, "The lived experience of anxiety and the many facets of pain: A qualitative, arts-based approach," *Canadian Journal of Pain*, vol.4, no. 3, pp. 6–18, Sep. 2020, doi: 10.1080/24740527.2020.1720501.

[3] M. Cepoiu-Martin, H. Tam-Tham, S. Patten, C. J. Maxwell, and D. B. Hogan, "Predictors of long-term care placement in persons with dementia: a systematic review and meta-analysis," *International Journal of Geriatric Psychiatry*, vol. 31, no. 11, pp. 1151–1171, Apr. 2016, doi: 10.1002/gps.4449.

[4] M. Wyder *et al.*, "Nurses experiences of delivering care in acute inpatient mental health settings: A narrative synthesis of the literature," *International Journal of Mental Health Nursing*, vol. 26, no. 6, pp. 527–540, doi: https://doi.org/10.1111/inm.12315.

[5] Y. Budiarto and A. F. Helmi, "Shame and self-esteem: A meta-analysis," *Europe's Journal of Psychology*, vol. 17, no. 2, pp. 131–145, May 2021, doi: 10.5964/ejop.2115.

[6] J. Domènech-Abella *et al.*, "Loneliness and depression in the elderly: the role of social network," *Social Psychiatry and Psychiatric Epidemiology*, vol. 52, no. 4, pp. 381–390, Feb. 2017, doi: 10.1007/s00127-017-1339-3.

[7] X. Li *et al.*, "A longitudinal study testing the role of psychache in the association between emotional abuse and suicidal ideation," *Journal of Clinical Psychology*, vol. 75, no. 12, pp.

2284–2292, Aug. 2019, doi: 10.1002/jclp.22847.

[8] H. Comtesse, V. Ertl, S. M. C. Hengst, R. Rosner, and G. E. Smid, "Ecological grief as a response to environmental change: A mental health risk or functional response?," *International Journal of Environmental Research and Public Health*, vol. 18, no. 2, p. 734, Jan. 2021, doi: 10.3390/ijerph18020734.

[9] L. Cordier, X. Fuchs, S. Herpertz, J. Trojan, and M. Diers, "Synchronous stimulation with light and heat induces body ownership and reduces pain perception," *The Journal of Pain*, vol. 21, no. 5–6, pp. 700–707, May 2020, doi: 10.1016/j.jpain.2019.10.009.

[10] M. Galbally *et al.*, "Maternal perinatal depression, circulating oxytocin levels and childhood emotional disorders at 4 years of age: The importance of psychosocial context," *Journal of Psychiatric Research*, Nov. 2020. http://dx.doi.org/10.1016/j.jpsychires.2020.07.010 (accessed Mar. 16, 2023).

[11] D. Ducasse *et al.*, "Psychological pain in suicidality: A meta-analysis," *The Journal of Clinical Psychiatry*, vol. 78, no. 3, Aug. 2017, doi: 10.4088/JCP.16r10732.

[12] J. L. Ordóñez-Carrasco, I. C. Guirado, and A. J. Rojas-Tejada, "Entrapment and psychological pain as proximal variables of suicidal ideation: Study of moderation," *unknown*, Oct. 18, 2020 https://www.researchgate.net/publication/344728716_Entrapment_and_Psychological_Pain_as_Proximal_Variables_of_Suicidal_Ideation_Study_of_Moderation

[13] K. C. Lewis, E. W. Good, J. G. Tillman, and C. J. Hopwood, "Assessment of psychological pain in clinical and non-clinical samples: A preliminary investigation using the psychic pain scale," *Archives of Suicide Research*, vol. 25, no. 3, pp. 552–569, Feb. 2020, doi: 10.1080/13811118.2020.1729914.

[14] J. Yager, "Addressing patients' psychic pain," *American Psychiatric Publishing*, Oct. 01, 2015. https://www.researchgate.net/publication/282425693_Addressing_Patients%27_Psychic_Pain

[15] E. L. Meerwijk and S. J. Weiss, "Utility of a time frame in assessing psychological pain and suicide ideation," *unknown*, Jun. 22, 2017. https://www.researchgate.net/publication/317818776_Utility_of_a_time_frame_in_assessing_psychological_pain_and_suicide_ideation

[16] A. Tk and S. Chandran, *Callista roy: Adaptation theory*. Jaypee Brothers Medical Publishers (P) Ltd., 2017, pp. 108–108. Accessed: Mar. 16, 2023. [Online]. Available: http://dx.doi.org/10.5005/jp/books/13072_12

[17] B. Basavanthappa, *Orem's self-care theory*. Jaypee Brothers Medical Publishers (P) Ltd.,2007, pp. 72–72. Accessed: Mar. 16, 2023. [Online]. Available: http://dx.doi.org/10.5005/jp/books/10558_5

[18] A. Younas, "A foundational analysis of dorothea orem's self-care theory and evaluation of its significance for nursing practice and research," *Creative Nursing*, vol. 23, no. 1, pp. 13 -23, 2017, doi: 10.1891/1078-4535.23.1.13.

[19] *Overview of watson's theory (10 caritas processes®)*. New York, NY: Springer Publishing Company, 2018. Accessed: Mar. 16, 2023. [Online]. Available: http://dx.doi.org/10.1891/9780826135568.0002

[20] L. Thornton, "A brief history and over view of holistic nursing," *Integrative Medicine: A Clinician's Journal*, vol. 18, no. 4, Aug. 2019.

[21] N. C. Frisch and D. Rabinowitsch, "What 's in a definition? Holistic nursing, integrative health care, and integrative nursing: Report of an integrated literature review - PubMed," *Journal of holistic nursing : official journal of the American Holistic Nurses' Association*, vol. 37, no. 3, Sep. 2019, doi: 10.1177/0898010119860685.

[22] *Florence Nightingale and her Times (1820–1910)*. Routledge, 2017, pp. 1–23. Accessed: Mar. 16, 2023. [Online]. Available: http://dx.doi.org/10.4324/9781315255194-1

[23] J. O. Prochaska and C. C. DiClemente, *The Transtheoretical Approach*. Oxford University Press, 2019, pp. 161–183. Accessed: Mar. 17, 2023. [Online]. Available:

http://dx.doi.org/10.1093/med-psych/9780190690465.003.0008

[24] S. J. Racal, B. Hengnalen, and O. Ketphan, "Transtheoretical Model (Stages of Change) and Its Potential Applications to Psychiatric and Mental Health Nursing Practice," *International Journal of Public Health and Health Sciences*, vol. 4, no. 2, pp. 1–8, Jun. 2022, doi: https://he01.tci-thaijo.org/index.php/ijphs/article/view/255223/173294.

[25] J. Watson, M. C. Smith, and W. R. Cowling III, "Unitary Caring Science: Disciplinary Evolution of Nursing," in *A Handbook for Caring Science*, New York, NY: Springer Publishing Company, 2018. Accessed: Jan. 12, 2024. [Online]. Available: http://dx.doi.org/10.1891/9780826133892.0002

[26] M. G. Gartland *et al.*, "Forensic Medical Evaluation of Children Seeking Asylum: A Guide for Pediatricians," *Pediatric Annals*, vol. 49, no. 5, May 2020, doi: 10.3928/19382359-20200421-01.

[27] Z. Farsi and S. Azarmi, "Effect of Roy's Adaptation Model-Guided Education on Coping Strategies of the Veterans with Lower Extremities Amputation: A Double-Blind Randomized Controlled Clinical Trial," *International journal of community based nursing and midwifery*, vol. 4, no. 2, pp. 127–36, Apr. 2016.

[28] M. J. S. FAAN PhD, RN, P. R. L. RN PhD, and R. D. C. CNE PhD, RN, NE-BC, *Middle Range Theory for Nursing*. Springer Publishing Company, 2023.

[29] J. Fuchshuber and H. F. Unterrainer, "Childhood Trauma, Personality, and Substance Use Disorder: The Development of a Neuropsychoanalytic Addiction Model," *Frontiers in psychiatry*, vol. 11, p. 531, Jun. 2020, doi: 10.3389/fpsyt.2020.00531.

[30] M. Cloitre, "The 'one size fits all' approach to trauma treatment: should we be satisfied?," *European Journal of Psychotraumatology*, vol. 6, no. 1, May 2015, doi: 10.3402/ejpt.v6.27344.

[31] A. Hudays, R. Gallagher, A. Hazazi, A. Arishi, and G. Bahari, "Eye Movement Desensitization and Reprocessing versus Cognitive Behavior Therapy for Treating Post-Traumatic Stress Disorder: A Systematic Review and Meta-Analysis," *International journal of environmental research and public health*, vol. 19, no. 24, p. 16836, Dec. 2022, doi: 10.3390/ijerph192416836.

[32] M. A. B. Helming, D. A. Shields, K. M. Avino, and W. E. Rosa, *Dossey & Keegan's Holistic Nursing: A Handbook for Practice*. Jones & Bartlett Learning, 2020.

[33] L. J. Carpenito, *Handbook of Nursing Diagnosis: Application to Clinical Practice*. LWW, 2016.

[34] A. M. Dydyk and S. Grandhe, "Pain assessment," *NCBI Bookshelf*, Jan. 29, 2023. https://www.ncbi.nlm.nih.gov/books/NBK556098/

[35] C. He, "The challenge of 'holding space' while holding the pager," *Current Psychiatry*, vol. 20, no. 7, Jul. 2021, doi: 10.12788/cp.0150.

[36] S. P. Rasheed, A. Younas, and A. Sundus, "Self-awareness in nursing: A scoping review," *Journal of Clinical Nursing*, vol. 28, no. 5–6, pp. 762–774, Oct. 2018, doi: 10.1111/jocn.14708.

[37] S. G. Hofmann, A. Asnaani, I. J. J. Vonk, A. T. Sawyer, and A. Fang, "The Efficacy of Cognitive Behavioral Therapy: A Review of Meta-analyses," *Cognitive Therapy and Research*, vol. 36, no. 5, pp. 427–440, Jul. 2012, doi: 10.1007/s10608-012-9476-1.

[38] M. C. Pascoe, D. R. Thompson, Z. M. Jenkins, and C. F. Ski, "Mindfulness mediates the physiological markers of stress: Systematic review and meta-analysis," *Journal of Psychiatric Research*, vol. 95, pp. 156–178, Dec. 2017, doi: 10.1016/j.jpsychires.2017.08.004.

[39] J. Swain, K. Hancock, A. Dixon, S. Koo, and J. Bowman, "Acceptance and Commitment Therapy for anxious children and adolescents: study protocol for a randomized controlled

trial," *Trials*, vol. 14, no. 1, p. 140, 2013, doi: 10.1186/1745-6215-14-140.

[40] M. J. Kreitzer, A. Weil, and M. Koithan, *Integrative Nursing*. Weil Integrative Medicine Libr, 2018.

[41] R. Jalil and G. L. Dickens, "Systematic review of studies of mental health nurses' experience of anger and of its relationships with their attitudes and practice," *Journal of Psychiatric and Mental Health Nursing*, vol. 25, no. 3, pp. 201–213, Feb. 2018, doi: 10.1111/jpm.12450.

[42] "American holistic nurses association," *American Holistic Nurses Association*, 2023. https://www.ahna.org/AmericanHolisticNursesAssociation/gclid/CjwKCAjw_MqgBhAGEiwAnYOAejgANemPG9qs9_0tx6DYhHCICGT4dDij7B3seIoSseWseiSe0HhhoCfjgQAvD_\BwE (accessed Mar. 16, 2023).

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Impact of Organization Changes on Management Accounting Practices and Firm Performance in Thailand

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Abstract

The purpose of this study is to examine the impact of organizational changes on management accounting practices and firm performance in Thailand. The quantitative research method was used in this research. The empirical research samples are 420 companies listed on the Stock Exchange of Thailand that have changed during 2014–2021, excluding all the firms in financial institution sectors, fund sectors, rehab sectors, and estate sectors. The results were analyzed by multiple regression analysis.

The research findings suggest that implementing organizational changes is related to the adoption of technologically advancement and organizational strategies, which have a significant beneficial effect on the adoption of new management accounting practices. Conversely, the research found that the competitive environment had a little positive influence on management accounting methods. Nevertheless, changes in management accounting systems have a significant and positive effect on performance.

Keywords: organization changes, management accounting change, management accounting practice

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1. Introduction

The use of accounting information to make decisions in various areas of executive management is considered to be a very important part of management. This information affects strategic determination or decision-making, planning and controlling the use of resources to be efficient and productive will result in better operations for the organization. The practices of bringing accounting information into decisions are many. They are collected in the management accounting system (MAS) and will be developed to meet the needs of executive management and the ever-changing business environment. In the past, it has been evident from the application of new management accounting tools to replace the traditional ones that focus only on costing and allocation of actual expenses, such as absorption costing, just-in-time (JIT), activity-based costing (ABC) total quality management (TQM), activity-based management (ABM), and reengineering, which have changed management accounting practices. [1]

Factors that influence management accounting changes in an organization are derived from internal factors, such as technology, production, practices, and strategy, and external factors, such as the business environment and competitive environment, which refer to the contingency theory. With today's technology, disruption has changed activities in the business cycle, requiring the use of information systems in processing to support the processes of data analysis. It can be assumed that the business world has become a digital world with many new innovations and

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constant changes, such as cloud computing, data science applications, and blockchain. These technologies, which are considered new tools with a lot of potential for massive data gathering, have an impact on managerial decisions that need to be quick and timely, or a more timely manner. However, even though big data is a source of data that makes analytics efficient, it is also full of inaccurate, useless, and unreliable data. Therefore, an executive accountant who has expertise in understanding business language is essential to playing a role in filtering, distinguishing, and interpreting those raw data, and presenting them to executives for use in decision-making. [2]

Accordingly, in management accounting, the goal is not only to control budgets, calculate costs, and analyze data for decision-making in projects, but also to manage the potential risks arising from data sources. For this reason, it is a question to lead research into whether these rapid changes in the enterprise affect changes in practices or tools in management accounting.

The latest research in this area in developing countries is seen in the studies by [3] and [4] in Indonesia. However, even though Thailand is one of the developing countries, there are country-specific differences such as legal systems, taxes, financial resources, politics, economics, and other incentives. It also varies greatly from developed countries, such as market size, data access, production factors, human contributions, various underlying structures, volatility in markets and finance, as well as good corporate regulation [5]. For this research study in Thailand, the Thaijo database found that [6] studied the causal relationship between strategic management accounting practices, intellectual capital development, and firm success.

These factors are, therefore, the motivation for research in this regard to lead to a better understanding and acceptance of changes in management accounting systems in organizations. In the case that traditional management accounting systems cannot be brought to decision-making, they may be reapplied or revised, or management accounting systems from developed countries may be adopted to be more consistent with decision-making. In addition, this research will complement the management accounting literature. The results of which will help regulators such as the Federation of Accounting Professions find ways to develop a system for the use of management accounting in making effective decisions. Therefore, this issue was studied of all companies listed on the Stock Exchange of Thailand because these organizations are large organizations with investment resources such as modern technology, manpower, etc.

2. Objectives

To investigate the impact of organizational change on the change in management accounting systems and performance of listed companies on the Stock Exchange of Thailand.

3. Conceptual Framework

This research study may be described as a conceptual framework for further research in the following manners:

4. Literature Review & Hypothesis

4.1 Contingency Theory

This research will use the contingency theory to explain the relationship between changing organizations and changing management accounting practices. This concept of management approach was developed by Fred Edward Fiedler in 1964 [7], which would consider the most appropriate corporate management model for each situation in the context of a different environment without any standardized model but taking performance and productivity into account. Therefore, the situation that an organization faces can be considered a major variable that affects its nature. For management accounting practices, [8] pointed out that development should design an accounting information system correctly and specifically suited to the entity, taking into account the coherence of both internal and external factors as well.

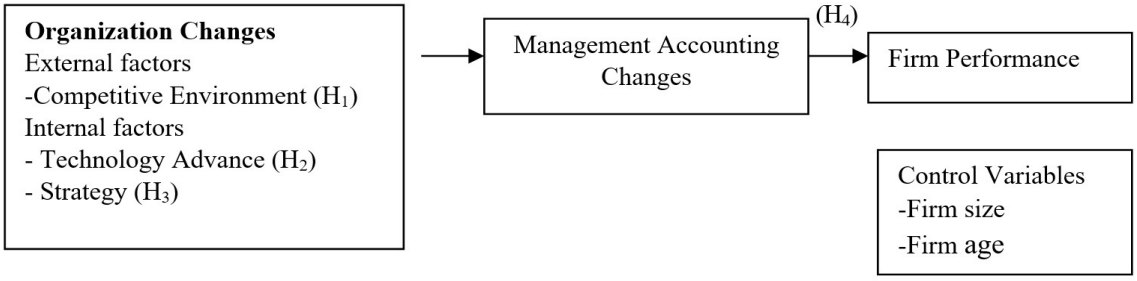

Figure 1: Conceptual Framework

4.2 Management Accounting Change

Managerial accounting practices come from the expansion and size of the larger economic structure, resulting in organizations requiring the information needed to assist in economic decisions by using modern accounting tools [9]. Thus, the change of management accounting is the study of problems concerning nature and role of the management accounting system in helping executives make decisions facing problems arising from different internal and external factors. The practice of management accounting has been seriously questioned since the late 1980s, whether the process of changing management accounting is consistent with the change of the enterprise to the new environment [10]. Therefore, change in management accounting is the study of problems concerning the nature and role of the management accounting system in order to assist management decision-making when faced with problems that come from different internal and external factors. The practice of management accounts has been seriously questioned since the late 1980s, as has whether the process of changing management accounts is in line with the organization's new environmental needs. This was widely discussed by researchers and scholars, and in the 1970s, organizations introduced new management accounting techniques such as activity-based costing (ABC), activity-based management (ABM), balanced scorecard (BSC), and lean accounting. [11].

4.3 Organization Change

Organizational structure changes are one way to help an organization survive in a rapidly changing business environment. This results in greater complexity in the structure of the organization and requires good planning, as it can eventually lead to bankruptcy [12]. In particular, the efficiency of control and direct systems and the management accounting practice system are important tools that have an impact on organizational change. Past research studies have found that large organizations are complex and that there is a relationship between strategies managed by distributed management systems and organizational administrative structures that are effectively managed and related to management accounting systems. For small organizations, it is associated with the control of individuals by console-dated management, which lacks Independence. Therefore, when an organization encounters high uncertainty, distributed management requires more complex information from management accounting than usual to be used in decision-making. This reduces uncertainties and improves the quality of decision-making [4],[13].

4.4 The Relationship of Organizational Change to Management Account Change

The factors that will lead to the change of the organization according to the Contingency Theory will be based on both internal and external factors.

External factors, which include the competitive environment, have been discussed. If there is increasing uncertainty, it requires executives to use the management model of accounting information to make more decisions. This research suggests that an adequacy between the environment and the system of an enterprise is necessary to change for the management accounting system. And to support the need for new management information, according to the research of [14]. This leads to the assumption that:

Hypothesis 1: An organization facing uncertainty in a highly competitive environment will change its accounting management practices.

Internal factors include changes in advanced manufacturing technology and changes in organizational strategy. In the review of literature found in the research of [16], they also discussed

new technologies in production practices and the structure of production costs, such as computers integrated with production and just-in-time (JIT). Because quick machines and computer systems have taken their place in factories, inventories are not available and direct labor costs are the main concern. Traditional cost control systems will not be able to help executives properly allocate resources and related costs, which will be linked to the planning of the organization's strategy. In line with the research of [17] and [18], this leads to the assumption that:

Hypothesis 2: Organizations that use advanced manufacturing technology will change management accounting practices.

Hypothesis 3: Organizations with strategic changes will result in changes in management accounting practices.

4.5 The Relationship of Management Account Change to Firm Performance

After conducting a literature analysis, it was determined that there is a connection between alterations in management accounting practices and performance. The research revealed that corporate transformation corresponds to modifications in management accounting practices. In order to enhance the decision-making process, managers must use information derived from management accounting, including planning, cost control, and the evaluation of choices that may not align with production and customer delivery timelines. This ultimately leads to improved operational outcomes. Based on the findings of [4] and [9] it may be inferred that:

Hypothesis 4: Management accounting practices with changes in conduct often enhance performance.

5. Methodology

5.1 Population and Sample

The population used in the study was accounting and/or financial executives of organizations listed on the Stock Exchange of Thailand, totaling 420 organizations (information as of 8 March 2022) [19], with the following exceptions: 1) Organizations that are not classified as eligible may be removed or already be removed. 2) Unregistered organizations, belonging to the financial institution sectors, fund sectors and rehabs sectors, and real estate sectors, because this type of business has different accounting practices from other types of organizations. The data collection was a questionnaire by the researcher. A total of 420 questionnaires were distributed and 102 questionnaires were returned, representing 24.16% compared to the number of respondents who responded at least 20%, which considered the samples suitable for analysis [20].

5.2 Variable Development and Measurement

The researcher developed a questionnaire for each variable included in the study, drawing on the literature review and using the methodology of [21]. The objective was to tackle two concerns: 1. Does organizational change influence the alteration of management accounting? 2. Does the alteration of management accounting have an impact on operational performance? To define the variable, Item 1 might proceed as follows:

Independent variable. This study determined the organization's change during the years 2014-2021 as measured by internal and external factors. Internal factors: There are four items that advanced technological changes measure. And organizational strategy changes have four items. External factors measured from competitive environmental changes. There are four items.

Dependent variables. This study determined management accounting practices, measured by 1) Changes in the way you think about costs, consisting of three items. 2) Changes in how to measure cost accumulation, consisting of three items. 3) Changes in the implementation of management accounting into planning and control, consisting of three items. 4) Changes in the implementation of management accounting in decision-making, consisting of two items. 5) Changes in the implementation of management accounting in investment, consisting of four items. 6) Changes in the implementation of management accounting to the operating, consisting of four items.

Item 2 specifies the variable's definition in the following manner: The independent variables include changes in management and accounting methods. The dependent variables consist of performance, which includes three financial performance questions and three non-financial performance ones.

Control variables. This research defines organizational size and organizational age as variables, with organizational size measured by the number of employees and organizational age measured by years of operation.

5.3 Reliability and validity

This research examines the accuracy, confidence, and classification power of the questions by examining them through experts and determining the reliability of each item using the item total correlation technique. For independent variables, organizational changes have discrimination (r) between 0.307 and 0.774, and the dependent variable, management accounting practices, has discrimination (r) between 0.402 and 0.750, and firm performances have discrimination (r) between (r) 0.432-8.023 with a confidence level greater than 0.70 being an acceptable value as a suitable quality tool. It can be used to collect data on samples [22]. For testing the reliability of the questionnaire using alpha coefficients according to the Cronbach method. The alpha coefficient is between 0.802 and 0.905, which is consistent with [23] stating that confidence tests exceeding 0.70 are considered acceptable for quality suitable for the sample.

For this research, multiple correlation analysis and multiple regression analysis were used to test the relationship and impact between organizational change and management accounting practices and firm performance of companies listed on the Stock Exchange of Thailand. The equation model for statistical analysis was presented as follows:

$$Mas = \beta 0 + \beta_1 Com + \beta_2 Tec + \beta_3 Str + \beta_4 FS + \beta_5 FA + \varepsilon_1 \quad \text{Model 1}$$

$$FP = \beta 0 + \beta_1 Mas + \beta_2 FS + \beta_3 FA + \varepsilon_1 \quad \text{Model 2}$$

By β: the regression coefficient, ε_1: the forecast tolerance, MAS: Management Accounting System, FP: Firm Performance, Str: Organization Strategy, COM: Competitive environmental, Tec: technology advance, FS: Firm Size, and FA: Firm Age.

Table 1. Results of correlation coefficient analysis on organizational changes to change management accounting practices and firm performance

Variables	FP	Mas	Com	Tec	Str	FS	FA	VIFs
Mean	3.669	3.8261	4.0343	3.8824	4.0833	3.25	3.86	-
S.D.	.70476	.57344	2.16121	.81197	.79707	.930	.564	-
FP	1	.689**	.344**	.224*	.613**	-.248*	.117	
MAS		1	.491**	.468**	.780**	-.200*	.029	1.044
Com			1	.406**	.475**	-.137	.036	1.409
Tec				1	.417**	.125	-.046	1.401
Str					1	-.169	.092	1.474
Firm Size						1	.067	1.114
Firm Age							1	1.030

Statistical significance level ***p‹0.01, **p‹0.05, *p‹0.10

From Table 1, it was found that if all independent variables are highly interrelated, they could cause a multicollinearity problem. Therefore, an analysis of the relationship between the two variables showed that each association factor was between 0.029 and 0.780, which is less than 0.80. Additionally, it appeared that the VIFs of all variables were equal to 1,030 and 1.474, which was less than 10, indicating that the independent variable has a relationship at a level that does not cause a multicollinearity issue. [24]

6. Results of research and discussion

6.1 Basic Statistical Analysis Results

The sample group is comprised of a certain number of individuals, represented as both a numerical value and a percentage. Women account for 5.4%, while men account for 0.7%. The majority of the sample, about 3.1%, fall between the age range of 25 and 40 years, and 3% of them possess both undergraduate and master's degrees. In the field of accounting, the majority of the sample about 4.8% both bachelor's and master's degrees. 3.9% of the sample have been employed for over 10 years. Accountants make up 1.9% of the workforce inside the company. The assets of most firms exceed $150 million, accounting for 3.6%. The majority of companies have been in

operation for 11 to 15 years, accounting for 0.6%. Additionally, the company boasts a workforce of over 1,000 workers and employers, constituting 42%.

6.2 Descriptive Statistics Analysis Results

Table 2. Average amount of variables impacting organization change

Item	Min	Max	N	Mean	SD	Translate	Rating
Com	0.50	17.50	102	4.0343	2.16121	High	2
Tec	0.75	5.00	102	3.8824	0.81197	Medium	3
Str	2.25	5.00	102	4.0833	0.79707	high	1
Total				4.00	1.25675	high	

From Table 2, the average of the factors that influence the overall change in the organization is high (mean = 4.00, SD = 1.25675). The organization's strategy factor is at a high level with the highest average (mean = 4.0833, SD = 0.79707), followed by competitive environment (mean = 4.0343, SD = 2.16121).

Table 3. Average amount of variables impacting management accounting practices change

Item	Min	Max	N	Mean	SD	Translate	Rating
Determine Cost	0.00	5.00	102	3.6209	0.82058	Medium	6
Cost Accumulation	2.00	5.00	102	3.7124	0.72370	Medium	5
Planning and Control	2.67	5.00	102	4.0458	0.74762	High	2
Decision-Making	2.00	5.00	102	4.0758	0.85233	High	1
Investment Analysis	0.00	5.00	102	3.7770	0.91597	Medium	4
Measurement of Performance	2.25	5.00	102	3.8235	0.69527	Medium	3
Total				3.8424	0.79257	Medium	

From Table 3, the average of the factors that influence the overall change in management accounting is medium (mean = 3.8424, SD = 0.79257). The decision-making is at a high level with the highest average (mean = 4.0758, SD = 0.85233), followed by planning and control (mean = 4.0458, SD = 0.74762), measurement of performance (mean = 3.8235, SD = 0.69527). investment analysis (mean = 3.7770, SD = 0.91597) cost accumulation (mean = 3.7124, SD = 0.72370), and determine cost (mean = 3.6209, SD = 0.82058).

Table 4. Average amount of variables firm performance

Item	Min	Max	N	Mean	SD	Translate	Rating
Financial Performance	0.00	5.00	102	3.4444	1.06689	Medium	2
Non- Financial Performance	2.00	5.00	102	3.8924	0.69728	Medium	1
Total				**3.6684**	**0.8820**	**Medium**	

From Table 4, the average of variables firm performance is at a medium level (mean = 3.6684, SD = 0.8820). Non-financial performance is at a high level with the highest average (mean =3.8924, SD = 0.69728), followed by financial performance (mean = 3.4444, SD = 1.06689).

6.3 Multiple Regression Analysis Results

Table 5. Results of a multiple regression analysis on the impact of organizational change on changing management accounting practices (Model 1)

Organizational Change	Management Accounting Change		t	P-Value
	β	Std. Error		
Constant	1.629	0.331	4.917	0.000
Com	0.028	0.019	1.458	0.148
Tec	0.119	0.050	2.361	0.020
Str	0.465	0.053	8.844	0.000
FS	-0.060	0.039	-1.520	0.132

Organizational Change	Management Accounting Change		t	P-Value
	β	Std. Error		
FA	-0.021	0.062	-0.330	0.742

F=36.049 p=0.000 Adjust R^2=0.634 Statistical significance level *** p < 0.01, ** p < 0.05, * p < 0.10

Table 6. Results of a multiple regression analysis on the impact of management accounting practices on firm performance (Model 2)

Management Accounting Change	Firm Performance		t	P-Value
	β	Std. Error		
Constant	.345	.528	.653	.515
Mas	.813	.090	9.059	.000
FS	-.093	.055	-1.675	.097
FA	.134	.090	1.489	.140

F=32.547 p=0.000 Adjust R^2=0.484 Statistical significance level *** p < 0.01, ** p < 0.05, * p < 0.10

Table 5 shows the results of the multiple regression analysis testing the impact of organizational changes in management accounting practices of listed company on the Stock Exchange of Thailand. The results showed that the independent variables had a 63.40% ability to explain management accounting changes (Adjust R^2) and organizational changes from external factors measured by competition changes (COM) had a positive but insignificant impact on management accounting changes. Organizational changes from internal factors measured by technology advancement (Tec) had a significant positive impact on management accounting changes, ($\beta 2 = 0.119$, $p < 0.05$). Additionally, organizational strategy changes had a significant positive impact on management accounting, ($\beta 3 = 0.465$, $p < 0.01$).

Table 6 shows the results of the multiple regression analysis testing the impact of management accounting changes on performance of listed company on the Stock Exchange of Thailand. The study revealed that the independent variable accounted for 48.4 percent of the variation in performance (adjusted R^2). It also shows that management accounting changes had a significant positive impact on performance. Hypothesis test results can be summarized, as shown in Table 8.

Table 8 Hypothesis test results

Item	Research hypotheses	Hypothesis test results
Hypothesis 1:	An organization facing uncertainty in a highly competitive environment will change its accounting management practices.	Non-support
Hypothesis 2:	Organizations that use advanced manufacturing technology will change management accounting practices.	Support
Hypothesis 3:	Organizations with strategic changes will result in changes in management accounting practices.	Support
Hypothesis 4:	Management accounting practice changes in conduct often enhance firm performance.	Support

7. Conclusions and discussion

Organizational change is crucial to changing management accounting practices because information from management accounts is what drives managers to make decisions to suit the situation. According to the Contingency Theory, management accounting practices must be developed to be tailored to the specifics of the organization, taking into account both external and internal factors. This research includes the use of advanced technology in production as well as changes in strategies within the organization. Studies and external factors include business competitiveness in the context of a registered organization in Thailand. The research shows that:

Internal factors influencing the technologically advanced shift (TEC) has a positive impact on significant changes in management accounting practices. It demonstrates that the technological shift of today plays an essential role in the practice of management accounting. This is due to the fact

that business processes have shifted to the digital world and there is a greater interest in sustainability. As a consequence of this, businesses now have no choice but to search for methods to incorporate big data into their decision-making processes through the utilization of cutting-edge technology in the collection of insights, which then leads to immediate management decision-making and policymaking [25]. Managerial accounting includes making-decisions, specifically with budget control, cost computation, and analysis for decision-making in projects, as well as risk management [2]. As shown by the findings of a study conducted by [26], it has conducted research on the evolving function of management accounting in product development with a focus on the increasing importance of drawing information from digital systems. It has been discovered that new breakthroughs in the use and utilization of technology have contributed to the driving force behind improvements in management accounting. According to [27], during the course of an investigation into the role that managerial accounting plays in the process of enhancing the performance of a supply chain system owned by a logistics company, it was discovered that modifications of management accounting practices are dependent on the various logistics chain systems owned by the company.

Internal factors, changes in organizational strategy (Str) have a significant positive impact on changes in management accounting practices. It shows that organizations with challenges in organizational strategy are prone to significant management accounting changes. Changes to organizational strategy can be caused by a number of factors, e.g., changes in the business environment, changes in shareholders, etc. As a result, the organization's goals and missions will change, leading to organizational restructuring and appropriate strategy formulation, such as planning, controlling, costing, evaluation, and decision-making processes, different from traditional management accounting. This research is consistent with the research of [4]. The study of the impact of organizational change on organization performance caused by a change in managerial accounting practices in food industries shows that organizational changes have a positive effect on significant management accounting changes. Moreover, the research of [28], studying management control systems and strategic management of organization innovation, found that the various strategies of the organization adopted have an impact on cost management. [29] found that green intellectual capital has a positive correlation with both environmental management accounting. It shows the implementation of environmental management accounting as a mediator in relation to the organization's strategy for environmental action.

External factors of the competitive environment (Com) have a positive effect on altering management accounting practices, indicating that organizations with a high degree of competitiveness are more likely to change their management accounting practices. Managers who face increased market competition expect the information required for decision-making, particularly the information that originates from a variety of systems and channels before leading to significant decisions. Nonetheless, this research result is ambiguous. It may be due to other factors, such as the rise in competitiveness induced by coronavirus infection and related issues, which requires organizations to implement integrated enterprise strategies and may necessitate new adjustments. This is evident from the research of [30], which examined the impact of coronavirus infection on the competitiveness of Russian fertilizer companies. This is in accordance with [31] and [32], studying both the SME and manufacturing industries in Indonesia.

Modifications in management account- ting methods provide a significant and positive influence on performance. These findings demonstrate the important role that management accounts play in the use of information for managerial decision-making. Consequently, it is presumed that the practices of management accounting should align with the changes occurring inside the firm. Managers should evaluate enhancements of accounting adjustments, including strategic planning, cost management, efficient decision-making, and timely delivery of items to clients, based on the studies conducted by [4] and [9].

8. Suggestions for implementation

The management accounting practice information system is designed to predict project budgeting, control, and decision-making. This study discovered that technological advancements and strategic change factors have an effect on traditional management accounting practices. Consequently, participants should evaluate the following:

Managers who are responsible for the company's finances or accounting should consider upgrading or altering the management accounting system, e.g., implementing Block chain technology, and take into account the potential hazards associated with the marketing competitive environment, even though the impact on accounting practices is uncertain and may be a result of the coronavirus infection in the last two years, managers should closely monitor when the situation recovers. Lastly, the Federation of Accounting Professions may be required to consider launching a training course on how to make more executive judgments based on accounting facts.

9. Proposals for the next research

This study is a compilation of information on all companies listed on the Thai stock market. It does not recognize the results of research at the specific level of the business, as each business may require distinct accounting information. Therefore, future research should focus on samples that have a dramatic and swift impact on changes, such as logistics and technology businesses.

however, management accounting research can have a variety of perspectives, such as the impact of big data on management accounting decision-making or the impact of block chain technology on the evolution of administrative practices.

References

[1] Gao, J.(2022). Research on the corporate financial transformation with big data technologies, *International Journal of progressive sciences and technologies (IJPSAT),*32(2), 08-12.

[2] Srikeaw, B.(2022). Artificial intelligence (AI) changes and big data analysis on future of accounting profession, *Journal of Federation of accounting professions*,4(2), 48-57

[3] Safari Sarchah, F., Yazdifar, H., & Pifeh, A. (2019). The effects of intra- and extra organizational factors on management accounting practices in the privatization processes: evidence from Iran, international, *Journal of finance and managerial accounting*, 4, (15), 97-113.

[4] Wahyuni, N.,& Triatmanto,B. (2020).The effect of the organizational change on company performance mediated by changes in management accounting practices, *Accounting*, 6(2020), 581–588.

[5] Tybout, J. R. (2000). Manufacturing firms in developing countries: How well do they do, and why? *Journal of Economic Literature*, 38(1), 11-44.

[6] Hannimitkulchai, K.(2022). The causal relationship of strategic management accounting practices, intellectual capital development and firm success. *University of Thai Chamber of Commerce Journal Humanities and Social Sciences*, 41(2), 49-169.

[7] Atienza, M. &Tabuena, C. (2021).The impact Of covid-19 pandemic on managerial accounting and its adjustments in financial markets. *International Journal of Business, Technology, and Organizational Behavior.*1(4), 287-296.

[8] Otley, D. (2016). The contingency theory of management accounting and control: 1980–2014*, Management Accounting Research*, 31 (June), 45-62.

[9] Saymeh, A.(2021).The effect of selected management accounting tools on the financial performance of industrial companies (Jordan???s case). *Management Information and Decision Science,* 24(4), 1–18.

[10] Kaplan, R. (1994). Management accounting (1984-1994): Development of new practice and theory. *Management Accounting Research*, 5(3–4), 247-260.

[11] Grasso, L. & Tyson, T. (2021). The Association between management accounting practices, organizational characteristics and facility performance. *Advances in Management Accounting*, 33, 31-75.

[12] Donald, M. (2019). Organizational impacts from disruption, leading and managing change in the age of disruption and artificial intelligence, *Emerald Publishing Limited*, Bingley, pp.21-56. https://doi.org/10.1108/978-1-78756-367-420191003.

[13] Bassani, G., Pfister, J. &Cattaneo, C. (2021). Management accounting change as an amplifier of a leadership dispute: An

ethnography of convergent and divergent leader–follower relations. *Accounting, Auditing & Accountability Journal,* 34(9), 105-134.

[14] Oyewo, B. (2022). Contextual factors moderating the impact of strategic management accounting on competitive advantage, *Journal of Applied Accounting Research*, 17 (Oct), 921–949.

[16] Hoque, A., Yamaura, S., Sakai, A., Khanam, S., Karim, M., Hoque, Y., Hossain, S., Islam, S. &Hossain, O. (2006). Arsenic mitigation for water supply in Bangladesh: Appropriate policy perspectives. *Water Quality Research Journal*. 41(2), 226–234.

[17] Nair, S. & Tan, X. (2018). Factors influencing the implementation of activity-based costing: A study on Malaysian SMEs, *International Business Research* , 11(8), 133-141.

[18] Nyamwanza, L., Mvundla, N.,& Madzivire, E. (2020). Impact of management accounting on decision making: A Zimbabwean perspective, *Journal of Accounting, Business and Finance Research*, 9(1), 37-49.

[19] Bank of Thailand. (2022). Foreign Direct Investment: FDI. Retrieved http:// www2.bot.or.th/statistics/ BOTWEBSTAT.aspx?reportID=656&language=TH

[20] Aaker, D.A, Kumar, V., & Day, G.S. (2001). *Marketing research*. 7th Ed. John Wiley & Sons New York, NY.

[21] Baines, A. & Langfield-Smith, K. (2003), Antecedents to management accounting change: A structural equation approach, *Accounting, Organizations and Society*, 28(7/8), 675-98.

[22] Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (3rd ed.). New York: McGraw-Hill.

[23] Hair, Jr., J. F., Black, W. C., Babin, B. J., Anderson, R. E., & L. Tatham, R. (2006). *Multivariant Data Analysis*. New Jersey: Pearson International Edition.

[24] Black, K. (2006). *Business statistics for contemporary decision making* (4th ed). USA: John Wiley and Son.

[25] Pilipczuk, O. (2020). Toward cognitive management accounting, *Sustainability*, *12*(12), 5108 ; https://doi.org/10.3 390/su12125108

[26] Möller.K, Schäfer.U & Verbeeten.F. (2020). Digitalization in management accounting & control: An editorial. *Journal of Management Control,* 31, 1–8.

[27] Almatarneh, Z., Jarah, B., & Jarrah, M. (2022). The role of management accounting in the development of supply chain performance in logistics manufacturing companies. *Uncertain Supply Chain Management*, 10(1),13-18.

[28] Biswas, S.S.N. & Akroyd, C. (2022), Management control systems and the strategic management of innovation, *Qualitative Research in Accounting and Management*, 19(5), 513-539.

[29] Asiaei, K., Bontis, N., Alizadeh, R., & Yaghoubi, M. (2022). Green intellectual capital and environmental management accounting: Natural resource orchestration in favor of environmental performance. *Business Strategy and the Environment*, 31(1), 76–93.

[30] Llinova, A., Dmitrieva, D., & Kraslawski, A. (2021). Influence of COVID-19 pandemic on fertilizer companies: The role of competitive advantages. *Resources Policy*, 71 (102019),1-15.

[31] Giantari, I. G. A. K., Yasa, N., Suprasto, H., & Rahmayanti, P. (2022). The role of digital marketing in mediating the effect of the COVID-19 pandemic and the intensity of competition on business performance. International Journal of Data and Network Science, 6(1), 217-232.`

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Influence of hot red pepper (capsicum frutescens l.) as a diet supplement for the growth of native chicken (Gallus gallus domesticus)

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Abstract

Native chicken production is a trend in many rural areas in the Philippines because of the highly adaptable conditions with less food, poor shelter, diseases, and sudden changes in weather patterns, which generally stress the exotic varieties. Thirty-six native chickens were used in the experiment, randomly allocated to 4 treatments, and replicated three times with nine native chickens for each treatment using a randomized complete block design. The treatments used in this experiment were T_0 = (control) 50 grams of commercial feeds; T_1 = 49.50 grams commercial feeds + 0.50 gram hot red pepper; T_2 = 49.25 grams commercial feeds + 0.75 gram of hot red pepper; and T_3 = 49 grams commercial feeds + 1 gram of hot red pepper. Results showed that supplementation of hot red pepper had no difference *($P < 0.05$)* between the starter and finisher in cumulative feed consumption and cumulative feed conversion ratio on starter, grower, and finisher. However, weekly weight gain significantly differs from the first week to the ninth week *($P < 0.05$)*. Furthermore, native chicken feeds with 49.50 g of commercial feed + 0.50 g of hot red pepper (*Capsicum frutescens L.*) gained the highest percentage of weight. The study revealed that different levels of hot red pepper application affect the diet performance of the native chicken. Supplementing red hot pepper for the growth of native chicken also resulted in more than 50% return on investment. Therefore, incorporating red hot pepper as a diet supplement in feed can be profitable for native chicken farmers.

Keywords: Native chicken, Hot red pepper, Growth performance, and Feed supplement

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1. Introduction

Raising native chickens is very popular in many rural areas of the Philippines. They are standard features in many yards in many neighborhoods. Although commercial varieties like Dekalb are more productive and yield better, native chickens are sturdier [1]. They are highly adaptable to the conditions in the rural areas of the Philippines, where there is less food, poor shelter, diseases, and sudden changes in weather patterns, which generate stresses on the exotic varieties [2]. The native chickens of the Philippines are practically left to fend for themselves in rural areas, find their food and water, and find their way back to the shelter because the method of growing is categorized as a traditional method which is not truly a system of upbringing [3]. As a result, supplementing native chicken diets with some feed additives could be an alternative way to improve growth and feed conversion efficiency. Furthermore [4], improving management practices, such as providing better housing and feed, could help improve the productivity and profitability of native chicken production in the Philippines.

Chickens are the most popular poultry worldwide, irrespective of culture and region [5]. Poultry is one of the Philippines' fastest-growing segments of the agricultural sector today. Native chickens contribute significantly to Philippine agriculture by providing supplemental meat and eggs while providing extra income to many farmers [6]. [7], signified 81.09 million heads of native/improved chickens in the Philippines as of January 1, 2022. This represents a 4.4% increase from the 77.70 million heads recorded in the same period in 2021. Therefore it is apt [8-10] to engage in proper management practices for native chickens as a guide to help farmers and backyard raisers improve their native chicken

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production practices and increase their income by utilizing locally available resources.

On the other hand, several studies have demonstrated the effect of hot red pepper (HRP) on the performance of broiler chickens [11-12]. HRP boosts pancreatic and intestinal enzyme activity, enhances bile acid secretion, and increases broiler chickens' body weight (Bwt) [13]. [14] proved that it reduces heat stress and improves feed digestibility, feed intake (FI), feed conversion efficiency, mortality, carcass features, blood parameters, and production cost. Adding hot red pepper to broiler chicken diets improved feed utilization because it stimulated appetite and feed intake, which improved endogenous digestive enzyme secretion [15]. Capsaicin, a naturally occurring substance that makes a pepper hot stimulates appetite in poultry, so adding hot red pepper to the diet influences broiler feed consumption [16]. Natural feed additives such as hot red pepper (*Capsicum frutescens L.*) and broiler chicken diets could enhance productive responses. Hence, this study is conceptualized to determine the influence of hot red pepper (*Capsicum frutescens L.*) as a diet supplement for native chicken. Investigating hot red pepper's influence as a diet supplement for native chickens can have important implications for animal health, food security, and sustainable agriculture. It can help improve the productivity and growth of native chickens, reduce synthetic additives, promote natural feed additives, and contribute to the overall health and welfare of the poultry.

2. Materials and Methods

This research applied experimental design. A randomized complete block design (RCBD) was utilized in this study. The treatments used in this experiment were as follows: T_0 = (control) 50 grams of commercial feeds; T_1 = 49.50 grams commercial feeds + 0.50 gram hot red pepper; T_2 = 49.5 grams commercial feeds + 0.75 gram of hot red pepper; and T_3 = 49.0 grams commercial feeds + 1 gram of hot red pepper with the experimental layout as:

Block	Treatment allocation			
1	T_3	T_2	T_1	T_0
2	T_0	T_3	T_2	T_1
3	T_2	T_3	T_0	T1

2.1 Birds and housing

Thirty-six (36) chicks of native chicken were randomly selected per treatment, with three heads per replicate. The brooding pen and cages were cleaned thoroughly using detergent soap, water, brush, and brooms. For sanitation purposes, hot water was poured to kill bacteria that would cause disease to the native chickens. The waterier and feeding troughs were thoroughly cleaned. Cages were provided with lights at night for easy access to feeders and waterers. The poultry house was made from bamboo, branches of river tamarind, nipa, and extruded green-colored plastic net that measures 60 cm × 70 cm × 65 cm per cage to have a cool temperature.

2.2 Hot red pepper collection and preparation

The hot red pepper was harvested in the researcher gardens in Purok 5, San Isidro, Asturias, Cebu. The hot red pepper was ground into smaller pieces using a knife and chopping board. These were placed on the net for sun-drying for 8 hours and transferred to big plastic ware. Eight hundred thirty-seven (837) grams of hot red pepper was used as a diet supplement for native chickens for the entire study.

2.3 Brooding stage

Thirty-six (36) chicks of native chicken (1-month-old) were placed into the brooding pen. They were fed an ad libitum system to ensure their rapid development growth. The native chicks were given lights (5 watts bulb) to keep them warm on cold nights.

2.4 Feeding system

Feeding management for the study using 1-month-old native chicken as experimental animals comprised the following: Days 31-41—native chicks starter crumble; day 42—75% of native chicks starter crumble + 25% of native grower crumble; day 43—50% of native chicks starter crumble + 50% of native grower crumble; day 44—25% of native chicks starter crumble + 75% of native grower crumble; days 45—69 a composition of 100% native grower crumble; day 70—comprised of 75% of native grower crumble + 25% of native finisher crumble; day 71—50% of native grower crumble + 50% of native finisher crumble; day 72—25% of native grower crumble + 75% of native finisher crumble; and day 73-92—chickens were given 100% native finisher crumble.

Creep feeding. A ratio of 75%: 25%, 50%: 50%, and 25%: 75% of native chick boosters were fed to the 42nd, 43rd, and 44th days old native chicks, respectively. From the 45th to the 69th day, 100% of native grower crumble (Integra 2000) was given to 36 native chickens. The creep feeding system was used again on the 70th, 71st, and 72nd days; the native chicken was fed at a ratio of 75%: 25%, 50%: 50%, 75%: 25% of native grower crumble (Integra 2000) and native finisher crumble (Integra 3000). The native finisher crumbles (Integra 3000) were fed to the native chicken 100% fully from the 73rd day up to the 92nd day of termination.

2.5 Data gathering

The data was collected by measuring the cumulative feed consumption, weekly weight gain, cumulative feed conversion ratio, and voluntary feed intake.

Results and Discussion

Table 1. Cumulative feed consumption of native chicken fed hot red pepper as a diet supplement in grams

Treatment	Starter (31 DAH)	Grower (51 DAH-78 DAH)	Finisher (79 DAH-92 DAH)
T_0	52.6950	53.1875**	55.2200
T_1	54.5150	54.4800**	57.4333
T_2	53.6650	53.0000**	54.9533
T_3	51.6600	57.5600*	59.0867
CV(%)	3.9500	3.9147	6.3872
P-value	0.02202*	0.00001*	0.0012*
Mean	53.1337	54.5568	56.6733

Legend:

T_0 = 50 grams of commercial feeds

T_1 = 49.50 grams commercial feeds + 0.50 gram hot red pepper

T_2 = 49.25 grams commercial feeds + 0.75 gram of hot red pepper

T_3 = 49.0 grams commercial feeds + 1.0 gram of hot red pepper

DAH = days after hatching

*= significant

**= not significant

Table 1 explains there is a significant effect on the starter stage in all treatments. This means that native chicken is affected by the hot red pepper diet, but in the grower stage, T_3 showed statistically comparable to all T_1 and T_2. Based on the result [17], adding hot red pepper to the diet influences and improves feed consumption. The same results in the finisher stage were significant in all treatment groups. The result of the present study negated [18] that pepper can be added to the drinking water of native chicken at 30 ml/L water to affect growth and increase profit positively. The result shows that a higher hot red pepper dosage may not necessarily result in better growth performance and that an optimal dosage must be determined for each growth stage. Overall, the findings provide important insights for developing effective feeding strategies for native chickens using natural feed additives such as hot red pepper.

Table 2 . Weekly weight gain in grams/ bird of native chicken fed hot red pepper as a diet supplement

Treatment	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
T_0	199.9967**	257.2167**	300.5300**	364.99**	493.61**	624.99**	657.80**	752.22**	761.66**	977.22*
T_1	341.6667*	399.1633*	535.5533*	626.66*	716.39*	834.44*	902.50*	986.39*	1,029.44*	1,113.61*
T_2	298.3300***	330.5500*	384.4400***	474.16**	555.28**	639.72***	697.22***	768.33**	866.66***	945.27*
T_3	268.3267***	322.2200***	399.1667***	463.05**	540.00**	652.22***	721.39***	816.11***	891.67***	1,148.33*
P- value	0.0123*	0.0012*	0.0456*	0.0021*	0.0001*	0.0087*	0.0002*	0.0134*	0.0018*	0.00001*
Mean	277.0800	327.2875	404.9225	483.215	576.32	687.8485	727.56	830.7625	887.3575	1,046.1075

T_0 = 50 grams of commercial feeds
T_1 = 49.50 grams commercial feeds + 0.50 gram hot red pepper
T_2 = 49.25 grams commercial feeds + 0.75 gram of hot red pepper
T_3 = 49.0 grams commercial feeds + 1.0 gram of hot red pepper
*= significant
**= not significant
***= slightly significant

Table 2 shows that in the 1st week, T_2 is statistically comparable to T_3; however, T_0 is slightly significant to T_1; the data were subjected to analysis of variance and showed a significant result at 0.05 % significance level. In the 2nd week, T_0 is slightly significant to T_1, and T_2 is comparable to T_3. During the 3rd week, T_0 is slightly significant to T_1; however, T_2 is statistically comparable to T_3. In the 4th week, T_1 is significant between treatment T_0, T_2, and T_3, respectively, compared to each other. In the 5th week of weekly weight gain, T_1 is significant in all treated groups. The data were subject to analysis of variance and showed a significant result at a 5 % level of substantial. In the 6th week and 7th weeks, T_1 is slightly more significant than T_0. However, T_2, and T_3 are statistically comparable. In the 8th week, T_1 is slightly significant to T_0 and T_2, while T_3 is statistically comparable to all treated groups. In the 9th week, T_0 is slightly significant to T_1, while T_2 is comparable to T_3. In the 10th week, the last week of the study, all treatments are not significantly affected by hot red pepper (HRP) given to the native chicken.

The findings imply that the effects of hot red pepper (HRP) on weekly weight gain in native chickens may vary depending on the dosage and duration of treatment. The study found that different dosages of HRP (0.50 gram, 0.75 gram, and 1.0 gram) showed different levels of effectiveness in promoting weight gain in chickens, and the effects were not consistent across all weeks. The HRP treatment effectively promoted chicken weight gain during some weeks but not others. For

example, in the 5th week, treatment 1 (0.50 gram of HRP) was significant in all treated groups, but in the 10th week, none of the treatments showed significant effects. The differences in effectiveness between HRP dosages and between weeks show that there may be an optimal dosage and duration of HRP treatment for promoting weight gain in native chickens. Further research may be needed to determine the optimal conditions for HRP treatment in chicken farming. The statistical significance of the results at a 5% significance level indicates that some differences between treatments are likely not due to chance, while others may be.

Table 3. Cumulative feed conversion ratio of native chicken fed red hot pepper as a diet supplement

Treatment	Starter (31 DAH)	Grower (51 DAH-78 DAH)	Finisher (79 DAH-92 DAH)
T_0	6.9504	7.0022	6.6720
T_1	7.0080	7.0035	6.6667
T_2	6.9535	6.9708	6.7400
T_3	6.9500	7.0000	6.6333
CV(%)	5.4695	8.8956	9.9580
P- value	0.00536*	0.0012*	0.00001*
Mean	6.9654	6.9941	6.678

Legend:
T_0 = 50 grams of commercial feeds
T_1 = 49.50 grams commercial feeds + 0.50 gram hot red pepper
T_2 = 40.25 grams commercial feeds + 0.75 gram of hot red pepper
T_3 = 49.0 grams commercial feeds + 1.0 gram of hot red pepper
DAH= days after hatching
*= significant
**= not significant

Table 3 illustrates that in the starter stage, grower stage, and finisher stage, in the cumulative feed conversion ratio of native chickens, there is a significant effect on all treatments. It means that the FCR changes consistently throughout the different stages of the birds' growth. This could have important implications for poultry farmers and feed producers. Different additives' effect on digestibility slightly improved the performance, and this effect was statistically significant. The result of the present is confirmed that of [19], who noticed that the dietary inclusion of HRP significantly ($P < 0.05$) improved FCR compared with the control.

The study's findings imply that there is a significant advantage in changing the feed formulation or nutrient content of the diet across the different stages of growth. This could simplify the feeding regime for farmers and reduce costs associated with switching feed formulations. The lack of significant differences in FCR across different stages of growth in native chickens highlights the need for further research to determine the optimal feeding strategies for these birds.

Table 4. Voluntary feed intake of native chicken fed hot red pepper as a diet supplement in grams

Treatment	Starter (31 Days after Hatching)	Grower (51 DAH-78 DAH)	Finisher (79 DAH-92 DAH)
T_0	474.2850	451.8350*	441.8000***
T_1	462.7500	436.3000***	460.5000*
T_2	483.0200	449.4975***	447.6667***
T_3	485.6000	422.9750**	413.6333**
CV(%)	2.6606	5.0211	5.8707
P-value	0.00448*	0.0012*	0.0123*
Mean	476.4137	440.1518	440.9

Legend:
T_0 = 50 grams of commercial feeds
T_1 = 49.50 grams commercial feeds + 0.50 gram hot red pepper
T_2 = 49.25 grams commercial feeds + 0.75 gram of hot red pepper
T_3 = 49.0 grams commercial feeds + 1.0 gram of hot red pepper
DAH= days after hatching
*= significant
**= not significant
***= slightly significant

Table 4 shows that the voluntary feed intake of native chicken has a notable difference between treatments where the grower and finisher show a significant difference. For starters, a significant difference was observed during the treatments' application. On the other hand, in grower, there was a significant difference between the treatments where T_0 showed a higher voluntary feed intake than T_3, which shows the lowest voluntary feed intake between all the treatments, and T_0 is comparable to T_2 and T_1, where it shows no significant difference between each other. However, there was a significant difference between T_1 and T_3 in the voluntary feed intake at the finisher stage. The study of [20] further illustrates that supplementation with natural feed additives in a powder form of chili pepper in the concentration of 0.5% (CP0.5) and 1% (CP1.0) led to significant differences ($p < 0.05$) in the body mass of chickens compared to control and experimental treatments. At the end of the trial, chickens with the dietary addition of 0.5% chili pepper recorded the highest body mass of 2.46 kg, followed by treatment with 1% chili pepper (2.44 kg). Moreover, observed differences were statistically significantly ($p < 0.05$) higher when compared with other treatments.

The study's findings imply that using natural feed additives such as hot red pepper can influence the feed intake of the birds, particularly during the grower and finisher stages. The significant difference in voluntary feed intake between treatments during the grower stage could indicate that the use of hot red pepper in the diet may affect the palatability of the feed, which could result in reduced intake. However, it is worth noting that the comparison of T_0 with T_1, T_2, and T_3 showed no significant difference in feed intake during the starter stage. The significant difference in voluntary feed intake during the finisher stage between T_1 and T_3 could have implications for the growth performance of the birds.

The result of the study further illustrated that the synergistic effect of the combination of red hot pepper and commercial feeds in the native chicken diet enhances weight gain. The specific combination used in the study, with 49.50 g of commercial feed and 0.50 g of hot red pepper, effectively promotes growth in native chickens.

Table 5. Return of investment from native chicken fed hot red pepper as a diet supplement

Treatment	Gross Sales	Total Investment	Net Profit	ROI (%)
T_0	1,524	868.22	655.78	75.53%
T_1	1,792	870.88	921.12	105.77%
T_2	1,519	872.21	646.79	74.16%
T_3	1,593	873.44	719.56	82.38%

T_0 = 50 grams of commercial feeds
T_1 = 49.50 grams commercial feeds + 0.50 gram hot red pepper
T_2 = 49.25 grams commercial feeds + 0.75 gram of hot red pepper
T_3 = 49.0 grams commercial feeds + 1.0 gram of hot red pepper

Table 5 indicates the Return on Investment (ROI) on each treatment supplemented with hot red pepper for the growth of native chicken. Among the treatments, T_1 got the highest ROI of 105.77%, which means faster return payback than other treatments, followed by T_3 and T_0 with 82.38% and 75.53%, respectively. However, T_2 had the lowest percentage, 74.16%. Therefore, it is evident that red hot pepper as a diet supplement is a promising avenue for a good harvest and yield performance, as all treatments noted more than 70% of the return. Furthermore, the results indicate that including red hot pepper as a diet supplement could be a promising strategy for improving the economic performance of poultry production. T_1 had the highest ROI, meaning that the investment in this treatment resulted in the highest profits in the shortest time. T_3 and T_0 also showed a good return on investment, indicating that they are economically feasible treatments. However, T_2 had the lowest ROI, suggesting that it may not be the most cost-effective option for chicken production.

3. Conclusions

The study showed that 0.50 g of hot red pepper could be considered an alternative feed additive to the diets of native chicken, as it showed a significant increase in weekly weight gain and voluntary feed intake during the finisher stage. The results suggest that red hot pepper supplementation can positively affect the growth and development of native chickens, making it a promising avenue for native chicken production. Although there were no significant differences in the cumulative feed consumption during the starter and finisher stages and the incremental feed conversion ratio during all stages, the study found that red hot pepper supplementation resulted in more than 50% return on investment. This implies that using hot red pepper as a feed additive can produce a profitable poultry production system. Therefore, the study recommends the utilization of red hot pepper in growing native chickens, with the caution that the different levels of application may affect the diet performance of the birds. In conclusion, the results of this study suggest that the use of red hot pepper as a dietary supplement in the production of native chickens has the potential to improve performance and profitability in native chicken production.

References

[1] Lisnahan C., and Nahak O., 2020. Growth performance and small intestinal morphology of native chickens after feed supplementation with tryptophan and threonine during the starter phase. *Vet World*. 2020 Dec; 13(12): 2765–2771. doi:

10.14202/ vetworld.2020.2765-2771. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7811536/

[2] Mabalay, M. R. B., and Pascual, L. G., 2019. Phenotypic characterization of native chicken in the rural areas of the Philippines. *Asian Journal of Agriculture and Development*, 16(1), 49-65.

[3] Bureau of Agriculture and Fisheries Standards (BAFS), 2018. The Philippine National Standard (PNS) Free Range Chicken. BPI Compound, Visayas Avenue, Diliman, Quezon City 1101 Philippines.

[4] Asis, I. R., Calub, T. M., Demayo, C. G., and Sevilla, C. C., 2014. Assessment of traditional native chicken production system in the Philippines. *International Journal of Agriculture and Biology*, 16(6), 1175-1180.

[5] Naldo, M., Agbisit, E., Salces, A., Arboleda, M.D. and Magpantay V., 2021. Small-scale native chicken production systems in mountain barangays of Ayungon, Negros Oriental, Philippines. *Philippine Journal of Veterinary and Animal Sciences*, 47(1), 20-28. https://doi.org/ 10.5329/pjvas.v47i1.6041

[6] Rodriguez, B. L., and Serrano Jr, A. C., 2016. Indigenous chickens in the Philippines: Status, challenges and opportunities. *Philippine Journal of Veterinary Medicine*, 53(2), 41-50.

[7] Philippine Statistics Authority, 2022. Highlights of the Philippine Animal Industry as of January 1, 2022. Retrieved from https://psa.gov.ph /statistics/sectoral/livestock-and-poultry/highlights-philippine-animal-industry-january-1-2022

[8] Department of Agriculture-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development, 2019. Native Chicken Production Guide. Retrieved from https://www.pcaarrd.dost.gov.ph/home/portal/index.php/42-quick-information-dispatch/3077-native-chicken-production-guide

[9] Manalili, F. R., 2018. Developing a Native Chicken Production and Management System in the Philippines. *Animal Production Science*, 58(3), 399-404. doi: 10.1071/AN16729

[10] Magboo, N. N., and Cabling, M. J. P., 2019. Indigenous Chicken Production and Management Practices in the Philippines: Insights from a Survey of Smallholder Farmers. *Tropical Animal Science Journal*, 42(3), 191-201. doi: 10.5398/tasj.2019.42.3.191

[11] Agarwal, P., Das, C., Dias, O., and Shanbhag, T., 2017. Antimicrobial property of capsaicin. *Journal of Pharmacy and Bioallied Sciences*, 9(Suppl 1), S45-S50. doi: 10.4103/ jpbs.JPBS_290_16

[12] Abdelnour, S., Alagawany, M., Abd El-Hack, M. E., Sheiha, A., Saadeldin, I., and Swelum, A., 2018. Nigella sativa and Its Derivatives as Nutraceuticals against Infectious and Noninfectious Diseases: A Review. Evidence-Based Complementary and Alternative Medicine, 2018, 1-13. doi: 10.1155/2018/6272384

[13] Khalique, A., Huang, Y., Ahmad, I., Liu, Z., Suleria, H. A. R., and Qi, D., 2020. Effects of dietary supplement- ation of horse radish peroxidase (HRP) on performance, nutrient digestibility, pancreatic enzyme activities, jejunal morphology, and serum biochemistry of broiler chickens. *Journal of Applied Animal Research*, 48(1), 83-92. doi: 10.1080/09712119.2019.1648408

[14] Munglang, N., and Vidyarthi, V., 2019. Hot Red Pepper Powder Supplement- ation Diet of Broiler Chicken - A Review. *International Journal of Livestock Research*, 7, 159-167. doi: 10.5455/ijlr.20180612053833

[15] Abdelli, N., Oriol, D., and Pérez, J. F., 2021. Phytogenic Feed Additives in Poultry: Achievements, Prospective and

Challenges. Animals (Basel), 11(12), 3471. doi: 10.3390/ ani11123471. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8698016/

[16] Nang, M., 2020. Hot Red Pepper Powder Supplementation Diet of Broiler Chicken - A Review. *Livestock Research International*, 7(3), 159-167. Retrieved from http://www.jakra- ya.com/journal/lr.

[17] Haque, M. N., and Islam, M. A., 2018. Effect of dietary hot pepper (Capsicum annuum) on growth performance, carcass traits and economics of broiler production. *International Journal of Biosciences*, 12(4), 320-328. https://doi.org/10.12692/ijb/12.4.320-328

[18] Dela Vega, J., and Gonzales, M., 2019. Response of Native Chicken to Selected Saponin-Containing Herbs Extracts under Partially Ranged System. *Mindanao Journal of Science and Technology*, 17, 49-58. Retrieved from https://mjst.ustp.edu.ph/index.php/mjst/article/view/268

[19] Abou Elkhair, R., Selim, S., Susan, M., and Hussein Eldha, A., 2018. Effect of supplementing layer hen diet with phytogenic feed additives on laying performance, egg quality, egg lipid peroxidation and blood biochemical constituents. *Animal Nutrition*, 4(4), 394-400. doi: 10.1016/j.aninu.2018 .05.004

[20] Puvača, N., Brkić, I., Jahić, M., Nikolić, S. R., and Radović, G., 2020. The Effect of Using Natural or Biotic Dietary Supplements in Poultry Nutrition on the Effectiveness of Meat Production. *Sustainability*, 12(11), 4373. https://doi.org/10.3390/su12114373.

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Prevalence and Associated Factors of Dementia among the Older People in Chiang Mai Province

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Abstract

This cross-sectional descriptive study investigated the prevalence and associated factors of dementia among older people in Saraphi District, Chiang Mai Province. A sample of 877 older people residing in Nong Phueng, Yang Noeng, and Saraphi Subdistricts was selected using purposive sampling method. Data were collected using a questionnaire to obtain general background information and the Thai version of the Mini-Mental Status Examination. Statistical analysis included frequency, percentage, chi-square test, and Fisher's exact test.

The result revealed that the prevalence of dementia was 15.39%, with 84.61% of participants being non-demented. Significant factors associated with dementia included current employment status, personal health conditions, smoking, alcohol consumption, exercise, and social activity participation. Factors not associated with dementia were gender, marital status, education, previous occupations, brain injury, food supplementation, family history of dementia, and hobbies.

The study identified a substantial prevalence of dementia among the older people in Saraphi District. The associated factors highlight the importance of addressing modifiable risk factors and providing tailored interventions to prevent and manage dementia in Saraphi District, Chiang Mai Province.

Keywords: dementia, older people, prevalence and associated factors

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1. Introduction

Thailand has transitioned into an aging society, with a growing population of older people. According to the 2023 statistics, Thailand's total population was approximately 66 million, with individuals aged 60 years and older accounting for 19.74% or 13 million of the population. This proportion has been steadily increasing over the years, primarily attributed to advancements in medical treatments and effective public health interventions. However, increased longevity is often accompanied by a higher prevalence of age-related health concerns. Dementia is one of the health problems that is rapidly growing in older people. It is a progressive neurological syndrome characterized by the gradual and sustained deterioration of brain cells, leading to cognitive impairments and memory loss. This condition affects an individual's ability to recall both short-term and long-term memories. Consequently, dementia has emerged as one of the five most prevalent chronic diseases among older people in Thailand. Additionally, Akter et al. [2] projected that the global number of dementia patients would nearly triple to 153 million by 2050. Within the Southeast Asian region, Thailand has reported a significant prevalence of dementia, estimated at 9.7% in 2022 [3]. This prevalence rate exhibits a gender disparity, with 7.8% in males and 9.61% in females. Notably, the prevalence of dementia in Thailand has been observed to double every five years.

As dementia not only affects the individuals diagnosed with the condition, leading to memory loss, cognitive decline, and forgetfulness that impair their daily functioning, it also has significant physical, mental, behavioral, social, and economic impacts on their caregivers and family members [4]. Prior research has focused on investigating factors associated with dementia prevalence in various regions of Thailand. Airada [5]

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revealed that area-specific aspects bring about different factors for dementia [6] [7] [8] [9] [10]. The factors most related to dementia in older people comprise economic status, individuals, health-related behaviors, activity participation, family history with dementia, and congenital ailments respectively [11]. Furthermore, Baumgat et al. [12] noted that genetic factors, age, gender, marital status; behavioral factors, such as, eating habits, overweight, smoking, excessive alcohol consumption, lack of physical exercise, and exposure to toxins; and cardiovascular risk factors are all factors that affect dementia.

Saraphi District is among the five districts in Chiang Mai with the highest proportion of older people population, accounting for 24.45% [13]. This demographic shift has led to an aging society, increasing the likelihood of dementia prevalence among older people. Despite this, there have been no prior screening or surveys conducted at the primary level to assess dementia risk in the community. Moreover, no investigations have been carried out to identify the factors influencing dementia risk in the area. In light of this knowledge gap, the present study aimed to investigate the prevalence and associated factors of dementia among older people in Saraphi District, Chiang Mai Province. The findings of this research will provide valuable insights for developing targeted interventions to prevent and manage dementia in this population. Also, the findings underscore the significance of regular health check-ups, early detection, and prompt treatment in enhancing the quality of life for individuals with dementia and their caregivers

2. Research Objective

This research aimed to investigate the prevalence and associated factors of dementia among older people in Saraphi District, Chiang Mai Province.

3. Research Conceptual Framework

A conceptual framework for this research is illustrated in Figure 1.

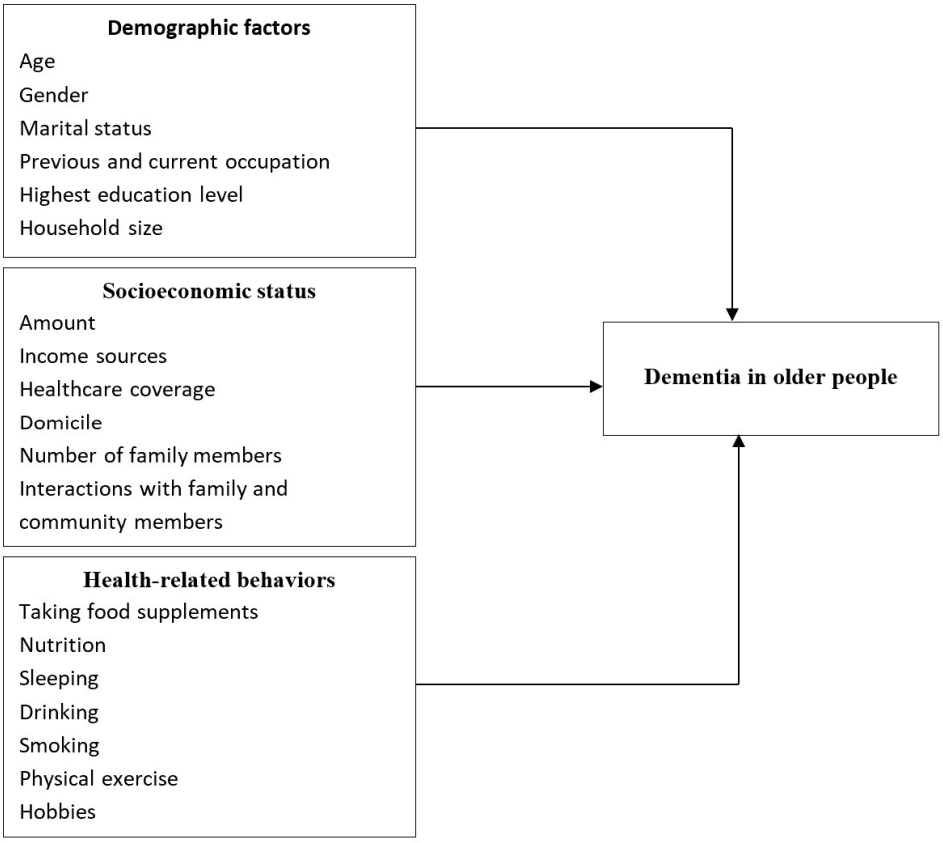

Figure 1. A conceptual framework

4. Research Methodology

This cross-sectional descriptive survey was conducted as follows:

4.1 Population and Sample Group

877 older people were selected as the sample group. The criteria for selecting the sample group were as follows: age 60 years and over; both genders; good ability to see, hear and communicate in Thai; not disabled or bed-ridden; residing in the three municipalities: Nong Phueng, Yang Neong and Saraphi Municipalities in Saraphi District, Chiang Mai province; and willingness to participate in this research. The sample size was calculated from the following formula: Older population in Saraphi District (N) = 16,138, Error (d) = 0.05, Alpha (α) = 0.05, $Z_{\alpha/2}$ = 1.96, deff = design effect, the value of 2 was selected and prevalence of dementia proportion (p) = 0.56 which was obtained from Kawitu [14]. Also, 10% of the average samples were additionally collected to prepare for a case of participant's withdrawal, so the total number of samples in this study was 877.

$$n = \frac{deff\ x\ Z^2_{\alpha/2}P(1-P)N}{Z^2_{\alpha/2}P(1-P)+Nd^2}$$

$$n = \frac{2\ x\ (1.96)^2(0.56)(1-0.56)(16138)}{(1.96)^2(0.56)(1-0.56)+(16138)(0.05)^2} = 739.89$$

4.2 Research Instruments

1. The questionnaire on general information of older people was meticulously designed to capture a comprehensive profile of their demographics, socioeconomic status, and health-related behaviors. It comprised three distinct sections. The general information of older people was composed age, gender, marital status, previous and current occupation, highest education level, and household size. For socioeconomic status, there were multiple-choice items that included amount, income sources, healthcare coverage, domicile, number of family members, and interactions with family and community members. Information about health-related behavior consisted of levels of general health, sicknesses, and history of brain injuries to the point of becoming unconscious. Other health-related behaviors included taking food supplements, nutrition, sleeping, drinking, smoking, physical exercise, and hobbies. The questionnaire underwent rigorous validation procedures. Three experts independently assessed the congruence between each item and its intended objective, resulting in an Index of Item-Objective Congruence (IOC) of 0.90, indicating a high level of content validity.

2. The Mini-Mental State Examination-Thai 2002 (MMSE-Thai 2002) was employed as the primary screening tool for dementia in this study. Developed by the Institute of Geriatric Medicine, Department of Medical Services, Ministry of Public Health, the MMSE-Thai 2002 is a standardized test adapted from the original Mini-Mental Status Examination by Folstein, Folstein, and McHugh [15]. The MMSE-Thai 2002 consists of two versions tailored to the educational level of the older participants: a 30-item version for literate individuals and a 23-item version for illiterate individuals. The test assesses cognitive function across various domains, including orientation to time and place, memory, attention, language, and visuospatial skills. The total score on the MMSE-Thai 2002 ranges from 0 to 30, with higher scores indicating better cognitive function. Interpretation of the scores varies based on the educational level of participants. For illiterate individuals, a score of 14 or higher is considered normal, while for those with primary school education, a score of 17 or higher is indicative of normal cognitive function. For individuals with education beyond primary school, a score of 22 or higher is considered normal. Participants who scored below the established cut-off points for their respective educational levels were considered at risk for dementia.

4.3 Data collection

1. Prior to data collection, the research protocol was submitted for ethical review and approval through the online research compliance platform of Chiang Mai Rajabhat University. The study was approved by the Board of Human Research Ethics, Chiang Mai Rajabhat University, under the research project titled, "The Development of Screening Test and Evaluation Systems of the Risk of Older People with Dementia in Saraphi District, Chiang Mai Province, by Using the Data Mining Technique." The registration number is IRBCMRU 2022/164.08.08, dated August 11, 2022.

2. A comprehensive review of the literature on dementia and dementia screening instruments was conducted.

3. Following the receipt of ethical approval, a letter of approval from Chiang Mai Rajabhat University was submitted to the mayors of the three participating municipalities to obtain permission to conduct the research within their jurisdictions.

4. Prior to data collection, meetings were held with the mayors and heads of the older people associations in the three participating municipalities. During these meetings, the research objectives, data collection methods, and the requested collaboration for data collection were thoroughly explained and discussed.

5. A total of 877 older people were recruited from the Nong Phueng Older People Association, Yang Neong Older People Association, and Saraphi Municipality Older People Association, using simple random sampling. Before participation, the purpose of the study, data collection procedures, and potential benefits and risks were thoroughly explained to each participant. Ample opportunity was provided for questions and clarification. Informed consent was obtained from all participants before proceeding with data collection.

6. After a thorough explanation of the study's purpose, procedures, and potential implications, informed consent documents were distributed to all potential participants. Participants were given ample time to review and understand the document before providing their written consent to participate in the research.

7. All 877 older people underwent dementia assessment using the Mini-Mental State Examination-Thai 2002 (MMSE-Thai 2002) Test. The assessments were conducted by trained medical personnel to ensure accuracy and consistency.

8. Data collection was conducted through questionnaire administration via interviews to gather information on dementia within three districts. The collected data encompassed demographic characteristics, disease status, and health-related behaviors. The data collection process spanned seven months due to disruptions caused by the COVID-19 pandemic.

4.4 Data Analysis

The data collected from the questionnaire were analyzed using statistical tests, including the chi-square test and Fisher's exact test. These tests were employed to determine the prevalence of dementia among older people in Saraphi District, Chiang Mai Province, and to identify factors associated with dementia.

5. Research Findings

The study sample comprised 877 older people, of whom 679 (77.40%) were female and 198 (22.60%) were male. The age distribution of the participants ranged from 60 to 84 years, with the majority (448 or 51.08%) falling within the 60-69 age group. The 70-79 age group accounted for 285 participants (32.50%), while the 80-89 age group included 144 participants (16.42%). Regarding educational attainment, 542 participants (61.87%) had completed six years of schooling or less. A total of 229 participants (26.14%) had completed 7-12 years of education, while 71 participants (8.11%) held diplomas or equivalent qualifications. Undergraduate education was completed by 27 participants (3.08%), and 7 participants (0.80%) had attained education beyond the bachelor's degree level.

The preliminary screening using the MMSE-Thai 2002 revealed that 135 (15.39%) of older people had dementia, while the remaining 84.61% did not. To determine the prevalence and associated factors of dementia among older people in the district, statistical analyses were conducted. The results are presented in Table 1.

Table 1. The analysis of the prevalence and associated factors of dementia among older people in Saraphi District

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
Gender						
Male	161	81.3	37	18.7	Fisher's Exact	0.632
Female	581	85.6	98	14.4		
Age (year)						
Young-old (60-69 ปี)	441	98.4	7	1.6	χ^2=54.554	$< 0.001^*$
Middle-old (70-79 ปี)	222	77.9	63	22.1		
Old-old (80-89 ปี)	79	54.9	65	45.1		
Marital status						
Married	557	92.5	45	7.5	χ^2=6.200	0.087
Single	102	72.9	38	27.1		
Widowed	34	48.6	36	51.4		
Separated	29	65.9	15	34.1		
Divorced	10	50.0	10	50.0		
Educational level						
Lower than primary education or primary education	477	89.5	56	10.5	χ^2=4.805	0.249
Secondary education	180	75.3	59	24.7		
Diploma	59	83.1	12	16.9		
Bachelor degree	20	74.1	7	25.9		
Higher than bachelor's degree	6	85.7	1	14.3		
previous occupations						
Agriculture	227	76.9	68	23.1	Fisher's Exact	0.782
Business	150	92.6	12	7.4		
Technical specialist	99	88.4	13	11.6		
General administration	78	86.7	12	13.3		
Civil service	67	94.4	4	5.6		
Specific professional specialist	20	87.0	3	13.0		

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
Butler/housewife	101	81.5	23	18.5		
Current work						
Unemployed	253	65.2	135	34.8	Fisher's	< 0.001*
Employed	489	100.0	0	0.0	Exact	
Personal ailments						
Diabetes	29	93.5	2	6.5	Fisher's	< 0.001*
Diabetes +hypertension	72	75.0	24	25.0	Exact	
Diabetes + hypertension + hyperlipidemia	66	66.7	33	33.3		
Diabetes + hypertension + hyperlipidemia + stroke	0	0.0	5	100.0		
Hypertension	73	93.6	5	6.4		
Hypertension + hyperlipidemia	77	74.0	27	26.0		
Hyperlipidemia	69	95.8	3	4.2		
Bone and joint diseases	58	100.0	0	0.0		
Bone and joint diseases + hypertension	47	100.0	0	11.9		
Bone and joint diseases + hyperlipidemia	59	88.1	8	100.0		
Hypertension + stroke	0	0.0	5	50.0		
Hypertension + hyperlipidemia	6	50.0	6	100.0		
Hypertension + hyperlipidemia + stroke	0	0.0	10	0.0		
Heart disease	6	100.0	0	0.0		
Cancer + diabetes	1	100.0	0	0.0		
Cancer + hypertension	4	100.0	0	0.0		
Dyspepsia + diabetes	37	100.0	0	0.0		
Dyspepsia + hypertension	35	97.2	1	2.8		
Dyspepsia + hyperlipidemia	42	100.0	0	0.0		
Heart Disease +hyperlipidemia	8	72.7	3	27.3		
Heart Disease + hypertension	7	70.0	3	30.0		

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
None	46	100.0	0	0.0		
Brain damage						
Yes	7	20.0	28	80.0	Fisher's Exact	0.511
no	735	87.3	107	12.7		
Use of dietary supplements						
Yes	113	71.1	46	28.9	Fisher's Exact	0.721
no	629	87.6	89	12.4		
Having siblings or relatives with dementia						
Yes	18	66.7	9	33.3	Fisher's Exact	0.783
no	724	85.2	126	14.8		
Smoking						
no	635	96.9	20	3.1	χ^2=38.230	$< 0.001^*$
Used to	41	35.0	76	65.0		
yes	66	62.9	39	37.1		
Drinking alcohol						
No	378	94.7	21	5.3	χ^2=46.782	$< 0.001^*$
Yes, occasionally	191	78.0	54	22.0		
Used to	144	75.0	48	25.0		
Yes, always	29	70.7	12	29.3		
Exercise						
Yes, occasionally	667	83.7	130	16.3	χ^2=27.230	$< 0.001^*$
Yes, always	73	100.0	0	0.0		
No	2	28.6	5	71.4		
Hobbies						
Yes	742	84.6	135	15.4	Fisher's Exact	0.322
No	0	0.0		0.0		
Participation in social activities						
At least once a month	476	89.1	58	10.9	Fisher's	

Factors	With Dementia		Without Dementia		Statistics	P-value*
	frequency	percentage	frequency	percentage		
					Exact	$< 0.001^{*}$
1 – 4 times per week	132	95.7	6	4.3		
No	56	44.1	71	55.9		
more than 5 times per week	78	100.0	0	0.0		

Table 1 presents the results of the statistical analyses examining the relationship between various factors and dementia among older people in Saraphi District. The factors found to be significantly associated with dementia include current work status, personal ailments, smoking, alcohol consumption, exercise habits, and participation in social activities. Factors that were not found to be significantly associated with dementia include gender, marital status, education level, previous occupations, history of brain damage, use of food supplements, family history of dementia, and hobbies.

6. Discussion of the findings

The prevalence of dementia among older people in Saraphi District was found to be 15.39%, which is comparable to the national prevalence rate of 16.4% reported by the Institute of Geriatric Medicine [16]. However, this finding differs from studies conducted in other regions of Thailand. Suwan & Trakulsithichok [17] reported a prevalence rate of 18.16% among the older people in Mueang District, Prathum Thani province, while Duangchan, Yodthong & Detduang [18] found a prevalence rate of 24.35% among older people in Phetchaburi Province. These variations in prevalence rates may be attributed to differences in demographic characteristics, educational levels, lifestyle factors, and cultural practices across different regions of the country.

The analysis of the relationship between dementia and situational contexts of older people in Saraphi District revealed that age was related to dementia. This finding is consistent with that of Suwan & Trakulsithichok [17], revealing that dementia was most prevalent among older people aged over 80 years (51.2%) and was least prevalent among those aged 60-69 years (9.6%). This is due to the fact that, when a person get older, there are changes in the brain structure and frontal lobe, the number of neurons and glial cells reduces, and some cells are dead, resulting in abnormalities of the nervous system and decrease in memories [19] [20] [21]. Additionally, congenital ailments affect dementia. This is consistent with Muangphaisan [22] and Nanthakhwang & Wongma [23], noting that congenital ailments like hypertension, diabetes, high cholesterol, and heart disease, have direct and indirect effects on the reduction in the functions of the brain that may result in dementia later. The results of this investigation revealed that older people with cerebrovascular disease had a higher rate of dementia than those with other congenital diseases. Smoking and drinking are also the factors related to dementia. This is in line with Lertkrathok et al. [24], noting that smoking reduces blood flows in the cortex and sub-cortex, hastening cerebral atrophy. Likewise, excessive drinking affects Substantia Alba and frontal lobe, which are in charge of thinking, memory management, problem-solving, and creative thinking, on sending nervous signals from neurons [25]. Furthermore, Nanthakhwang & Wongma [22] found that smoking older people were more likely to have dementia than ex-smoking older people. Physical exercise is also related to dementia. Xu et al. [26] reported that physical exercise could prevent the degeneration of neurons, increase the efficiency of the heart system and neurons, and improve blood flow in the brain, making the brain function better, which could reduce the risk factors of dementia. Participation in social activities and current occupations are also related to dementia.

Lertkrathok et al. [24] revealed that participating in social activities of older people enabled them to move their bodies and get involved in activities and activate their brains to secrete neutrophils to improve the functions of afferent nerve fibers that connect neurons as well as reducing the risks of dementia. Duangchang, Yodthong & Detduang [18] added that involvement in occupations comprises activities that require body movements and the use of muscular strength and energy, bringing about the development of intellectual skills that could reduce the risk of dementia. However, the findings in this investigation revealed that there was no relationship between taking food supplements and dementia, which was not in line with Muangphaisan [22], revealing that food supplements, e.g., vitamins C, E, B, and fish oil could reduce the risk of dementia. In this investigation, it was found that 50.47% of older people took medicinal herbs, 26.66% took minerals, 16.51% took vitamins, and 6.37% took the essence of chicken. These food supplements do not reduce the risk of dementia and no relationship has been found between taking food supplements and dementia.

7. Limitations, Recommendations and Implications

The research faced limitations due to the COVID-19 pandemic, which impeded data collection through questionnaires on general older people information via interviews and diagnosis using the Mini-Mental State Examination-Thai 2002 (MMSE-Thai 2002). Older people expressed concerns about potential infection, necessitating stringent adherence to social distancing and infection control measures to ensure their safety during these procedures. In the visuoconstruction section of the MMSE-Thai 2002, which assesses dementia in older people, participants are required to draw a series of figures to evaluate eye-hand coordination. However, some individuals may be hesitant to draw with a pen or pencil due to underlying medical conditions, such as Parkinson's disease, which can impair fine motor skills. The technological gadgets designed to facilitate the drawing process should be implemented. Furthermore, due to a limited number of the sample group, it is recommended that a larger number of the sample group be included in future studies and more areas and districts in the province be covered in order to obtain clearer statistical data on dementia. However, the research's findings have significant implications for healthcare practice. Healthcare professionals in Tambon health-promoting hospitals should integrate these findings into their planning for older people healthcare services within their communities. Early detection and accurate diagnosis of dementia are paramount for improving the quality of life for affected individuals. By implementing the research's recommendations, healthcare providers can contribute to the well-being of the older people population.

8. References

[1] K. Nanthachaim, The Efficacy of Memory Training Using Montessori Philosophy - Based Activities Mild Dementia Elderly, Bangkok: Chulalongkorn University, 2008.

[2] S. F. U. Akter, et al., Dementia: Prevalence and risk factors. International Review of Social Sciences and Humanities, 2(2) (2012) 176-184.

[3] S. Khomnate, C. Shittipun, S. Poonsuk, The development of a care system for the elderly with dementia in Sisaket Province. Journal of Public Health Nursing, 34(1) (2020) 97-111.

[4] W. Suwanrada, et al., The preliminary report of long term care service for the elderly, Bangkok: Saksopa Publishing Co.,Ltd, 2010.

[5] S. Airada, Prevalence and Factors Associated with Dementia and Mild Cognitive Impairment among Elderly in Na-Mafang Subdistrict, Amphur Muang, Nongbua Lamphu Province, Udonthani Hospital Medical Journal, 30(3) (2022) 376-386.

[6] P. Doungkaew, S. Taneepanichskul, Prevalence of Dementia among Elderly in Taiban Sub-District of Samutprakarn Province, Thailand, Journal of Health Research 28(3) (2014) 151-157.

[7] L. Panakorn, et al., Factors Influencing Dementia in Elderly Women in Lamphun Province, Journal of Public Health, 45(1) (2015) 197-209.

[8] A. Suwan, S. Trakrusitichok, Prevalence and Factors Associated with Dementia among Elderly in Lukhok Subdistrict, Muang District, Pathumtani Province, Journal of Association of Private Higher Education Institutions of Thailand, Bangkok 5(2) (2016) 21-32.

[9] C. Thongwachira, S. Thophon, R. Kwanyuen, S. Niputhuttapong, Research to prevalence associated factors of dementia among the elderly and develop handbook of health education: A case study in Bang Phlat District, Bangkok: Suan Dusit University, 2016.

[10] P. Pibarnwong, et al., A study of dementia and factors associated with dementia among elderly in North East, JOBCNSUR, 8(2) (2018) 46-57.

[11] P. Sukchan, K. Niyomdecha, D. Srichaisuwan, Factors Related to Dementia among Elderly Persons in Thailand: A Systematic Review, Princess of Naradhiwas University Journal, 14(1) (2022) 276-292.

[12] M. Baumgart, et al., Summary of the evidence on modifiable risk factors for cognitive decline and dementia: A population-based perspective, Alzheimers Dement, 11(6) (2015) 718-726.

[13] National Statistical Office of Thailand, The number of population categorized by age, sex, and region, Available from http://statbbi.nso.go.th/staticreport/page/sector/th/01.aspx (assessed 30 Jan 2023).

[14] K. Kwanruen, Prevalence and associated factors with dementia in elderly: lampang province, Bangkok: Mahidol University, 2014.

[15] R. Namchantra, Rehabilitation of Elders with Dementia, HCU. Journal, 14(27) (2010) 137-150.

[16] The Institute of Geriatric Medicine, Medical technology assessment: The comparison of Thai Mental State Examination and Mini Mental Status Examination in Thai version 2002 for screening the elderly with dementia, Bangkok: The Institute of Geriatric Medicine, 2008.

[17] S. Trakulsithichoke, A. Suwan, Effects of a cognitive stimulation program on the cognitive abilities and ability to perform the activities of daily living in elders who are at risk of or have dementia,Thai Red Cross Nursing Journal, 9(2) (2016) 145-158.

[18] C. Duangchan, D. Yodthong, P. Dechduang, The Prevalence and Predicting Factors of Dementia among Older People Living in Community, Phetchaburi Province, Journal of Prachomklao College of Nursing, Phetchaburi Province, 3(2), (2020) 133-148.

[19] R. N. Kalaria, Vascular basis for brain degeneration: faltering controls and risk factors for dementia, Nutr Rev, 68(2) (2010) 74-87.

[20] D. K. Jeppesen, et al., DNA repair deficiency in neurodegeneration, Prog Neurobiol, 94(2) (2011) 166-200.

[21] C. Imarb, Quality of Life among the Elderly in Watphleng District, Ratchaburi Province, Medical Journal, 39(1) 2020 65-77.

[22] V. Muangphaisan, Dementia: Prevention, assessment and care, Bangkok: Phappim, 2013.

[23] N. Nanthakwang, J. Wongma, Prevalence of Dementia in the elderly with Hypertension in rural Chiang Mai, Thailand, Journal of Health Sciences Scholarship, 4(1) (2017) 5-12.

[24] S. Lertkrathok, Prevalence and Factors Associated with Dementia among Elderly People in Oraphim Subdistrict, Khonburi District, Nakhonratchasima Province, Journal of Public Health, 43(1) (2013) 42-54.

[25] E. P. Handing, et al., Midlife Alcohol Consumption and Risk of Dementia Over 43 Years of Follow-up: A population-based study from the Swedish twin Registry, J Gerontol A Biol Sci Med Sci, 70(10) (2015) 1248-1254.

[26] W. Xu, et al., Meta-analysis of modifiable risk factors for Alzheimer's disease, J Neurol Neurosurg Psychiatry, 86(12) (2015) 1299-1306.

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Development of physical activity model of the elderly

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Abstract

The purpose of this research was to develop a physical activity model. The research instruments included a questionnaire and a focus group. Content analysis was conducted to analyze a physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province. Analytical statistics used was Pearson's product-moment correlation coefficient at a significant level of .05 and descriptive statistics used included frequency, percentage, mean, and standard deviation of factors relating to physical activities of the elderly. The socio-demographic data factors were analyzed for correlation with physical activities and sedentary behavior of the elderly. The findings revealed that:

1. Sex and age were negatively correlated with sedentary behavior, while income was positively correlated with sedentary behavior.
2. Status and health condition were positively correlated with recreational activities, while health condition was positively correlated with highly intense work activities.
3. Enabling factors (free time, equipment, and facilities) were negatively correlated with recreational activities and had a negative correlation with highly intense work activities.

The results that were divided into two aspects: 1) propriety standard with community characteristics, and 2) feasibility standard for implementation. It was found that the model is most suitable with the average of 88.80 and standard deviation of 0.95. It indicates that the physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, using a participatory process, is appropriate and can be practically applied to the elderly.

Keywords: model development, physical activity, elderly, sedentary behavior

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1. Introduction

The world's elderly population is currently increasing, as announced by a United Nations report [1] which predicts that the world's population will increase to 9.7 billion by 2050, or within the next 30 years, and may increase by nearly 11 billion by the year 2100. The world's population is on its way to becoming an elderly society as a result of a longer life span, medical technology advancements, and lower birth rates in many countries. According to the data, the birth rate has decreased from 3.2 births per woman in 1990 to 2.5 births per woman today and could reach as low as 2.2 births per woman by 2050. Accordingly, it demonstrates that many countries are entering a completely elderly society.

According to the census data of the National Statistical Office and the population estimates of the Office of the National Economics and

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Social Development Council from 1960-2030, Thailand has been transitioning into an elderly society since 2005 because of the population over 60 years old, which accounts for 10.4 percent of the total population. Furthermore, Thailand is expected to enter the "Aged Society" between 2024 and 2025, increasing the proportion of the elderly population while the proportion of those of working age tends to decrease. Research by the [2] showed that an aging society may affect economic growth either through a decrease in the quality and quantity of labor, a slowdown in household consumption in the future, or the deterioration of the financial stability of Thai households.

The changes when entering the elderly are numerous which could be the functioning of the cardiovascular system, nervous system, musculoskeletal system, or joints. These changes are all caused by the deterioration of various systems resulting in the occurrence of chronic diseases that necessitate ongoing care for the elderly as well as having an impact on the elderly's quality of life. As a result, it is important to address the issue of the elderly. One way to solve the problem with minimal budget and maximum benefit is to improve one's health through regular physical activities.

Physical Activity (PA) is one of those activities that is critical to the health and well-being of the elderly. By doing this, the muscles move back and forth causing the use of more energy while resting. When performed daily, various movements help reduce the risk of disease and promote better health. It is significant for the prevention of serious chronic diseases that affect the elderly, such as coronary artery disease and ischemic stroke [3]. Physical activities that move the body on a regular and continuous basis, at a moderate level, have the potential to slow the progression of chronic diseases and reduce the incidence of heart disease by 20-25% [4]. According to the 2015 population physical activity survey, Thailand had a total of 10,330,314 elderly people and 10,281,014 with insufficient physical activities or sedentary behavior, representing 99.52 % of the population and tending to have increased sedentary behavior. Insufficient physical activities not only affect one's health but also affect the economy, society, and quality of life.

There are six communities in Lat Ya Subdistrict Municipality, Kanchanaburi Province, and Wat Thung Lat Ya Elderly School was established in 2018. According to the report dated September 23, 2019, there are 1,112 male and female senior citizens between the ages of 59 and 120 in the school.

Lat Ya Municipality is located in Mueang Kanchanaburi District. It is also a tourist route that leads to various tourist attractions. Therefore, it is a diverse community. There are villagers, government officials, and a large number of tourists in the area. There is growth in various areas of the community and a greater need for various factors among the people. However, the study discovered that there was no data used to promote health through physical activities among the elderly in that area.

Consequently, the research team is interested in developing a physical activity model among the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province. Green and Kreuter's PRECEDE model [5] was used as a conceptual framework for the study aiming to improve the well-being of the elderly leading to a good quality of life and a good role model for other communities.

2. Literature Review

Thailand has been an aging society since 2005 and it is predicted that in the next 20 years, Thai society will become a completely aging society. By definition, the elderly means people aged 60 years and over [6]. It is the age that people are retired from work. The physical condition has changed to deterioration physically, mentally and socially, and there are reduced social roles and occupational activities [7].

The World Health Organization [8] defines physical activity as physical activity caused by the work of muscles requiring the use and metabolism of energy. The Department of Health, Ministry of Public Health, stated that physical activity can be divided into four categories: occupation, housework, travel, and leisure activities that occur in daily life. The level of physical activity can be divided into four levels [9] as follows. Sedentary behavior is an activity that does not physically move. This includes sitting and lying down (sleeping is not counted). Low physical activity is the movement that is less exerting focusing on activities that leave one feeling less tired, and it is a movement that occurs in everyday life. Moderate intensity is an activity that causes moderate fatigue while doing activities. One

can still speak in sentences, sweat, or if the heart rate is measured, there will be a pulse level between 120-150 beats per minute. Vigorous Intensity makes one feel very tired when moving the body. It continuously repeats the activity with the use of the major muscles, and while doing activities, one cannot speak in sentences and feels short of breath. If the heart rate is measured, there will be a pulse level of 150 beats per minute or more. Good health-promoting behaviors must be practiced continuously. The factors related to the behavior are divided into three groups: predisposing factor which is the basis causing motivation, enabling factor, which is a system or favorable resource, and reinforcing factor which is the stimulus contributor [10].

Making the community see the importance of personal development from the process of participation of ideas will drive various actions. It is necessary to have a conclusion of the ideas from [11,12,13,14,15]. It was synthesized into five steps: participation in conceptual adjustment, participation in surveys, participation in physical activity promotion planning, participation in action, and participation in monitoring and evaluation.

3. Objectives

Main objective

To develop a physical activity model for the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province.

Sub-objective

To study factors relating to elderly physical activities in Lat Ya Subdistrict Municipality, Kanchanaburi Province.

4. Conceptual Framework

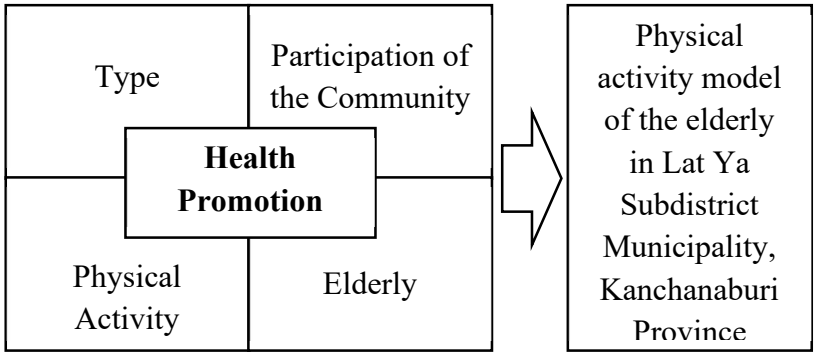

Figure 1 Conceptual framework development of physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province.

5. Research Instruments

1. The World Health Organization's Global Physical Activity Questionnaire (GPAQ) [16].

2. A questionnaire on factors relating to physical activities of the elderly in Lat Ya subdistrict municipality, Kanchanaburi province with the alpha coefficient of the entire questionnaire at 0.71.

3. Focus group with the Item-Objective Congruence (IOC) of 0.93

6.Methods

This research is a study of "The Development of Physical Activity Model of the Elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province." It is a quantitative and qualitative research model or a mixed method aiming to examine factors relating to physical activities and develop a physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province with a participatory process. In this study, the research team presented the findings in three phases as follows:

Phase 1: Preparing work before researching physical activities and factors relating to physical activities of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province.

For data collection, the team coordinated with related people the area, scheduled a meeting to clarify details, objectives, sequences, and methods of conducting

research, including agreements during the research, interviewed research participants, and evaluated health condition.

Phase 2: Developing the draft of physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, with a participatory process. For data collection, the team coordinated with related people in the area, scheduled a meeting to clarify details, objectives, sequences, and methods of conducting research, including agreements during the research. The focus group included 5 academic experts, 1 director of the social welfare division, 1 school principal, 3 leaders of the elderly club, and 3 elderly people. The draft of physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province was developed.

Phase 3: Examining the physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province.

For data collection, the team consulted with experts, clarified research objectives and procedures, and answered any additional questions. In addition, we explained the evaluation criteria to experts, and after receiving assistance, an appreciation letter was sent.

7. Data Analysis

Complete, accurate, and accomplished questionnaire data were processed by using package software and analyzed by using the following methods.

1. Analysis of the correlation between socio-demographic data, i.e., sex, age, education level, status, income, health condition, and the elderly's physical activities by using analytical statistics and Pearson's product-moment correlation coefficient at a significant level of .05.

2. Analysis of the correlation between predisposing factors, enabling factors, reinforcing factors, and the elderly's physical activities by using analytical statistics and Pearson's product-moment correlation coefficient at a significant level of .05.

8. Research Instruments

1. Global Physical Activity Questionnaire: GPAQ [17].

2. A questionnaire on factors relating physical activities of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, with the alpha coefficient of the entire questionnaire at 0.71.

3. Focus group with the Item-Objective Congruence (IOC) of 0.93

This research has been approved by Kanchanaburi Rajabhat University Research Ethics Committee, Institute of Research and Development COA No.018/2564.

9. Results

Phase 1

Complete, accurate, and accomplished questionnaire data were processed by using package software and analyzed by using the following methods.

1. Analysis of the correlation between socio-demographic data, i.e., sex, age, education level, status, income, health condition, and the elderly's physical activities by using analytical statistics and Pearson's product-moment correlation coefficient at a significant level of .05.

2. Analysis of the correlation between predisposing factors, enabling factors, reinforcing factors, and the elderly's physical activities by using analytical statistics and Pearson's product-moment correlation coefficient at a significant level of .05.

Table 1 Correlation coefficient between socio-demographic data, i.e., sex, age, education level, status, income, health condition, and the elderly's physical activities and sedentary behavior.

Factor	Physical Activity				Sedentary behavior
	Work activity		Round trip	Recreational activity	
	Highly intense	Moderately intense			
Sex	r = 0.02	r = 0.03	r = -0.06	r = 0.09	r = 0.50**
	Sig. = 0.94	Sig. = 0.85	Sig. = 0.76	Sig. = 0.62	Sig. = .004
Age	r = 0.16	r = 0.14	r = 0.21	r = -0.00	r = -0.39*
	Sig. = 0.40	Sig. = 0.45	Sig. = 0.25	Sig. = 0.99	Sig. = 0.032
Education	r = -0.19	r = -0.22	r = -0.04	r = -0.14	r = 0.17
	Sig. = 0.30	Sig. = 0.23	Sig. = 0.81	Sig. = 0.47	Sig. = 0.35
Status	r = -0.24	r = 0.09	r = -0.27	r = .63**	r = -0.32
	Sig. = 0.20	Sig. = 0.61	Sig. = 0.15	Sig. = 0.000	Sig. = 0.87
Income	r = -0.01	r = -0.03	r = 0.096	r = -0.127	r = 0.48**
	Sig. = 0.95	Sig. = 0.89	Sig. = 0.606	Sig. = 0.50	Sig. = 0.006
Health condition	r = 0.45*	r = 0.15	r = -0.107	r = 0.596**	r = -0.05
	Sig. = 0.010	Sig. = 0.43	Sig. = 0.568	Sig. = 0.000	Sig. = 0.775

** $p < .01$. * $p < .05$

From Table 1, the analytical results of the correlation coefficient between socio-demographic data, i.e., sex, age, education level, status, income, health condition, and the elderly's physical activities and sedentary behavior showed that:

Sex was negatively correlated with sedentary behavior at a significant level of .01 (r = 0.004). Age was negatively correlated with sedentary behavior at a significant level of .05 (r = 0.032). Income was positively correlated with sedentary behavior at a significant level of .01 (r = 0.006).

Status was positively correlated with recreational activities at a significant level of 0.1 (r = 0.000). Health status was highly and positively correlated with physical activities at a significant level of 0.5 (r = 0.010), and positively correlated with recreational activities at a significant level of 0.1 (r = 0.000).

From Table 2, the analytical results of Pearson's product-moment correlation coefficient between factors affecting physical activities revealed that:

Attitude enabling factor was negatively correlated with highly intense work activity at a significant level of .01 (r = -0.53) and it was negatively correlated with recreational activities at a significant level of .05 (r = -0.43).

Table 2 Correlation coefficient between predisposing factors, enabling factors, and reinforcing factors with the elderly's physical activities and sedentary behavior.

Factor	Physical Activity				Sedentary behavior
	Work activity		Round trip	Recreational activity	
	Highly intense	Moderately intense			
Knowledge predisposing factor	r = -0.03 Sig. = 0.88	r = -0.14 Sig. = 0.45	r = 0.06 Sig. = 0.76	r = 0.15 Sig. = 0.41	r = 0.00 Sig. = 1.00
Attitude enabling factor	r = -0.53** Sig. = 0.002	r = -0.17 Sig. = 0.38	r = 0.05 Sig. = 0.81	r = -0.43* Sig. = 0.02	r = -0.16 Sig. = 0.94
Information reception reinforcing factor	r = -0.23 Sig. = 0.21	r = -0.19 Sig. = 0.30	r = -0.04 Sig. = 0.84	r = -0.14 Sig. = 0.44	r = -0.22 Sig. = 0.24

** $p < .01$. * $p < .05$

Phase 2

The draft of physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, was developed using a participatory process from the literature review and focus group.

1. Literature review

The analytical results from the concept of [18,19,20,21,22] were synthesized into five steps as follows:

1. Conceptualization participation is good publicity for the community to see the importance of personnel development and to have the concept and vision in the same direction.

2. Survey participation is a study of community contexts, lifestyles, environmental resources, local wisdom, and learning resources in the community.

3. Promoting physical activity participation is to invite people in communities, local administrative organizations, community leaders, and related agencies or networks to attend meetings to plan physical activity promotion.

4. Action participation is to implement the work plan by using the local wisdom to create the curriculum, and inviting people in the community as lecturers to educate the elderly.

5. Participation in evaluation and benefit is the establishment of a monitoring committee comprised of many parties, i.e., individual, family, and community, or surveying feedback from the public. This evaluation is important because it will have an impact on benefit allocation decisions, termination, or retention, including policy or project improvements.

2. Focus group

The analytical results from the focus group indicated that the physical activity model is as follows:

Step 1: Conceptualization participation

The community recognizes the importance of personnel development to have the same concept and vision by organizing meetings to clarify objectives and inviting a lecturer to educate along with organizing practical activities.

Step 2: Survey participation

Community contexts, lifestyles, resources, environment, local wisdom, and learning resources are explored in the community.

Step 3: Physical activity promotion participation is to invite people in communities, local administrative organizations, community leaders, and related agencies or networks to attend meetings to plan physical activity promotion.

Step 4: Action participation is to implement the work plan by using local wisdom to create the curriculum and inviting people in the community as lecturers to educate the elderly.

Step 5: Participation in evaluation is the establishment of a monitoring committee comprised of many parties, i.e., individual, family, and community, or surveying for feedback from the public. This evaluation is

important because it will have an impact on benefit allocation decisions, termination, or retention, including policy or project improvement.

Factors affecting participation and success are as follows:

1. The leaders' enthusiastic and strong community commitment

2. Having kinship which is long-lasting social capital

3. The community environment, which is conducive to living together in the community

4. Shared local wisdom within the community

5. The community has a mechanism that facilitates activities or learning together

6. Having a shared belief in the community that health is everyone's responsibility to help one another

7. Government and private sector promotion and support

8. Having appropriate health promotion innovation for the elderly in the community

9. Having stable status and good health condition affecting physical activities

Obstacle factors are as follows:

1. Sex, age, status, income, and health condition affect the intense level of physical and recreational activities, as well as sedentary behavior.

2. Attitude enabling factors affect the intense level of physical and recreational activities.

3. Event participation time due to the pandemic situation and the economic downturn of households, especially during the year 2021, reduces travel and refrains people from social activities, affecting sedentary behavior.

4. Mental states, such as feeling tired, wanting to rest, and boredom, affect physical activities and sedentary behavior.

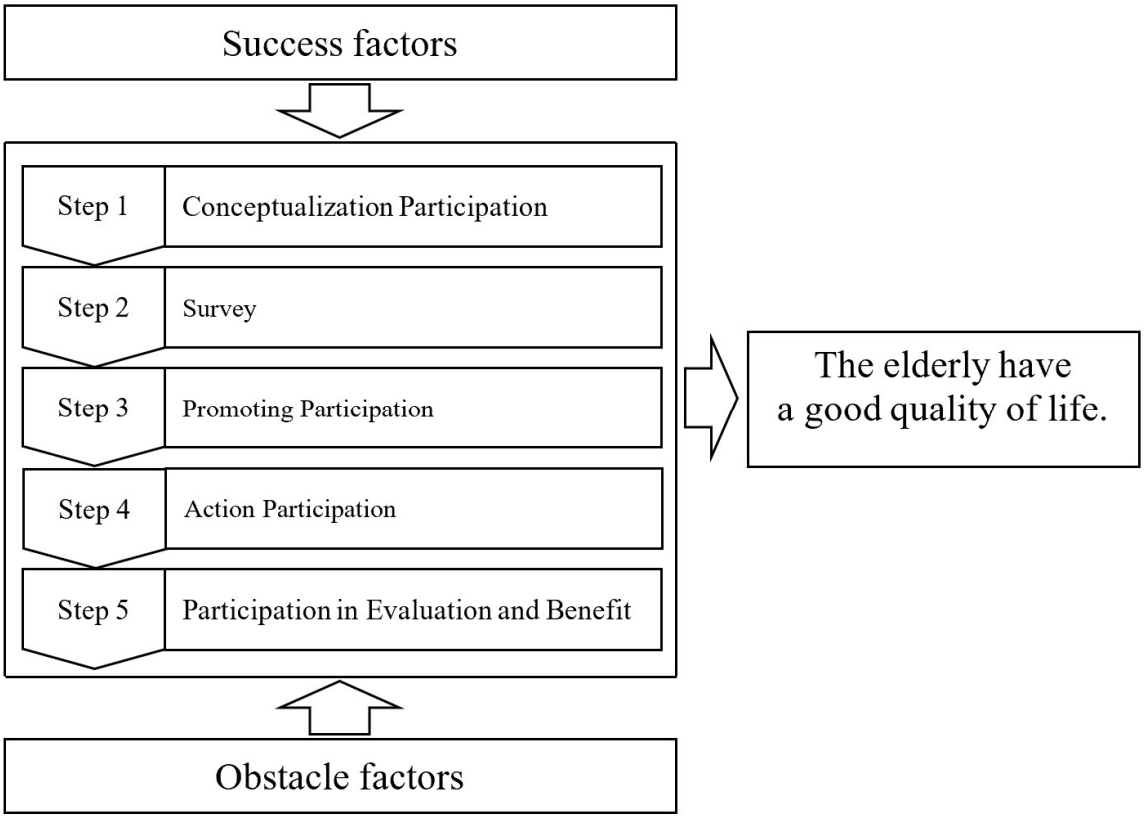

Figure 2 The draft of physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, using a participatory process

Research results in phase 3 examined a draft of physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, using a participatory process.

The researcher evaluated the model by using data from a qualitative assessment of a physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, with a participatory process. The study was divided into two aspects: 1) propriety standard corresponding to the nature of the community, and 2) practical feasibility. It was found that the quality of participation model in physical activities of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, was at the highest level. The mean was 88.80, and the standard deviation was 0.95. This showed that the model of participation in physical activities of the elderly was appropriate and could be applied to the elderly. The details are as follows:

In terms of the propriety corresponding to the community, experts agree that the physical activity model of the elderly is appropriate to meet the needs of people in the community. It provides opportunities for people in the community to participate in activities, create a sense of responsibility, and build unity in the community. In addition, selected physical activities also help to promote the preservation of Thai arts and culture in the community.

In terms of practical implementation, experts agree that the physical activity model of the elderly is a model that is easy and convenient to use. Physical activities can be used for exercise to promote one's health. People can have time to exercise, and the equipment used is appropriate and easy to find. Most importantly, there is a clear user manual that can be used in practice.

10. Discussion

Point 1: Factors relating to physical activities of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, showed that:

Most of the samples were female, elderly, married, having an elementary education, and engaged in physical activities at a low level (high level of sedentary behavior). This was because most of them were at home and had a moderate level of daily activities and low level of other activities. This probably resulted from the natural decline in performance, which was an obstacle to physical activities causing most of the elderly to sit around and watch TV. The findings are consistent with the study of [23], showing that fewer physical activities were mostly found in females, the elderly, those who did not study or attend primary school, and those who did not work. It could be explained based on the conceptual framework of the transition theory [24], stating that sex and age were factors of personal conditions and a predictor of the transition or whether it is going to pass easily or not. Physical activity is an important factor in slowing the deterioration of organs. Therefore, physical activities for the elderly must be promoted.

Income positively correlated with sedentary behavior can explain why elderly people with good incomes will have more knowledge and understanding of healthcare and better practices to reduce sedentary behavior. This is consistent with the study of [25], which found that those with different incomes had different healthcare behaviors. High-income groups tend to have better healthcare behaviors than low-income groups.

Status was positively correlated with sedentary behavior and recreational activities. It can be explained that the elderly who live with their spouses have consultations to promote healthcare and encourage each other to do recreational activities regularly. This is consistent with the study of [26], showing that the elderly with different marital statuses had different health behaviors.

Health condition was positively correlated with recreational activities and highly intense work activities. This may be because most of the samples' body mass index was not highly excessive, and they had normal pulse rate, normal blood pressure, an annual health check-up, no illness requiring hospitalization in the past year, and a good level of information reception. This indicated that the samples had a good health condition. This may be because the elderly stay with their children. When they are ill, they are cared for with love and concern. Their children also encourage them to seek knowledge about health and do recreational activities. This is consistent with a study by [27], which found that most caregiver relatives had a positive quality of relationship between caregivers and care receivers, including a feeling of intimacy and satisfaction among each

other in situations where both parties interact under supervision.

Enabling factors were negatively correlated to recreational activities and highly intense work activities. This is consistent with the study of the elderly by [28], which found that resources that support exercise for health (location, equipment, and time) of the elderly in Ban Suan Municipality, Chonburi Province, were not correlated to exercise behavior. This may be caused by the fact that the elderly had insufficient knowledge about physical activities or did not understand how to use those materials. The equipment may be inadequate, not convenient, or require a lot of force which is not suitable for the elderly. The organization of environment that is conducive to physical activities would help the elderly to have more physical activities [29].

Point 2 : The development of physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, using a participatory process found that:

Physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province with a participatory process included five key processes and two factors affecting participation. Every step and factor is important and is a continuous process. It makes the community truly and sustainably participate. This is in accordance with the concept of [30], stating that the heart of sustainable development lies in the members of the community gathering as a community of learning, having knowledge, and making it beneficial. This knowledge is in line with a study by [31] and [32] that applied a participatory process to acquire a model and guideline from the actual needs of the elderly.

Point 3: Examining the draft model of physical activity of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, using a participatory process found that:

In terms of propriety corresponding to the community, experts agree that the physical activities of elderly people in Lat Ya Subdistrict Municipality, Kanchanaburi Province, with a participatory process, are appropriate and meet the needs of people in the community and allow them to participate in activities. This creates a sense of responsibility and unity in the community. In addition, selected physical activities also help to promote the preservation of Thai arts and culture in the community. This is consistent with [33], who studied community participation in health promotion for the elderly. It was found that community participation will make the elderly very cooperative and enthusiastic, create a fun group atmosphere, and achieve objectives. Participation in decision-making, planning, and joint health promotion increases self-esteem in the community, and follow-up is conducted within the community so that the activities can become sustainable.

In terms of the feasibility of implementation, experts agree that a physical activity model of the elderly in Lat Ya Subdistrict Municipality, Kanchanaburi Province, makes participation processes simple and easy to implement. Physical activities can be used to promote one's health, while exercise time and equipment used are appropriate and easy to find. Most importantly, there is a clear and practical manual. This is consistent with the ACSM [34] that physical activities for the elderly should be in line with daily activities or lifestyles. It should also be easy to do by oneself, challenge, promote agility, prevent falls, and be suitable for the physical condition of the elderly.

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References

[1,6] United Nations, World Population Prospects, The 2019 Revision Volume II: Comprehensive Tables. New York: United Nations, 2019.

[2] Bank of Thailand, Elderly Society and Challenges of the Thai Labor Market. A project to study the structure of Thai economy that has Implications for Policy Implementation Monetary Policy Group, 2018.

[3] L. DiPietro, Physical activity in aging: changes in patterns and their relationship to health and function, J. Gerontol A Biol Sci Med Sci. 56 (2001)

13-22. https://doi.org/10.1093/gerona/56.2.13.

[4] C.N. Merz, J.S. Forrester, The secondary prevention of coronary heart disease, J. Med. 102 (1997) 572-581. https://doi.org/10.1016/S0025-6196(11)63642-4.

[5,10] Green, L. W., & Kreuter, M. W. *Health promotion planing third edition an educational and ecological approach (3rd ed.).* California: Mayfield publishing company, 1999.

[7] Orachon Vothawee. *Factors Affecting Health Behaviors of the Elderly in Bang Phae District Ratchaburi Province.* Master of Arts Thesis, Community Psychology Program, Graduate School, Silpakorn University, 2005.

[8] World Health Organization. *Global recommendations on physical activity for health.* Geneva: World Health Organization, 2010.

[9] Physical Activity and Health Division, Department of Health. *Recommendations for promoting physical activity reduction in sedentary behavior and sleep for the elderly (from 60 years old).* Bangkok: NC Concept Company Limited, 2017.

[11,18] Cohen, J.M., & Uphoff, N.T. *Participations place in rural development: Seeking clarity through specificity.* New York: World Developments, 1980.

[12] World Health Organization and United Nations Children's Fund. *Report of the International Conference on Primary Health Care.* New York, 1978.

[13,20] Sunee Mallikamal, et al. *Effective Community Waste Management: Social, Economic, Management and Legal Models and Measures to Solve Community Waste Problems.* Bangkok: National Research Council of Thailand, 2002.

[14,21] Thawilvadee Burikul et al. *Dynamics of public participation: from the past to the Constitution of the Kingdom of Thailand B.E. 2550.* Bangkok: A. P. Graphic Design and Printing, 2009.

[15,22] Jutharat Chompan, Principal analysis "public participation" in the context of Thailand, J Environ. Manag. 8 (2012) 132-134. https://so02.tci-thaijo.org/index.php/JEM/article/view/28091

[16,17] Atchara Purakhom et al. *Handbook of Physical Activity Management for the Thai Elderly.* Nakhon Pathom: Faculty of Education and Development Sciences, Kasetsart University, Kamphaeng Saen Campus, Office of the Health Promotion Foundation, 2013.

[19] WHO/UNICEF. Report of the International Conference on Primary Health Care. New York, 1978.

[23] N. Liangruenrom, et al., Do Thai people have sufficient physical activity according to criteria: Data from the Health and Welfare Survey 2015, J. Public Health Syst. 11 (2017) 205-220. https://www.researchgate.net/publication/317416626_Do_Thai_People_Meet_Recommended_Physical_Activity_Level_The_2015_National_Health_and_Welfare_Survey/link/593a05974585153206379a94/download?tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19.

[24] A.I. Meleis, et al., Experiencing transitions: an emerging middle-range theory, Adv. Nurs. Sci. 23 (2000) 12-28. https://pubmed.ncbi.nlm.nih.gov/10970036/.

[25] U. Punyasophan, et al., Diseases and Prevention Behaviors of Hypertension among Postmenopausal Women in Tha Chang Sub-district, Tha Chang district, Surat Thani Province, J. Narathiwat Rajanagarindra Univ. 3 (2011) 47-60.https://li01.tci-thaijo.org/index.php/pnujr/article/view/53691

[26] K. Klumrat, et al., Causal Factors of Health Behaviors of the Elderly in the Western Region of Thailand, J. Humanities Soc. Sci. Sarakham Rajabhat Univ. 7 (2013) 93-104. https://so05.tci-thaijo.org/index.php/rmuj/article/view/19375

[27] E.O. Park, K.L. Schumacher, The state of the science of family caregiver-care receiver mutuality: a systematic

review, Nurs. Inq. (2013) 1-13. https://doi.org/10.1111/nin.12032.

[28] T. Sukanan, et al., Factors Affecting Exercise Behavior of the Elderly in Ban Suan Municipality, Chonburi province, Public Health J. Burapha Univ. 9 (2014) 66-75. https://www.researchgate.net/publication/312318746_Factors_Affecting_Exercise_BeBehavio_of_the_Elderly_People_in_Bansuan_Municipality_ChonBuri.

[29] M. Sararak, Promotion of Physical Activity in the Elderly, J. Sci. Technol. Ubon Ratchathani Univ. 17 (2015) 24-35.

[30] P. Wasi, On a New Path of Health Promotion Life Revolution and Society, Mo Chaoban, Bangkok, 1998.

[31] S. Nathan, L. Johnston, J. Braithwaite, The role of community representatives on health service committees: staff expectations vs. reality, Health Expect. 14 (2010) 272-284. https://doi.org/10.1111/j.1369-7625.2010.00628.x.

[32] F.L. Kessy, Improving health services through community participation in health governance structures in Tanzania, J. Rural Community Dev. 9 (2014) 14-31. https://journals.brandonu.ca/jrcd/article/view/826.

[33] N. Muensaen, S. Kraipiboon, Community Participation in Health Promotion of the Elderly, Ban Thung Luk, Chiang Dao District, Chiang Mai Province, Nurs. J. 41 (2014) 1-12. https://he02.tci-thaijo.org/index.php/cmunursing/article/view/33193

[34] American College of Sports Medicine, ACSM's Guidelines for Exercise Testing and Prescription, Lippincott Williams & Wilkins, Philadelphia, 2006.