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Contents

Analgesic-Anesthetic Effects of *Acmella oleracea* and *Zingiber montanum* Rhizome Extracts

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Abstract

Living with pain is very suffer. *Acmella oleracea* and *Zingiber montanum* Rhizome are often used for natural pain relief for years. However, scientific confirmation on the effectiveness of them is limited. The objectives consisted of 1) extract anesthetic pain relief substance from both herbs, 2) evaluate the effectiveness and 3) assess the user satisfaction. The methodology consisting of 1) *Acmella oleracea* and *Zingiber montanum* rhizome were infused marinade with ethanol before extracting the Spilanthol, Phenylbutanoid and Curcuminoid for pain relief to develop formula. Spilanthol acts as anesthesia while Phenylbutanoid and Curcuminoid act as pain reliever. 2) the formula was applied with sample who encountered with medium pain (score 4-6) determining by Visual Analog Scale of 0-10 point. The 30 voluntary samples did not get analgesic drug. Pain evaluation was done in 0^{th}, 30^{th}, 60^{th} and 90^{th} minute after applying the formula. Then, product satisfaction was examined by using 5 point Likert scale satisfaction questionnaire. Percentage, mean and standards deviation were used for data analysis.

The result showed that before applying the formula, 66.3% of sample encountered the high pain level. After applying the formula at 30^{th} and 60^{th} minute, 80% of sample reported a medium pain level. At 90^{th} minute, 70% of sample encountered with medium pain level with no high pain level. The user satisfaction for the total score was at 4.07. The highest satisfaction was the ointment adhesion to skin (4.27) and the lowest was formula odor (3.97).

Keywords: Pain relief, Analgesic-anesthetic, *Acmella oleracea, Zingiber montanum* rhizome

1. Introduction

Muscle pain and injury are debilitating conditions that significantly impair the state of health, and influence on quality of life, especially in elderly and working-age population (Duffield, 2020). Previous studies revealed that muscle aches and pain have a large impact on the health and well-being of older people such as low physical activity level, poor mobility, depression, and poor sleep quality (Blyth & Noguchi, 2017). Also, muscle injury due to awkward work posture as well as intrinsic sporting exercise are one of the most common reasons for seeking primary care in working-age (Alnaami et al., 2019). Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used for the treatment of muscle pain and injury. The ability of NSAIDs to reduce pain and inflammation is well-established (Su& O'Connor, 2013). They, however, have more side effects including gastrointestinal and renal side effects, hypertension, and other. Prolonged use of NSAIDs (over 7 days) is not recommended as it would delay muscle regeneration (Baoge et al., 2012). Alternatively, topical cream or ointment, such as methyl salicylate, are approved for temporary relief of minor to moderate aches and pains of muscle and joints (Higashi, Kiuchi, Furuta, 2010). Topical cream or ointment as methyl salicylate, nevertheless, may contribute to effects on blood flow. For example, it has been reported that an analgesic balm containing methyl salicylate and capsaicin applied to the forearm skin attenuated muscle-contraction–induced increases in blood pressure (Petrofsky et al., 2016).

According to the review, *Acmella oleracea*, a species of flowering herb (figure 1), contains spilanthol (primarily anesthetic). Previous studies found that *Acmella oleracea* represents a promise for pain management, particularly in chronic degenerative diseases, where pain is a significant critical issue (Rondanelli et al.,2020). While *Zingiber montanum* rhizome is (figure 2), composed of several compounds demonstrating anti-inflammatory activity. These bio-active compounds include curcuminoids, terpenoids and phenylbutaniods that have been used as a remedy for release pain and inflammation of musculoskeletal problems (Manimmanakorn et al., 2017; Wisuitiprot et al., 2019). These chemical compounds in both herbs are beneficial in the treatment of muscle pain or injury.

According to the topical cream and ointment formulation, herbal ointment and cream from extracts of *Zingiber montanum* rhizome have been traditionally used for the treatment of muscle soreness (Devkota et al., 2021). Whereas *Acmella oleracea* ointment have been used as topical anesthetic to relief muscular pain in traditional medicine (Lira Batista et al., 2021). An ointment or cream containing extracts of both *Acmella oleracea* and *Zingiber montanum* rhizome, however, has been limited due to the scarcity of the literature. In this paper we investigate analgesic-anesthetic effects of *Acmella oleracea* and *Zingiber montanum* rhizome extracts in the form of ointment as herbal ointment was found to be easy and convenient use. This alternative low-priced product will be beneficial for people who suffer from muscle soreness.

Figure 1 *Acmella oleracea*

Figure 2 *Zingiber montanum* rhizome

2. Research Objectives

2.1 Produce the *Acmella oleracea* and *Zingiber montanum* rhizome extracts as a pain-relief medicine

2.2 Evaluate the relative effectiveness of the *Acmella oleracea* and *Zingiber montanum* rhizome extracts on pain relief within a set period of time.

2.3 Measure user satisfaction after using the product.

3. Research Methodologies

3.1 Population and Sample

The samples consisted primarily of patients with moderate to high initial levels of muscle pain (4-6 scores), measured pain by visual analog scale (0–10 scale). The samples were obtained by purposive sampling of 30 people.

3.1.1 Inclusion criteria

1) The samples willing to participate in the research.

2) Continuously cooperate with the researcher until the experiment is completed and the data has been collected for the specified period.

3.1.2 Exclusion criteria

1) Unable to enter activities during storage period.

2) Treatment of aches and pains by using rubbing drugs, oral medications, compresses, acupuncture, physical therapy during the 7 days before participating in the product trial.

3) Have a history of severe skin allergies to drugs or chemicals.

4) There is an injury wound in the location of the pain.

3.1.3 Discontinuation criteria

1) Absent for the duration of the experiment

2) Refusing to participate in the trial after participating in the experiment for a while

3) There is an allergic reaction or irritation after using the product.

3.2 Research method was as follows

The research was divided into three steps;

3.2.1 The process of marination and quantify extraction

1) Preparing the *Acmella oleracea* (50 g) by marinating the herbs with 500 ml ethanol for 7 days

2) Preparing the *Zingiber montanum* rhizome (50 g) by marinating the herbs with 500 mL ethanol for 7 days

3) Shaking bottle of the submerged fermentation everyday
4) After 7 days, pouring herbs separately into separate beakers
5) Fermented material was filtered through filter paper, 11cm diameter, covering the glass beaker with a watch glass
6) Pouring the fermented herbs separately into separate 500 ml glass bottles
7) The ethanol was evaporated using a rotary evaporator

Figure 3 Rotary Evaporation

3.2.2 Preparation of topical ointment formulation

1) Studying and reviewing the ointment - based formula based on the National list of essentials drugs A.D.2013 (List of herbal medicine products) as follows:

Table 1 shows the lists of herbal medicine products

100g of ointment - based formula	Weight	Indications
Zingiber extract	14g	Relieving muscular aches and pains
Methylsalicylate	10g	Relieving muscular aches and pains
Menthol	5g	Cooling sensation after painting
Virgin Coconut oil	71g	Enhancing of skin permeation, and applying as a skin moisturizer

2) Adapting the formulation of *Plai* cream (*Zingiber montanum*) based on the national list of essentials drugs A.D.2013 by adding *Acmella oleracea* extract

Table 2 shows the lists of developed the formula by adding *Acmella oleracea* extract

100g of ointment - based formula	Weight	Indications
Zingiber extract	7g	Relieving muscular aches and pains
Acmella extract	7g	Relieving pain due to the anesthetic effect
Methylsalicylate	10g	Relieving muscular aches and pains
Menthol	5g	Cooling sensation after painting
Virgin Coconut oil	71g	Enhancing of skin permeation, and applying as a skin moisturizer

3) Conducting the herbal formula

3.1) Pouring the *Acmella oleracea* and *Zingiber montanum* rhizome extracts into beaker, mixing the contents thoroughly

3.2) Adding methyl salicylate, menthol, and virgin coconut oil with continuous stirring

3.3) Pouring the ointment into bottles

Figure 4 Analgesic-Anesthetic ointment to reduce pain from *Acmella oleracea* and *Zingiber montanum* Rhizome Extracts

3.2.3 Procedure for testing the product

1) Ask for the cooperation of the data collection assistant. Introduce research objectives to the subjects and confirm their willingness to try the product.

2) Inquire about muscle pain painful position and pain level before drug use (0 minutes)

3) Ask the subjects to sit or lie down in a comfortable position and ask for permission to apply topical cream to the pain point all over the area. By applying a gentle massage for 5-10 minutes, after that, ask about the pain level. After 30 minute, 60 minute, and 90 minute, the pain scores were recorded in the data recorder.

3.3 Research Instrument

3.3.1 Visual Analog Scale

The VAS score for grading of pain consists of a 10 centimeters (cm) line with 10 mm (0.01 cm) to each point of the scale and two end-points representing no pain and worst possible pain, where 0 = no pain, 1-3 = mild, 4-6 = moderate to severe, and 7-9 = very severe, and 10 = worst pain possible.

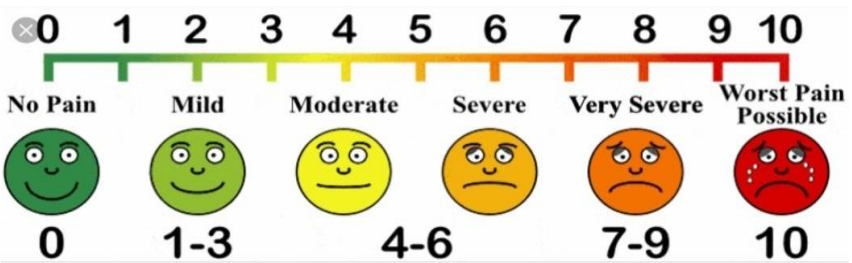

Figure 5 Visual Analog Scale

Ref: Shuhan He et al, Comparison of an Emoji-Based Visual Analog Scale With a Numerric Rating Scale for Pain Assessment, JAMA (2022). DOI: 10.1001/jama.2022.7489.

3.3.2 User satisfaction survey

This part surveyed the satisfaction with the product. There were five questions. This questionnaire was a 5-rating scales which were rated with the score as follow as: 1 = very low, 2 = low, 3 = moderate, 4 = high and 5 = very high.

The criteria was interpreted as follows: Mean between

1.00-1.49 = very low
1.50-2.49 = low
2.50-3.49 = moderate
3.50-4.49 = high
4.50-5.00 = very high

3.4 Data collection

3.4.1 The samples were collected by questioning muscle pain, pain position and pain level before using the product (0 minutes) and inquired after using the product at 30 minute, 60 minute, and 90 minute.

3.4.2 The samples were collected by inquiring about their satisfaction with the product after the trial.

3.5 Data analysis

Analyzed and presented as percentage, frequency, mean and standard deviation.

4. Results

4.1 Demographic data (n=30)

Table 3 shows the mean scores according to the demographic data

Variable	Frequency	Percentage
Sex		
1) Male	11	36.7
2) Female	19	63.3
Age		
1) Below 20	-	-
2) 21-40	12	40.0
3) 41-60	15	50.0
4) 60+	3	10.0
Weight	-	63.6 kg
Height	-	161.3 cm
Location of pain symptoms (one or more pain locations)		
1) Neck	21	70.0
2) Shoulder	29	96.7
3) Other	3	10.0

Variable	Frequency	Percentage
Occupation		
1) Students	4	13.3
2) Housewife	3	10.0
3) Merchant	4	13.3
4) Office worker	10	33.3
5) Gardener	6	20.0
6) Other	3	10.0

Table 3 shows that females predominated, composing 63.3 percent of the sample, age range = 41-60. The median age, weight and height of the samples were 43.27, 63.6, and 161.3, respectively. Most common location of pain symptoms was shoulder. Most samples were office workers.

4.2 Analgesic-anesthetic effects of *Acmella oleracea* and *Zingiber montanum* rhizome extracts

Table 4 shows the frequency and percentage of pain scores after the experiment at four different times.

Pain levels	Frequency and percentage			
	0 min	**30 min**	**60 min**	**90 min**
0 = no pain	-	-	-	-
1-3 = mild	-	2 (6.7%)	5 (16.7%)	9 (30.0%)
4-6 = moderate	11 (36.7%)	2 (80.0%)	24 (80.0%)	21 (70.0%)
7-9 = very severe	19 (66.3%)	4 (13.3%)	1 (3.3%)	-
10 = worst pain possible	-	-	-	-
Total	30 (100%)	30 (100%)	30 (100%)	30 (100%)

Table 4 revealed that, at 30 and 60 minutes after using the product, a number of patients with severe pain was decline from 66.3 percent of high-pain patients to 80.0 percent of moderate-pain patients. As well, the number of moderate-pain patients was at 70 percent after using the product for 90 minutes. A number of patients with severe muscle pain was reduced to 13.3 and 3.3 percent at 30, and 60 minutes respectively.

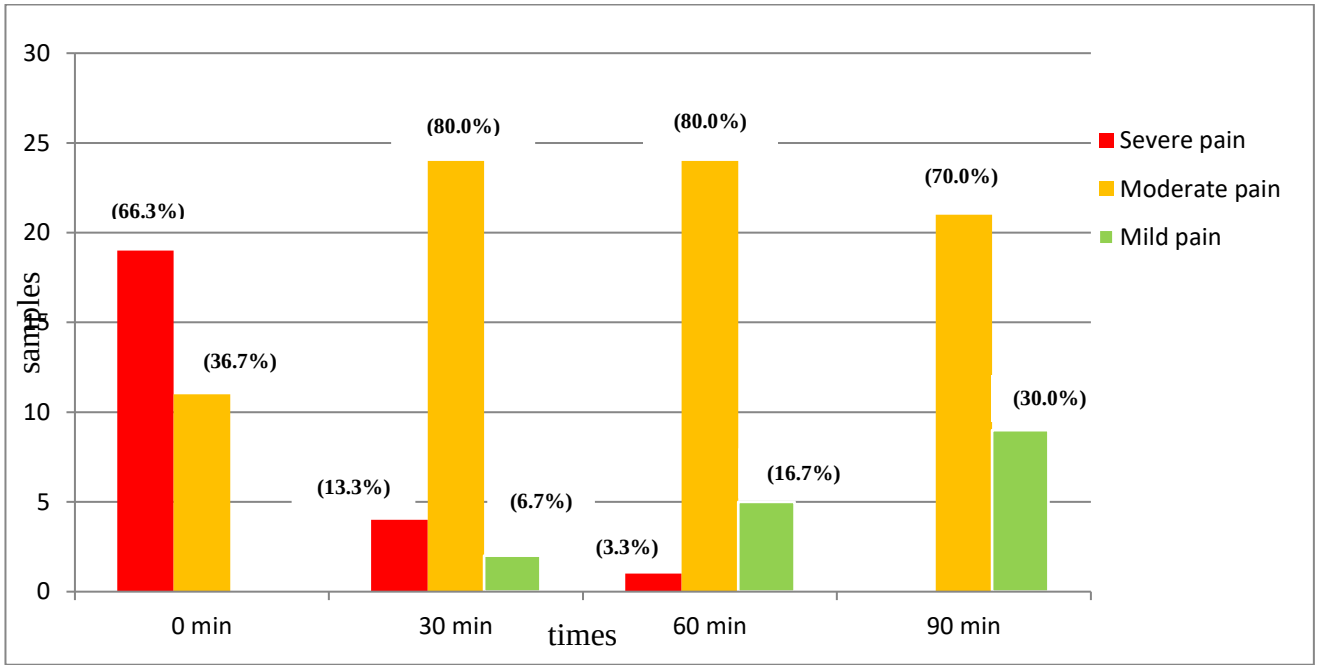

Figure 6 Comparing the pain levels of the samples after the experiment at four different times

Table 5 Comparing the pain levels of two groups before the experiment at different times

Pain levels	Samples with moderate pain (Before the experiment) (n=11)				Samples with severe pain (Before the experiment) (n=19)			
	0 min	**30 min**	**60 min**	**90 min**	**0 min**	**30 min**	**60 min**	**90 min**
Severe pain	-	-	-	-	**19**	5	1	-
Moderate pain	11	9	8	6	-	14	16	15
Mild pain	-	2	3	5	-	-	2	4
Total	11	11	11	11	19	19	19	19

4.3 User satisfaction after using the product

Table 6 User satisfaction in terms of mean and standard deviation

Topic	Mean	Standard deviation	Levels of satisfaction
1. Smell	3.97	0.93	high
2. Thick viscosity	4.00	0.74	high
3. Adhesion	4.27	0.58	high
4. Color	4.23	0.90	high
5. Rapid pain relief	4.00	0.83	high
Total	**4.07**	**0.78**	high

Table 6 shows that overall user satisfaction with the product was rated as good, mean = 4.07. Question regarding the ointment tightly adhere to the skin surface had the highest mean score, mean = 4.27, while the smell of the product had the lowest mean score, mean = 3.97.

5. Conclusion and Discussion

Through the study of analgesic-anesthetic effects of *Acmella oleracea* and *Zingiber montanum* rhizome extracts, this project aimed to 1) produce the *Acmella oleracea* and *Zingiber montanum* rhizome extracts as a pain-relief medicine 2) evaluate the relative effectiveness of the *Acmella oleracea* and *Zingiber montanum* rhizome extracts on pain relief within a set period of time, and 3) measure user satisfaction after using the product.

Study findings revealed that, at 30 and 60 minutes after using the product, a number of patients with severe pain was decline from 66.3 percent of high-pain patients to 80.0 percent of moderate-pain patients. As well, the number of moderate-pain patients was at 70 percent after using the product for 90 minutes. A number of patients with severe muscle pain was reduced to 13.3 and 3.3 percent at 30, and 60 minutes respectively. There were no patients with severe pain at 90 minutes after using the product.

The findings could be concluded that the ability of the *Acmella oleracea* and *Zingiber montanum* rhizome extracts to reduce pain and inflammation is not different when compared with traditional NSAIDs as a rapid onset of pain after applying both ointment and NSAIDs is approximately 30 minutes. This is because Spilanthol in the *Acmella oleracea*, primarily anesthetic, acts in various ways on the peripheral and central nervous system. It also has many biological activities to relief muscle soreness

Finally, overall user satisfaction with the product was rated as good, mean = 4.07. Question regarding the ointment tightly adhere to the skin surface had the highest mean score, mean = 4.27, while the smell of the product had the lowest mean score, mean = 3.97.

6. Recommendations

6.1 The product smell will require further improving
6.2 There should be more study regarding the silicone gel sheeting treatments from *Acmella oleracea* for wound healing

7. Acknowledgements

This work would not be completed without the invaluable supporters. I would like to express my sincere thanks and appreciation to my advisers for your outstanding suggestions. I am pleased to be given the opportunity to learn, discuss and share my opinion with you. I must also give thanks to staff of the PSU. Wittayanusorn school who have supported and encouraged me to further keep walking. I would like to thank you my family especially my parents for supporting me throughout the duration of the project.

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Development of A Face and Gesture Detection Application for the Exercise System and Accumulation of Reward Points

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Abstract

The COVID-19 pandemic has affected the daily lives of global citizens. Currently, it was reported that COVID-19 would last longer. Therefore, living with the COVID-19 outbreak will be the new normal. The restriction of physical contact leads to less exercise, especially outdoor activity. Exercising is necessary for building immunization. This is a reason why motivated applications for exercising are a limited attraction. This study aimed to develop face and gesture detection Applications for An Exercise System and Accumulation of Reward Points. The application benefits those living in a restricted area for distancing to protect and control COVID-19 spread. Scratch programs and face and gesture detection AI were used for application development. This application can detect faces, gestures, and point counting. The data will be reported in a google worksheet among the members. The application will be tested in January with 100 PSU Wittayanusorn school students.

Keywords

application; AI; exercise; Scratch programming; PSU. Wittayanusorn

1.) Introduction

The COVID-19 pandemic which began in December 2019 in Wuhan, China, made the World Health Organization (WHO) announce this as an international public health emergency on January 30th, 2022.

[A] Articles from authors and agency

Ministry of Public Health. 2021. The situation of Coronavirus Disease 2019 (COVID-19) Public Health Measures and problems, obstacles, disease prevention and control in travelers. Retrieved on June 2, 2022, from https://ddc.moph.go.th/uploads/files/20174202108200252 38.pdf

"for Thailand, the outbreak of the COVID-19 virus began with the first infected person, a tourist from China on 12 January 2020, and the first Thai patient found on 31 January 2020, whose history of driving a taxi for Chinese tourists. After that, the number of infected people continued to increase, causing the Ministry of Public Health to announce in the Government Gazette on March 1, 2020, and declare COVID-19 to be a serious contagious disease. According to the Communicable Disease Act B.E. 2558"

Maliwan, et al., 2022. The impact of the COVID-19 epidemic on activities and lifestyles and forms of occupational therapy services that pertain to the new lifestyle era. Retrieved on June 2, 2022, from https://kb.hsri.or.th/dspace/handle/11228/5533?locale-attribute=th

"In the past 2 years, the COVID-19 virus has spread all over the world. As a result, people have to change their daily lives, working, studying, and doing more online activities to reduce the spread of the COVID-19 virus

However, when there are more online activities, people have less physical activity. Physical inactivity affects many ways. Being restricted from lifestyle activities due to things beyond your control affects people with chronic illnesses. As a result, The elderly, children, and adolescents who did more activities online and did not go to school, had reduced self-care, lack of social skills, Insomnia, burnout, etc."

Weephumin, et al., 2022. A Study of Exercise Behavior During the COVID Situation of Personnel in Khlong Thom Hospital, Khlong Thom District, Krabi Province. Retrieved on Jube 4, 2022, from http://libapp.tsu.ac.th/OJS/index.php/TSUOJ/article/view/575
"According to the survey through a questionnaire among personnel in Khlong Thom Hospital, Khlong Thom District, Krabi province, it's found that there was 73.91% less physical activity and 89.13% felt bored."

Michelle Castillo. 2013. To ride the Moscow subway for free, do 30 squats. Retrieved on June 5, 2022, from https://www.cnet.com/culture/to-ride-the-moscow-subway-for-free-do-30-squats/
"In Moscow, Russia An exercise campaign has been set up in exchange for subway tickets. By requiring the user to perform the Squad position 30 times in 2 minutes."

According to www.burned-calories.com, it is found that in the same body weight, different exercising methods burn different amounts of calories, as shown in the following Table.

Weight (kg.)	Exercising Method	Calories burnt (kcal)				
		30 sec	1 min	2 min	5 min	1 hr
60	Burpee	4	8	17	42	504
	Push-Ups	4	8	17	42	504
	Jumping Jacks	4	8	16	40	485
	Squat	3	6	12	29	347
	Lunges	2	4	8	21	252
	Sit-Ups	4	8	17	42	504

	Mountain Climber	4	8	17	42	504
	Bridges (Butt lift)	3	6	13	32	378
	Crunches	3	5	11	26	315

Name: The amount of energy the body burns through different exercise postures. The results were controlled by setting the body weight to 60 kg.

Teerasak Suppraserd, Jantana Sansook. 2564. Motivation Influencing Exercise Behaviors of People Using Sports Stadium Services in Phra Nakhon Si Ayutthaya Province. *Mahachula Academic Journal* 8.2 (2021): 299-314.

"The motivation will affect the behavior of exercisers. There are both external and internal knowledge and attitude toward exercise. Along with the surrounding environment of the exerciser"

Narongporn Laosrisin. 2022. Into The Universe of Scratch Programming. Pg. 223-240.

"To train your AI to be able to detect gestures correctly, a diverse set of gesture data should be used, and must be displayed to make it easy for the user to understand"

[B] Idea & concept

Therefore, the organizing team has devised a fitness system to collect reward points by detecting faces and gestures using applications, to increase physical activity and health-enhancing practices among employees in various organizations, even at home.

2.) Working steps

[A] Equipment

1. Acer Laptop Aspire 5 Model
2. Coding website
3. Google Teachable Machine

[B] Working steps

1. Collect users' face image data to train the AI.
2. Bring user face image data to train AI with Google Teachable Machine to be able to recognize users' faces when logging in.
3. Test the accuracy of the work of the facial recognition AI.
4. Collect gesture data of various exercises to train the AI.
5. Take the gesture data to train the AI with Google Teachable Machine to be able to detect and check the accuracy of the user's posture while exercising.
6. Test the accuracy of the AI's gesture detection.
7. Bring both AI together into the same system to create a fitness system to collect reward points by detecting faces and gestures with the Scratch programming web, which has the system's working process as follows.
    1) Sign in using AI face recognition when it detects a user's face.

2) Let the user choose a posture to exercise. The system will indicate the benefits and the number of points that will be obtained from the exercise in that position. (The number of points earned will vary according to the amount of energy burned in each move for the same amount of time. According to the website www.burned-calories.com)
3) The system will start, which will allow the user to move in a position where the camera can see the whole body and capture the movement of the user whether it is correct or not.
4) When the exercise is completed, The system will add points to the user. The user can redeem the said points for the rewards specified by the system, such as drinking water, healthy food, etc.
5) When the user selects the desired reward, a QR Code that is linked to a PDF file stating the user's reward eligibility will be generated. The right must be used on the day of the exercise by applying the rights to participating stores

8. Test the fitness system's performance accuracy to collect reward points by detecting faces and gestures.
9. Evaluate user satisfaction using a survey.

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Development AI Chatbot for depression level diagnosis in PSU Wittayanusorn School

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ABSTRACT

According to the study, at least 1.5 million Thai people suffer from depression. In 2021, 6 people attempt suicide per hour. People with depression have a suicide success rate 20 times higher than the general population and 70 percent of people with depression die prematurely. American Psychiatric Association Described the severity of depression into 3 levels, mild depression, moderate depression, and severe depression. The lower depressive level could be developed to the higher one if patients do not get assisting on time. The instrument for diagnosing depressive level is limited as well as the determining the existed chatbot can actually be used furthermore the objective of this study was to develop the chatbot for depression level diagnosis provided that First step, create a form about students' interest to ask PSU Wittayanusorn students. Later, an AI chatbot was designed in the form of a line official called "Take care", with a total of 6 menus designed for example is talking , measures and screening tests for depression, a phone call, take a picture, horoscopes and contact channels for psychiatrists and psychiatric hospitals .The organizing committee uses the Dialog flow, Google script to develop interaction with users.Google sheets used to collect images, audio, and scores from the depression scale test. The target group was 300 students of grade 7-12 at PSU Wittayanusorn School definitely the data will be reported to administration man .The satisfaction form will be sent to all sample promptly after using chatbot. Satisfaction data was analyzed by using percentage, bar chart and frequency. The data will be completed by January, 2023 up to the point recommendation will be made after January, 2023 and This innovation assists the early detection of depression level which leads to prompt appropriate treatment.

Keywords

Depression level, AI Chatbot, Development,PSU Wittayanusorn

1)Introduction

Nowadays, Thailand is facing a higher rate of depression which has become more serious among rarious group of population because the number of pateints continually increases. However, treatment accessibity is limited to such as a small group of pateints due to lack of knowledge about the disease and lack of psychological expertises especially in the rural areas. Moreover, the biggest problem is some of the patients have concern about their privacy and decide not to obtain a medical treatment

This project is aimed to help the people to easily access their srocss levels by using the advantages of technology advancement. We design a chatbot which could score the stress levels of the users from 1 to 5 and may indicate that such user may have a hidden depression. Additionally, this chatbot could give a simple useful tips to reduce stress and now to take

care of their mental health. We expectthat this project could be a small part to help reducing this health issue and could be a useful depression screening tool.

2)Idea and Concept

According to the study, at least 1.5 million Thai people suffer from depression. In 2021, 6 people attempt suicide per hour. People with depression have a suicide success rate 20 times higher than the general population and 70 percent of people with depression die prematurely. The lower depressive level could be developed to the higher one if patients do not get assisting on time. The instrument for diagnosing depressive level is limited as well as the determining the existed chatbot can actually be used.

3)Working steps

[A] Equipment

Common equipment

1.Telephon Ipad or Notebook

2.Computer

Application and Website

1.Google Sheets

2.Google script

3.Bot noi

4.Line developer

5.Line Official

[B] Methodology

First step, create a form about students' interest to ask PSU Wittayanusorn students. Later, an AI chatbot was designed in the form of a line official called “Take care”, with a total of 6 menus designed for example is chatting , measures and screening tests for depression, a phone call, take a picture, horoscopes and contact channels for psychiatrists and psychiatric hospitals .The organizing committee uses the Dialog flow program, Google script to develop interaction with users. Google sheets used to collect images, audio, and scores from the depression scale test. The target group was 300 students of grade 7-12 at PSU Wittayanusorn School. The data will be reported to administration man. The satisfaction form will be sent to all sample promptly after using chatbot. Satisfaction data was analyzed by using mean, SD, percentage, bar chart and frequency

Picture about Take care chatbot

Mode in Take care :

https://drive.google.com/file/d/1hXHtUSPMWPYgvSOQsA8Y-scoa3lufdSn/view?usp=drivesdk

[C] Preparation

You need to have communication tools such as mobile phone, Ipad, tablet or computer next step lead communication tools scan QR code or add friends via ID Line when you succeed to add fiends you can select one mode from 6 mode that you want to talk with chat bot like chatting mode, Contact mode of each province, Horoscope mode and estimate depression level mode which that mode you must login your account and accept privacy policy and lead to take photo after there will be a talk wherewith organizer will collected words for analysis and take the test to estimate whereupon Take care will be users to rate their satisfaction.

[D] After use "Take care" chatbot

The data will be completed by January - February, 2023

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Development of Triboelectric nano-generator for low-power wireless devices

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Abstract

Currently, the trend of using EV (Electric Vehicle) is rapidly growth in the vehicle industry. The studies showed that the number of customers prefer EV because of lower energy expense as well as creating the friendly green environment and modern technology. EV is equipped with sensors connecting directly to battery by using wire. These consume much energy from vehicle battery leading to reducing operation time. However, the connecting of sensors and wire is complicated and difficult for maintaining. Thus, the alternative energy substitutes the battery is critical needed. The principle of Triboelectric was used for the energy harvesting. The reducing of the complication of the connecting by wireless device was conducted. The objectives of this project were to study principles and energy harvesting systems and to develop energy harvesting system using Triboelectric principle. In this project, we generate electricity by two materials collision together. We used Aluminum and Copper to be a material of collusive creation to induce an electron flow [The flow of electric current (I) occurs. Finally, the resistance (R: Ω) by using a decade resistance box was determined and the amount of potential difference (V) by using a multimeter was measured. From the formula V=IR and P=IV, we can calculate the electrical output power using the expression of P=V^2/R. We can obtain the output voltage (V) to be directly proportional to the impact vibration magnitude.

From the experiment setup, the average power output is 500 μW , the optimal resistance of 20MΩ and the Current output of 25pA.The further research should be concern of creating more harvesting energy. The benefit of this innovation is to reduce to use power directly from battery and reduce to the plenty use of wire with less complication.

Keywords

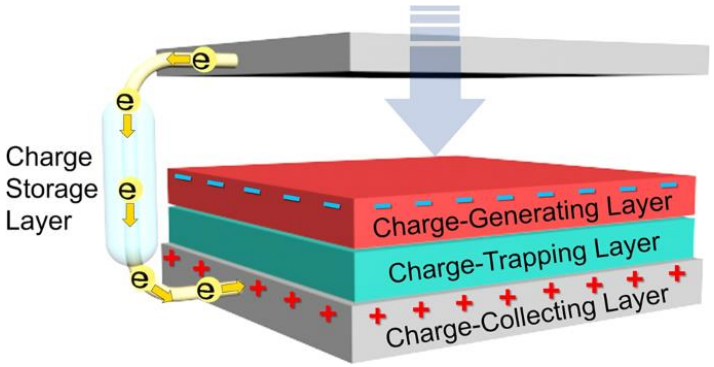
Triboelectric, Energy harvesting, resistance, potential difference, Electric current, Power density

1) Introduction

The triboelectric charging is a type of contact electrification on which certain materials become electrically charged after they are separated from a different material with which they were in contact. Rubbing the two materials with each other increases the contact between their surfaces, and hence the triboelectric effect. Rubbing glass with fur for example, or a plastic comb through the hair, can build up triboelectricity. Most everyday static electricity is triboelectric. The polarity and strength of the charges produced differ according to the materials, surface roughness, temperature, strain, and other properties.

The triboelectric effect is now considered to be related to the phenomenon of adhesion, where two materials composed of different molecules tend to stick together because of attraction between the different molecules. While adhesion is not a chemical bond between atoms, there is an exchange of electrons between the different types of molecules, resulting in an electrostatic attraction between the molecules that holds them together. Physical separation of materials that are adhered together results in friction between the materials. Because the electron transfer between molecules in the different materials is not immediately reversible, the

excess electrons in one type of molecule remain left behind, while a deficit of electrons occurs in the other. Thus, a material can develop a positive or negative charge that dissipates after the materials separate.



Representative components of a triboelectric nanogenerator (TENG)

2) Research Objectives

to study principles and energy harvesting system and to develop energy harvesting system using Triboelectric principle

3) Research Methodologies

3.1 Design an energy harvesting system

1) Use Fusion 360 program design of energy harvesting devices.

2) Utilize a 3D printer to construct and assemble energy harvesting devices.

3.2 Measurement of the voltage obtained when Teflon patterns are different.

1) Design the Teflon to have different patterns with the same area of each. All 4 images are triangle, circle, square and rectangle. And every pattern has the same thickness, which is 0.25 mm.

2) Add a triangle pattern into the Energy Harvester.

3) At a pressure of 0.35 MPa and a frequency of 0.67 Hz, the experiment was conducted.

4) Read the voltage from the oscilloscope when the value is stable.

5) Do the same with circles, squares, and rectangles.

6) Record the experimental results.

7) Bar charts were used to compare the experimental results.

3.3 Measurement of the voltage obtained when the Teflon thickness is different.

1) Design the Teflon to have different thicknesses with the same area, including 0.25, 0.5 and 1.0 mm.

2) Determine the frequency to be used in the experiment.

3) Add Teflon thickness 0.25 mm. into the Energy Harvester.

4) At a pressure of 0.4 MPa, the experiment was conducted.

5) Read the voltage from the oscilloscope when the value is stable.

6) Do the same with Teflon with a thickness of 0.5 mm. and 1.0 mm.

7) Record the experimental results.

3.4 Measurement of the voltage obtained when the controlling pressure is different.

1) Design Teflon to have the same thickness, area and shape.

2) Determine the frequency to be used in the experiment.

3) Add Teflon into the Energy Harvester.

4) Tested by using pressure of 0.4 MPa and pressure of 0.6 MPa.

5) Read the voltage from the oscilloscope when the value is stable.

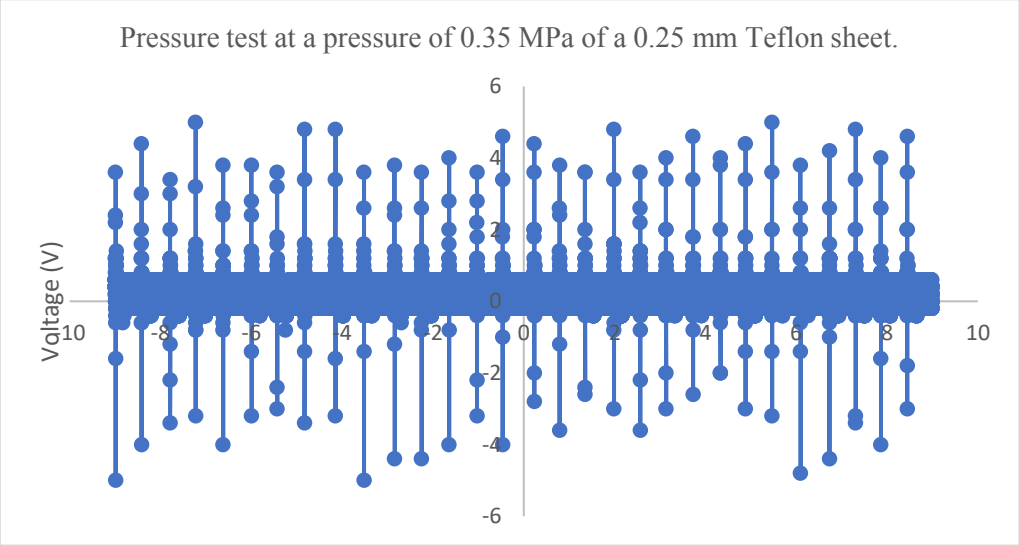
6) Record the experimental results.

4) Results

4.1 An energy harvesting system

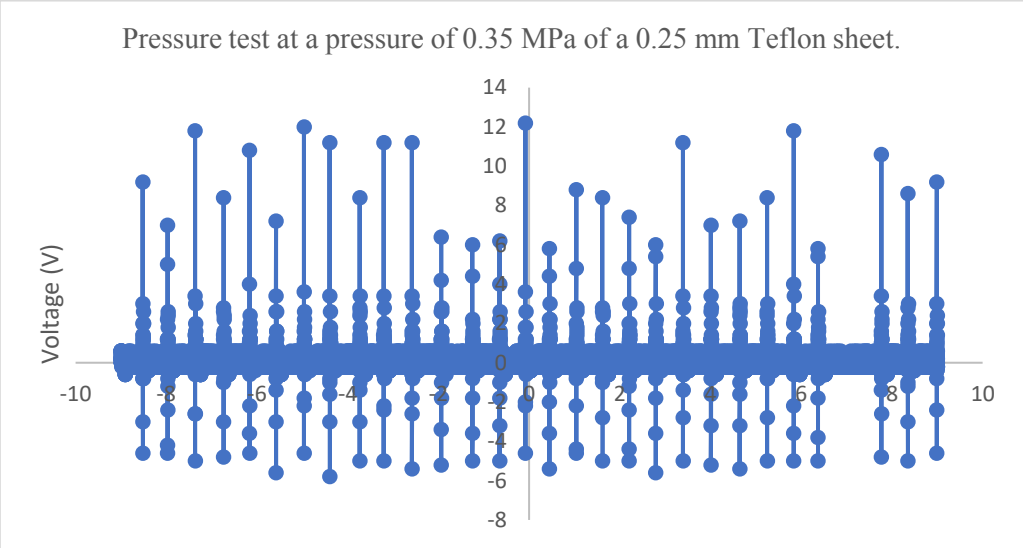
4.2 The experimental results of the voltage when Teflon patterns are different.

4.2.1 A triangle pattern



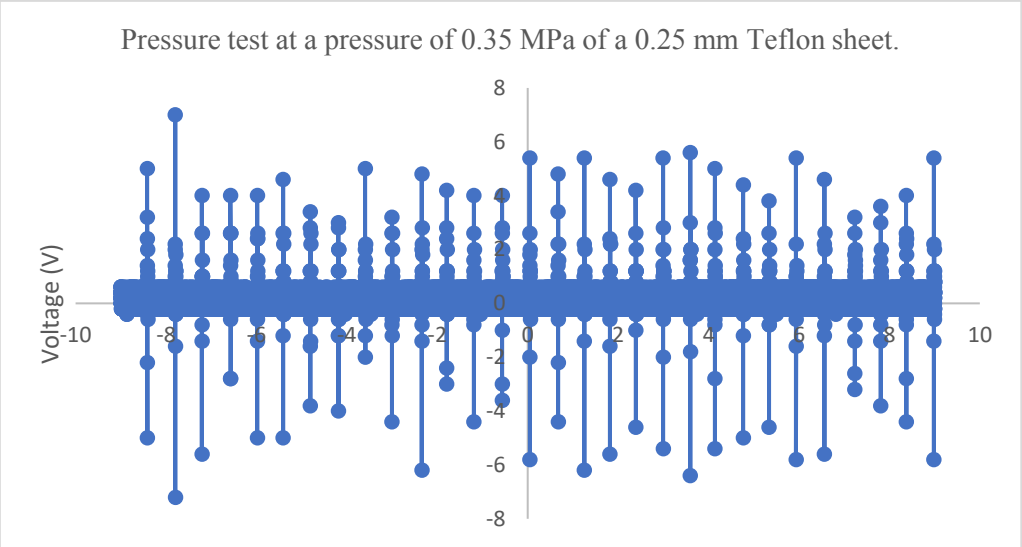
The maximum voltage is 5 V

4.2.2 A circle pattern



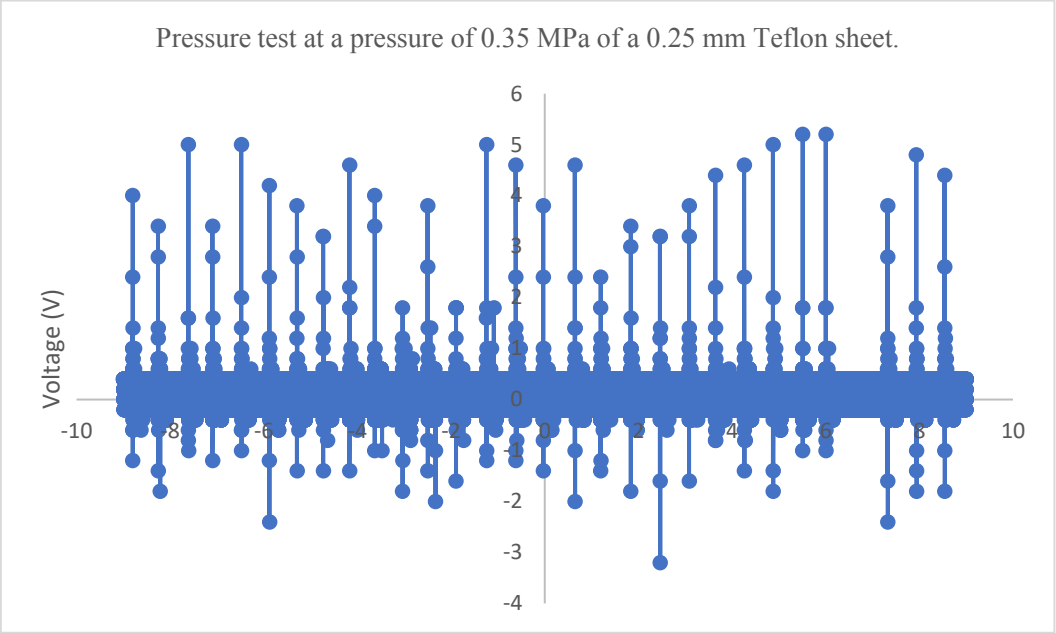
The maximum voltage is 7 V

4.2.3 A square pattern



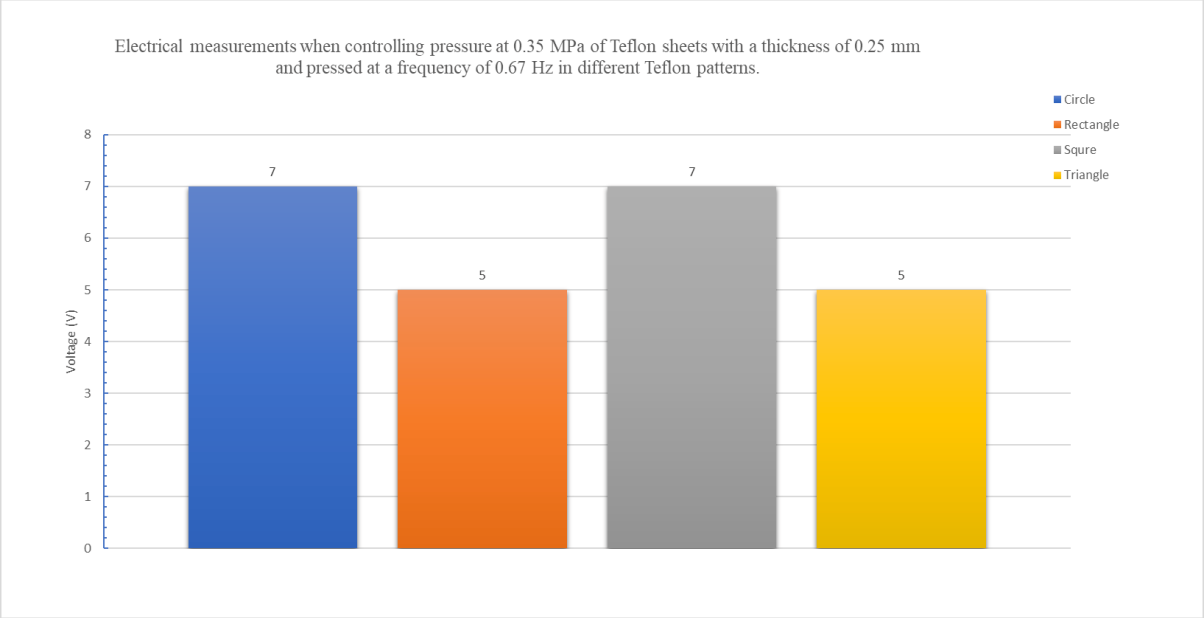
The maximum voltage is 7 V

4.2.3 A rectangle pattern



The maximum voltage is 5 V

4.2.4 Compare the voltage of each pattern.

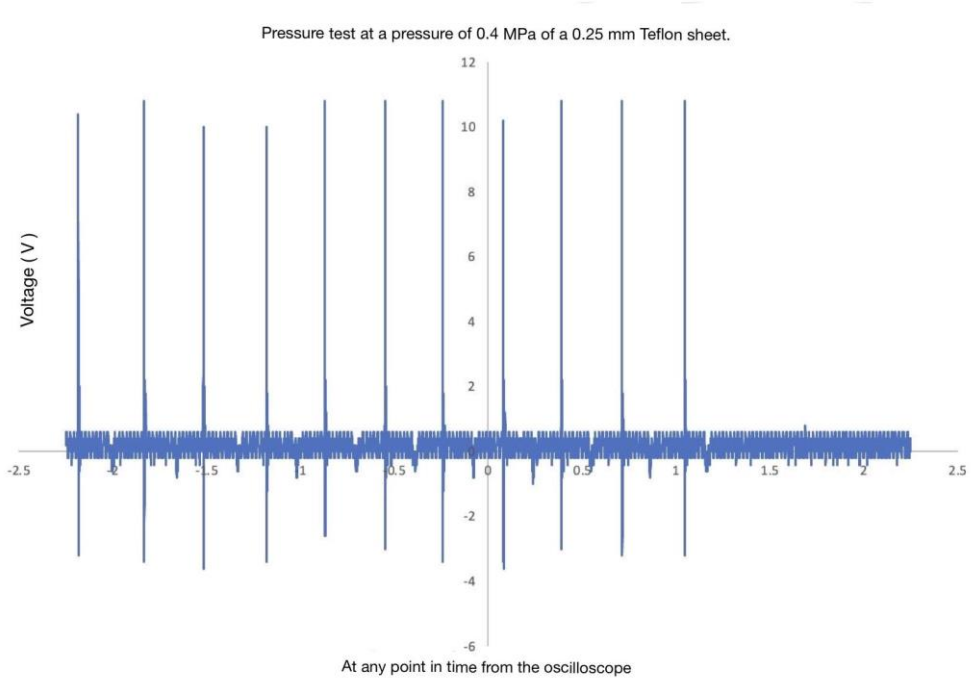


A circle pattern has the same voltage as A square and

A triangle pattern has the same voltage as A rectangle pattern

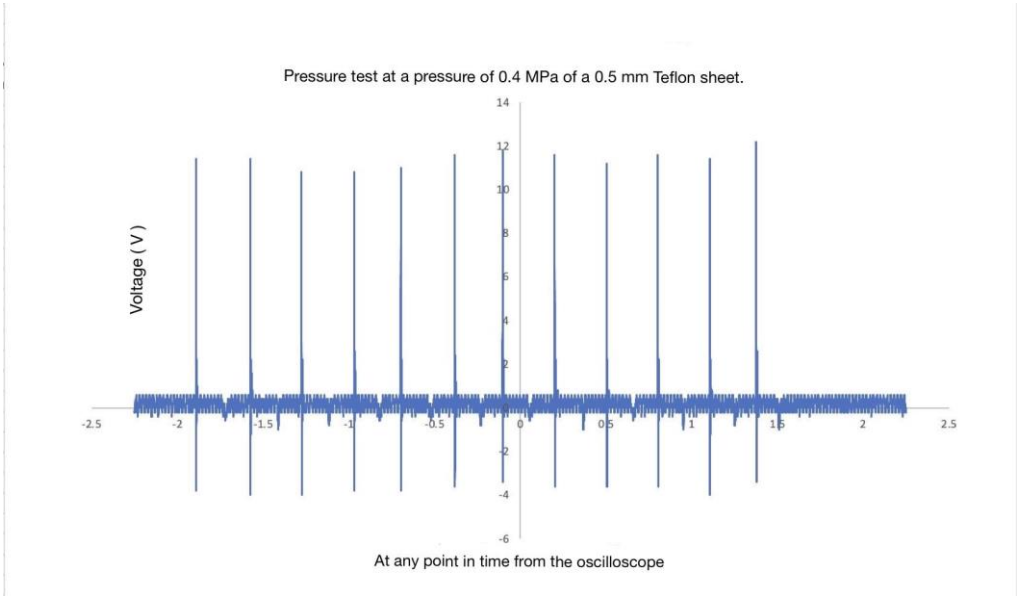
4.3 The experimental results of the voltage when Teflon thickness is different.

4.3.1 Teflon thickness 0.25 mm.



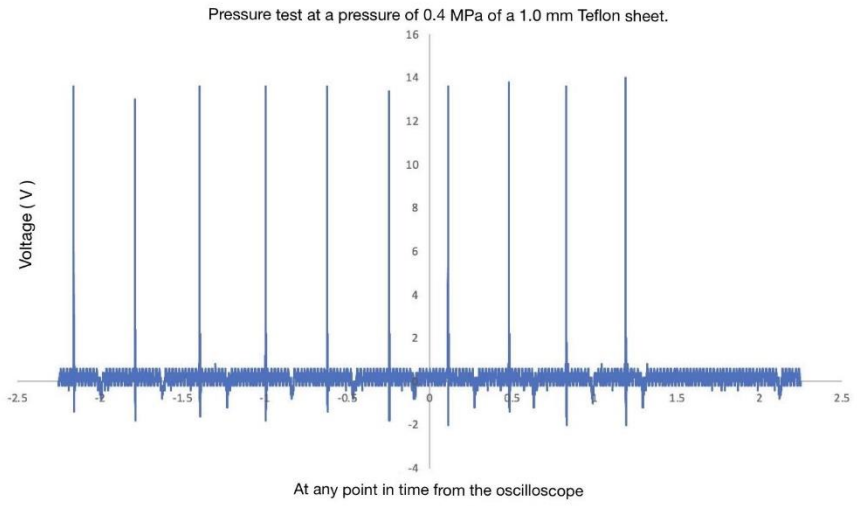
The maximum voltage is 10.8 V

4.3.2 Teflon thickness 0.50 mm.



The maximum voltage is 12.2 V

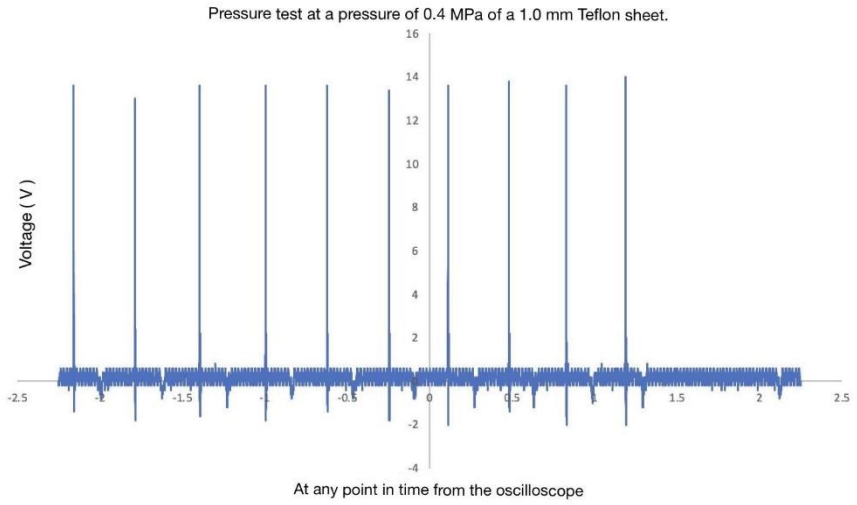
4.3.3 Teflon thickness 1.00 mm.



The maximum voltage is 14.0 V

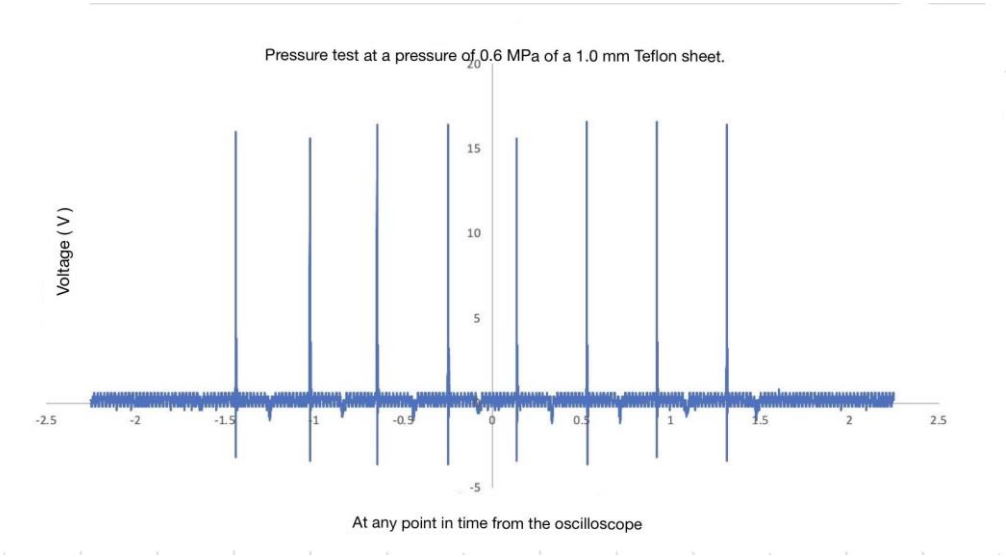
4.4 The experimental results of the voltage when the controlling pressure is different.

4.4.1 Tested by using pressure of 0.4 MPa



The maximum voltage is 14.0 V

4.4.2 Tested by using pressure of 0.6 MPa



The maximum voltage is 16.6 V

5) Conclusion and Discussions

Based on the triboelectric concept, we can create an energy harvesting system. By developing a device that creates friction between two materials that have a positive and negative dominance. came out as electrostatic discharge, which caused the induction of electric charges at the surface of the material and materialized as a voltage.

It was discovered that when the area was the same but the Teflon pattern was different after carrying out the experiment again and comparing the Teflon patterns. It will have a low impact on voltage. Also, it is possible to assume that the Teflon square design will generate more voltage than Longitudinal Teflon.

However, when comparing the pressure exerted and the Teflon thickness Both factors were discovered to have an impact on voltage gain. The resultant voltage will rise in direct proportion to the increase in Teflon thickness or pressure. It shows that the voltage is exactly related to the thickness of Teflon and the pressure being applied.

6) Recommendations

due to the still-small electrical energy received. It is critical to conduct research on the best ways to develop energy harvesting systems.

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Development of Community Base Physical Therapy Model for Stroke Patients

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Abstract

Cerebrovascular Diseases (CVD) or stroke causes the impairment of physical, mobility, perception, communication, behavioral and mental problems, as well as family and social problems. Thus, effective physical therapy for rehabilitation in stroke patients is crucial for more self-reliance and better recovery with the least of disability to promote a patient's quality of life. There are some limitations in community hospitals in treating CVD patients, such as constraints of number and skilled staff, and insufficient budget for quality medical equipment. The ratio of Cha-uat physical therapists per population is 1:22,000. The full-time equivalent staff (FTE) is 1:2. These numbers of manpower affect the discontinuance of physical therapy in stroke patients after discharge from the hospital. Community based physical therapy is a value of choice for patients, families, and community in self-care for more independence. This action research aimed to develop a community based physical therapy model for stroke patients. The study was conducted during November 2021 to May 2022. The study consisted of 2 phases: phase I) development of a conceptual framework for community based physical therapy for stroke patients by literature review guided by concept analysis proposed by Walker & Avant and phase II) development of a model of community based physical therapy for stroke patients. The sample, in this stage, were 8 stroke patients, 8 caregivers, 15 multidisciplinary professions, 70 village health volunteers, and 2 staff of local administration organization staff. The questionnaire used in the study was knowledge, attitude, motivation, professional standard, participation, and learning community in community based physical therapy for stroke patients. All of the questionnaires are assessed for content validity and reliability. The phase two brought activities which proposed in the conceptual framework into practice comprising of three stages: 1) PL: Policy & Laws including all laws and regulations or policies regarding to patient right and welfare benefits, 2) ANS: Active network & Standards covering all standards of practice which implemented by health personnel, and 3) R: Result consisting of knowledge, attitude, motivation and community learning before and after implementing the standards by the responsible persons. Then, the three stages were concluded as a PLANS-R model for community based physical therapy for stroke patients. This is the original model, which requires continuous refinement for more effectiveness. In addition, the model could be applied to other communities.

Keywords: Model development, Physical therapy, Stroke patients.

Introduction

Cerebrovascular Diseases (CVD) or stroke causes the impairment of physical, mobility, perception, communication, behavioral and mental problems as well as family and social problems. Thus, effective physical therapy for rehabilitation in stroke patients is crucial for more self-reliance and better recovery with the least of disability to promote the patient's quality of life. The database of National Health Security Office (NHSO), Thailand, reported that from 2019 to 2021, there were 328 of over 15-year patients per 100000 per capita faced with stroke and seems of higher trends (Somsak tiumkao,2021)[1]. The situation of stroke in Cha-uat, Nakhon Si Thammarat was diagnosed by ICD-10 (I60-I69) in Cha-uat hospital from 2016 to 2020 ranging from 776, 832, 869, 887, and 1,060, respectively. The stroke patients who got physical therapy at Cha-uat hospital from 2016 to 2020 were 155, 187, 184, 114 and 115, respectively (Cha-uat Hospital ,2021). This showed the increasing trend of patients who got physical therapy, except in the last two years (2019-2020), which might be due to the COVID-19 outbreak. Based on the researcher's experiences, it was found that patients and caregivers lacked knowledge and skills in physical therapy after being discharged from the hospital. In addition, there are some limitations in community hospitals in treating CVD patients, such as constraint of number and skilled staff and insufficient budget for quality medical equipment. The ratio of Cha-uat physical therapists per population is 1:22,000. The full-time equivalent staff (FTE) is 1:2. This number of manpower affects the discontinuity of physical therapy in stroke patients after discharge from the hospital. From the literature review and author's experience as a physical therapist, the obstacles and limitations of community hospitals in caring for patients after stroke are the constraints of physical therapists and health care staff, transportation, and the difficulty of setting up a comprehensive and effective home health care team. Sararin Pitthayapong(2018)[2] reported problems and obstacles in caring for stroke patients by community hospitals, including the continuous care by village health volunteer limitation knowledge and skills (Churak P. and Choeibuakaew W., 2022)[3] Therefore, this study aimed to develop a community based physical therapy model for stroke patients with the ultimate goal of health rehabilitation by the cooperation of networks. The study will include two major steps of 1) development of the conceptual framework of a community based physical therapy by applying concept analysis proposing and 2) implementation of conceptual framework and adjusting for appropriateness for use before concluding it as the "model of community based physical therapy." Community based physical therapy is a value of choice for patients, families, and community in self-care for more independence.

Methods

This action research aimed to develop a community based physical therapy model for stroke patients. The study was conducted during November 2021 to May 2022. The study consisted of 2 phases: phase I) development of a conceptual framework for community based physical therapy for stroke patients by literature review guided by concept analysis proposed by Walker & Avant (2005) and phase II) development of a model of community based physical therapy for stroke patients. The sample, in this stage, were 8 stroke patients, 8 caregivers, 15 multidisciplinary professions, 70 village health volunteers, and 2 staff of local administration organization staff. The questionnaire used in the study was knowledge, attitude, motivation, professional standard, participation, and learning community in community based physical therapy for stroke patients. All of the questionnaires are assessed for content validity and reliability. The item IOC ranged from 0.6 to 1.00, and Cronbach's alpha or the coefficient of 0.85-0.95 among the dimensions. Phase II brought activities that were proposed in the conceptual framework into practice comprising three stages: 1) PL: Policy & Laws including

all laws and regulations or policies regarding to patient rights and welfare benefits, 2) ANS: Active network & Standards covering all standards of practice which were implemented by health personnel. ANS consists of 2.1 Assessment, 2.2 Improvement plan, 2.3 Implementation, 2.4 Evaluation, and 3) R: Result consisting of knowledge, attitude, motivation and community learning before and after implementing the standards by the responsible persons. Then, the three stages were concluded as a PLANS-R model for community based physical therapy for stroke patients.

Results

Stroke patients have knowledge at a low level, attitude at a high level and motivation at a high level. After using the PLAN-R model, the range increased to a high level. The Barthel Index for Activities of Daily Living (ADL) before and after using the PLANS-R model showed that all patients had an increase in ADL. As shown in table 1. Patients with complications such as muscle pain and irregularity were reduced and did not cause complications in patients without complications.

Table 1 The Barthel Index for Activities of Daily Living (ADL) before and after using the PLANS-R model

BI score	Disability Level	Before		After	
		patient	%	patient	%
0 - 20	Very severity	3	37.5	0	0
25 - 45	Severity disabled	4	50.0	3	37.5
50 - 70	Moderately disabled	1	12.5	3	37.5
75 - 95	Mildly disabled	0	0	2	25.0
100	Physically independent but not necessary normal or social independent	0	0	0	0

Caregiver attributes ranging from the highest to the lowest were knowledge (low level), attitude (high level), motivation (high level), and community learning (medium level) before the PLANS-R model. After using this model the range increased to a high level.

Multidisciplinary professions have knowledge, attitude, professional standard, participation, and learning community in community based physical therapy for stroke patients increase after the use PLANS-R model (high level).

Village Health Volunteer attributes ranging from the highest to the lowest were attitude (high level), motivation (high level), community learning (medium level), participation (medium level), and knowledge (medium level). After using the PLANS-R model ranging from the highest to the lowest were attitude, motivation, and knowledge at a high level, community learning and participation at a medium level.

The staff of local administration organization staff increased their knowledge of policy and laws. The staff increased participation with stroke patients after using the PLANS-R model.

Conclusion and Recommendations

The development of a conceptual framework for community-based physical therapy for stroke patients by literature review guided by concept analysis proposed by Walker & Avant (2005) comprising of 3 stages: 1) PL: Policy & Laws including all laws and regulations or policies regarding to patient right and welfare benefit, 2) ANS: Active network & Standards covering all standards of practice which implemented by health personnel. ANS consists of 2.1 Assessment,2.2 Improvement plan,2.3 Implementation,2.4 Evaluation, and 3) R: Result consisting of knowledge, attitude, motivation and community learning before and after implementing the standards by the responsible persons. Then, the 3 stages were concluded as a PLANS-R model for community based physical therapy for stroke patients. the PLANS-R model is consistent with the study of Results of the Development of Model for Stroke Patients Care Siridhorn Hospital Khon Kaen Province. This study has the sample is stroke patient and nurse. But the PLANS-R model was a greater coverage of the sample consists of stroke patients (ischemic and hemorrhagic stroke), caregiver, multidisciplinary professions (Doctor, Physical Therapist, Nurse, Psychiatric nurse, Nutritionist and Pharmacist), Village Health Volunteers and The staff of local administration organization staff (Piyathida Churak and Wallapa Choeibuakaew,2022)[5]. After using the PLANS-R model, this sample increased knowledge. attitude, motivation, professional standard, participation, and learning community in community based physical therapy for stroke patients. The patient specific benefit can perform more Activities of Daily Living, reduce dependency and not cause complications in the patient. The community gets a suitable Community Base Physical Therapy Model for Stroke Patients and It is a community learning that can be extended to use in other communities.

However, this is the original model which requires continuous refinement for more effectiveness. In addition, the model could be applied to other communities.

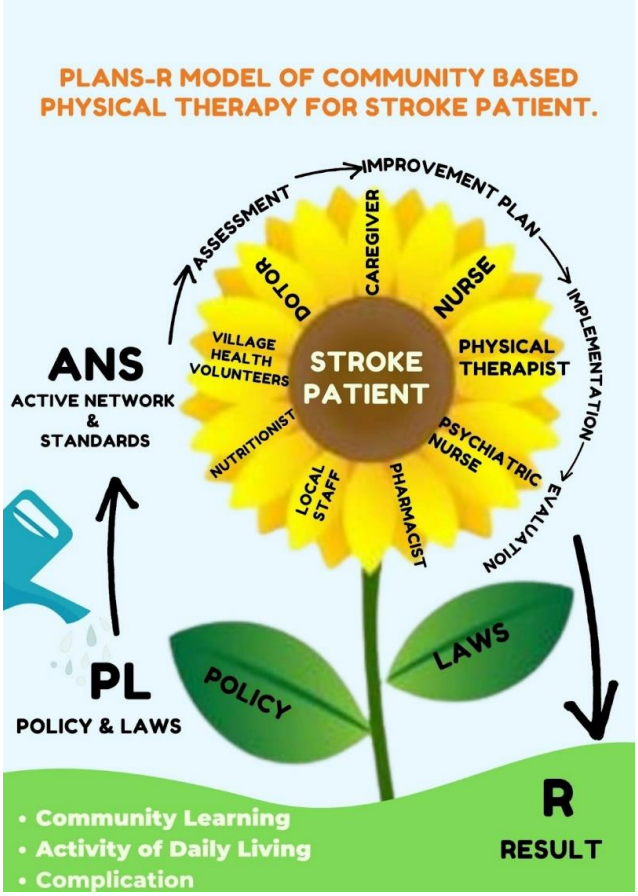

Figure 1 PLANS-R model for community based physical therapy for stroke patients.

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A health survey of household in case study: Lan Khoi community, Phatthalung, Thailand

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Abstract

The World Health Survey Plus (WHS+) is the flagship on household survey program that is announced by World Health Organization (WHO). Regarding to Lan Khoi community in Paphayom, Phatthalung is facing a health problems as chronic disease. Therefore, this study was to household survey to identify the health issue in Lan Khoi community. 185 households were collected by questionnaire and interview methods. The health issue identification was carried out by participatory method during July - September 2022. The data were analyzed via descriptive statistics. The results show that 65.9% of women have an average age of 48 years old and marriage. Half of respondents graduated on primary school. The majority of occupation was Rubber plantations for 35.1%. Regarding health data, 40% of respondents have a medical condition. 29.2% and 53.5% respondents were smoking and drinking, respectively Most of them had normal BMI and exercise regularly for 3 - 4 day per week. The health issue results clarified that the 40% respondents had Hypertension, Diabetes and Hyperlipidemia for 13%, 10.3% and 6.5% , respectively. Hence, the District Public Health Office should take into account and establish the guideline for health promotion and the regulation for surveillance system in term of the chronic diseases in Lan Khoi community.

Key words: Household Health Survey; Health; Lan Khoi community; Phatthalung

1. Introduction

World health organization (WHO) plays a role in public health care and coordination to protect and promote the health of society around the world. The WHO's original aims of working together to stop the spread of disease has now expanded to improve health everywhere in the world and promote progress in public health[1]. The overwhelming and crucial importance of achieving community health and health related sustainable development goals (HR-SDGs) in health. In addition, the World Health Organization has set up a flagship on household health program to regulate and promote the health of the population under the project "World Health Survey Plus" (WHS+)[2].

World Health Survey Plus (WHS+) is the World Health Organization's household survey-focused program. It focuses on exploring the information needed to association with health programming, policy and analysis. Regarding the observation of HR-SDGs, it provided the data system in household and their community by using WHS+ to gain more the opportunity to fill gaps in health data[2]. Health monitoring and assessments on each countries and their community is to enhance the health system. The World Health Survey Plus builds on WHO's experience in creating, analyzing and disseminating representative data from household surveys in over 101 countries, regional and global. The National Statistical Organization (NSO) has untapped potential to improve national health information systems and will be a key part of WHS+ implementation in many countries. According to track progress towards population health targets, the HR-SDGs and impact frameworks, WHS+ will drive strategic health goal measurement and add value to country data collection[3].

"NCDs" (Noncommunicable Diseases or non-communicable diseases) is the number one health problem in the world and also in Thailand, especially the 4 major NCDs, as following coronary heart disease-stroke, cancer, chronic obstructive pulmonary disease and diabetes[4]. These are the main cause of death for Thai people. This might be caused from several factors from risk behaviours such as smoking, drinking alcohol, consumption of sweet, oily, salty and insufficient physical activity. Moreover, there are social factors to drive NCDs such as the expansion of urban society, marketing strategy technological advances and communication. Department of disease control, Ministry of Public Health reported that in 2014, 14.9 million Thai population death due to 3 groups of diseases as following: 14% of communicable diseases, 71% of non-communicable diseases and 15% of injuries including road accidents and cerebrovascular disease. It has been reported that 1.4 time of male is facing these diseases more than female. Most females had diabetes mellitus, cerebrovascular disease and ischemic heart disease. Later, in 2019 Department of disease control, Ministry of Public Health[3] reported that NCDs as cancer, stroke and ischaemic heart disease is high rate of fatal in the first third diseases. Therefore, the trend of the population being at risk and suffering from NCDs is continues increasing rapidly. This is resulting in the loss of health in every year and tends to increase continuously.

Ban Lan Khoi community is located in Paphayom district, Phatthalung province, Thailand. This community is quite a large population because it consists of 487 households with 1,263 populations[5]. The community has a lot of tourists due to rafting business. The economy is growing and consumption behavior changing. Local people have changed food consumption to junk food

in term of deep fried, sweet, oily and salty which leads to health problems of the people in Lan Khoi Village. Therefore, a health problem in the community is increasing.

This study aimed to survey household health problem of the people in Lan Khoi village, Phapayom. Phatthalung, Thailand. The obtained health information is employed to develop a public health development plan in the community as well as providing important public health information to relevant government agencies in order to organize the prevention and remedy strategy

Methodology

This research is a descriptive research. Data were collected using questionnaires and in-depth interviews. 185 households were conducted by using a random sampling method. The questionnaire was created by the author, it is divided into 3 parts: personal information, health information and health behavior. The content validity was validated based on index of item objective congruence (IOC) by three experts. The health issue identification was carried out by participatory method during July - September 2022. The data were analyzed via descriptive statistics.

Results and discussion

1. Personal factor

From table 1 showed the personal factor of 180 participants in Lan Khoi village. It was found that the participants were 65.9% of female have an average age 48 year olds. Most were graduated in primary school and married. According to occupational, the participants has career in agricultural sector especially rubber plantation of 35.1%. Next, the participants were 34.1% of merchant and 25.4% of tourist business. 45% participants earned 5000-10000 baht per month. In addition to health, the 43.2% participants have an average BMI around 18.5-22.9, indicating the normal level.

Table 1 Brief personal data demographic of participants in Lan Khoi village. (n=185)

Personal factors	n (%)
Sex	
Female	122 (65.9)
Male	63 (34.1)
Age	
<19	2 (1.1)
20-29	8 (4.3)
30-39	26 (14.1)
40-49	41 (22.2)
50-59	43 (23.2)
60-69	44 (23.8)
70-79	16 (8.6)
80-89	5 (2.7)
Mean (±S.D.) 48.162 ± 10.82	

Personal factors	n (%)
Weight	
<46	18 (9.8)
46-55	56 (30.4)
56-55	66 (35.9)
66-75	27 (14.7)
76-85	14 (7.6)
>85	3 (1.6)
Mean (±S.D.) 58.478 ± 8.332	
Height	
<150	6 (3.2)
150-159	73 (39.5)
160-169	76 (41.1)
170-179	22 (11.9)
>180	8 (4.3)
Mean (±S.D.) 167.459 ± 6.392	
BMI	
<18.5	17 (9.2)
18.5-22.90	80 (43.2)
BMI	
23-24.90	43 (23.2)
25-29.90	36 (19.5)
>30	9 (4.9)
Education	
Uneducated	8 (4.4)
Primary school	89 (48.1)
Secondary school	33 (17.8)
High school	26 (14.1)
Voc. Cert/Dip Voc. Cert	16 (8.6)
Undergraduate	13 (7.0)
Status	
Single	14 (6.6)
Married	157 (84.9)
Married a widow	10 (5.4)
Divorce	4 (2.2)
Occupational	
Merchant	63 (34.1)
Weaving	2 (1.1)
Tourist business	47 (25.4)
Palm plantation	5 (2.7)
Rubber plantation	65 (35.1)
Livestock	3 (1.6)
Income	
<5000 Baht	38 (20.5)
5000 – 10000 Baht	83 (44.9)
10001 – 15000 Baht	43 (23.2)

Personal factors	n (%)
15001 – 20000 Baht	13 (7.0)
>20000 Baht	8 (4.3)
Religion	
Buddhist	178 (96.2)
Christianity	2 (1.1)
Islam	5 (2.7)

Regarding health issue, this health household survey showed that the 40% of respondents have chronic disease. As it can be seen in table 2, the Noncommunicable diseases (NCDs) in Lan Khoi village have shown the highest NCDs was Hypertension of 24% and then it was found that diabetes and hyperlipidemia of 19% and 12%, respectively. This key finding of this research is not align with the data of department of control disease, Ministry of public health, this might be due to a small number of data collection in Lan Khoi village comparing with the collected data from whole country. However, the NCDs health issue in Lan Khoi village was quite as same as the data from the ministry.

Table 2 A survey results of health issue in Lan Khoi village. (n=185)

Health information	n (%)
Chronic Disease	
Yes	74 (40.0)
No	111 (60.0)
Congenital disease (74 people)	
Diabetes	19 (10.3)
Cardiovascular disease	6 (3.2)
Cancer	3 (1.6)
Hypertension	24 (13.0)
Hyperlipidemia	12 (6.5)
Musculoskeletal disease	2 (1.1)
Other	8 (4.3)

Table 3 presents a survey of health behaviors of participants in Lan Khoi village. It can be seen from the table that the 87% participants drunk water 8 glasses per day and 75% slept 6 hours per day. However, the participants were smoking and drinking alcohol with 29.2% and 24.9%, respectively. Most had adequate nutrition as protein, carbohydrate, vitamin, mineral and fat. From this result, the participants seem to have a good behavior to protect and prevent their health.

Regarding to health prevention, the 53.5% participants do the exercise regularly for 3 - 4 day per week and 91.9% and 78.9% participants always wash the hands before eating and wearing mask. From the results indicated that most participants have an excellent behavior for health prevention.

Table 3 A survey results of health behaviors in Lan Khoi village. (n=185)

Health information	n (%)
Drinking 8 glasses of water per day	
Yes	161 (87.0)
No	24 (13.0)
Sleep for 6 hours per day	
Yes	139 (75.1)
No	46 (24.9)
Wash your hands before eating	
Yes	170 (91.9)
No	15 (8.1)
Smoking	
Yes	54 (29.2)
No	131 (8.1)
Regular exercise	
Yes	99 (53.5)
No	86 (46.5)
Drinking alcohol	
Yes	46 (24.9)
No	139 (75.1)
Wearing a hygienic mask every time before leaving the house	
Yes	146 (78.9)
No	39 (21.1)
Nutrition	
Yes	149 (80.5)
No	36 (19.5)

Conclusion

The survey of health household in Lan Khoi community, Phatthalung, Thailand was NCDs which is hypertension, diabetes and hyperlipidemia. The majority NCDs in Lan Khoi community was found hypertension. However, personal factor as BMI was shown normal. The health behavior data indicated that the participants have a good health behavior, for example, less smoking and drinking alcohol, sufficient nutrition, exercise and wearing mask. The obtained data can be employed as basic health information for various District Public Health Office as a guideline for disease prevention and surveillance.

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Key Success Factors in Surveillance Prevention and Control for COVID-19 Outbreak in the Piman Community by Village Health Volunteers, Muang Satun

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Abstract

This descriptive research aimed to explore 1) success factors in Surveillance Prevention and Control for COVID-19 in the Piman Community by Village Health Volunteers 2) effect of Surveillance Prevention and Control for COVID-19 in the Piman Community by Village Health Volunteers The sample was 119 village health volunteers drawing by purposive sampling. Data was collected during December 2021 to July 2022 using a questionnaire developed by the researcher with Alpha Cronbach of 0.76 and CVI range of 0.67-1.00. The result showed that 1) the highest success factor score was (1) vaccine reducing the COVID-19 infection rate ($\bar{X}$=4.55, S.D.=0.83) and (2) self-esteem of being a part of the COVID-19 controlling and prevention system ($\bar{X}$= 4.52, S.D.=0.75)

Key words: Village health volunteer, COVID-19, Success factors, Primary Care Unit (PCU)

INTRODUCTION

The current epidemic situation of the Coronavirus Disease 2019 (COVID-19) has resulted in many infected cases and deaths. The World Health Organization (WHO) has declared the outbreak of the disease a Public Health Emergency of International Concern (PHEIC) (WHO,2020). Coronavirus Disease 2019 is a dangerous communicable disease according to the Communicable Diseases Act B.E. practice for relevant government agencies to be able to resolve the epidemic situation to end as soon as possible (Ratchaniporn Chuensuwan,2021)

The situation of Coronavirus Disease 2019 (COVID-19) in Thailand, the Ministry of Public Health Adjusted guidelines to accommodate COVID-19 patients from May 14 to June 20, 2021. There were 81 COVID-19 patients receiving treatment per day, 3,094 cumulative patients, 1,731 recovered, and 130 continued treatment. There were 1,233 patients under treatment, 930 patients with the group of light yellow syndrome, 303 patients in the yellow group, and 928 vacant beds left (Department of Disease Control, 2021). Information proposed on 22 June 2021, the total number of COVID-19 infection cases in Satun Province were 10,613 recovery, and 73 cumulative deaths (Epidemiology, Satun Province, 2021). As of May 3, 2022, in the Phiman Sub District area, the total confirmed cases of COVID-19 were 607 cases and 10 cumulative deaths (Epidemiology, Satun Hospital, 2021). As the epidemic situation increases, public health volunteers play an important role in the success of the outbreak control operations. Prevention of COVID-19 was a collaborative work among staff, patients, and communication with people in the community. Therefore, the factors of success of the operation, surveillance, prevention, and control of COVID-19 in the community of village health volunteers at Piman Community Health Center, Muang District, Satun Province were studied to be beneficial to the development of village health volunteers and to develop the potential of this in the area to create a learning community in the future.

Objectives

1. To study the level of success factors in prevention and control of Coronavirus Disease 2019 (COVID-19) in the community by village health volunteers.

2. To study the results of surveillance of COVID-19 outbreak in the community by village health volunteers

Methodology

This is a descriptive research. Data were collected from 119 public health volunteers studied during December 2021-July 2022. Purposive sampling was used to draw the samples. Random sampling. The research instrument was a questionnaire of ‘roles, duties, and community communication of village health volunteers’ developed by a researcher from literature review. The index of item objective congruence (IOC) of the questionnaire was done by 5 experts with the range from 0.67 to 1.00. The acceptance IOC was higher than0.50 (Pranee

Lambensa. 2020). The reliability, alpha chronbach coefficient, was 0.76 with accepted value of 0.67 (Wanlop Ratchatranon. 2018. Data was collected by self-administered. Data was analyzed by using descriptive statistics.

Result and Discussion

An average of success factors resulted from the study consisting of demographic characteristics of the sample sample were 119 Village Health Volunteers. The average score of proactive COVID-19 control; perception of the severity of the disease; data search, recording, and report results, performance motivation, support medical equipment, recording, and report results was 4.53,4.24,4.49,3.72,4.24,4.31 respectively. The detail will be shown in table 1

Table 1 shows the average score, standard deviation, and interpretation of success factors for the implementation of surveillance, prevention, and control of Coronavirus Disease 2019 (COVID-19) by village health volunteers in Piman community Community

No.	Factor	Mean	S.D.	level
Proactive COVID-19 Control		**4.53**	**1.13**	**High**
1.	Home visit for education about COVID-19	4.25	0.79	High
2.	Home visits to identify sick and at-risk groups in the community	4.06	0.91	High
3.	The strictness of sick and risk groups in observing the symptoms of illness and changes with COVID-19	4.18	0.86	High
4.	Strictly requiring people to wear masks and follow government measures.	4.43	0.82	High
5.	Coordination Notify the authorities Suspected potential risk of developing COVID-19 and sending care bags to the sick group treated at home.	4.34	0.84	High
Perception of the severity of the disease		**4.24**	**0.80**	**High**
6.	COVID-19 is easily caused by coughing, sneezing, and runny nose.	4.36	0.85	High
7.	COVID-19 can cause death.	4.21	0.99	High
8.	COVID-19 has severe symptoms, such as pneumonia. Especially with people who are sick. and the elderly	4.41	0.92	High
9.	COVID-19 can reduce its severity. with vaccination	4.55	0.83	Excellent
Performance Motivation		**4.49**	**0.61**	**High**
10.	Searching for risky and sick groups is a duty that volunteers must perform.	4.42	0.87	High

11.	Working for surveillance Prevent COVID-19 work for the people	4.41	0.81	High
12.	The level of feeling that can work for surveillance and prevention of COVID-19	4.34	0.80	High
13.	Degree of pride When you are part of the work to watch. Prevent COVID-19 in the community	4.52	0.75	Excellent
Support Medical Equipment		**3.72**	**0.87**	**High**
14.	The agency has sufficient support for volunteer work equipment, such as bringing antiseptics, alcohol, gloves, masks, apron, mercury to check body temperature, etc.	3.73	1.06	High
No.	**Factor**	**Mean**	**S.D.**	**level**
15.	The agency has the support of quality equipment to work.	3.76	1.10	High
Data Search, Recording, and Report Results		**4.24**	**0.81**	**High**
16.	Village health volunteers were asked about the initial symptoms of COVID-19.	4.24	0.81	High
Data Search, Recording, and Report Results		**4.31**	**0.74**	**High**
17.	Volunteers have information on entering and exiting the area. both from the provinces and abroad	4.03	0.97	Great
18.	Data, records, and summaries of COVID-19 operations are restored. to the officer	4.01	0.98	Great

Although the level of success factors for operations, surveillance, prevention, and control of Coronavirus Disease 2019 (COVID-19) was at the highest and high level, considering each item, there still needed to be further development. Impediments to the implementation of Village Health Volunteers are a lack of knowledge and skills. Lack of work guidelines because it is an emerging disease inadequate equipment Participation of Parties and People Especially in urban communities with a diverse population in the community.

Conclusions

In conclusion, the study found that the Level of success factors of operations, surveillance, prevention, and control of Coronavirus Disease 2019 (COVID-19) in the community of Village Health Volunteers Phiman Community Health Center, the most 2 items are number 9. COVID-19 can reduce its severity. with vaccination and item 13. level of feeling of pride When you are part of the work to watch. Prevention of COVID-19 in the community ($\bar{X}$=4.55,4.52 S.D.=0.83,0.75) which needs further development. Although there is a high level of success factors for operations, surveillance, prevention, and control of Coronavirus Disease 2019 (COVID-19) Still have to consider issues that need to be very important in development using the 80/20 Pareto Rule (mean minimum, maximum S.D.), which must be further developed in village health volunteers as follows: Item 14. The agency has device support In the work of volunteer volunteers, such as bringing disinfectants, alcohol, gloves, surgical masks, aprons,

and mercury to measure body temperature. Item 15. The agency supports quality equipment for work. Item 17. Volunteer volunteers. There is information about entering and exiting the area. Both from the provinces And abroad, and item 18. There is a return of information, records, summarizing the operations of the COVID-19 disease. to officials ($\bar{X}$=3.73,3.76,4.03,4.01 S.D.=1.06,1.10,0.97,0.98) is useful for further development of the potential of Village Health Volunteers

The success factor comes from the volunteers. is true intention Pride in duty, having a volunteer spirit, and being a local person who wants to help people. There is a collaboration among network partners and community cooperation. and staff Earning trust and support from officials and monitoring operations.

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The industrial noise prevention behavior in beverage manufacturing workers

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Abstract

This quasi-experimental study aimed to evaluate the effectiveness of the noise prevention program by comparing pre and post score of noise prevention behavior. A total of 30 production workers was recruited. The face-to-face interview survey, a toolbox meeting was held to implement workplace noise prevention knowledge, and the behavior observation check sheet was used to observe the workers' behavior in real time and to assess their compliance with the noise prevention measure. Most of them were male (93.3%), had ten years or below working experience (96.7%), and were in the age group of 40 years and below (86.7%). Nearly half of them hold a high vocational certificate education. Hearing noise prevention knowledge was high and the result of the paired t-test showed a significant difference in hearing noise prevention knowledge. The industrial noise prevention attitude of participants improved from a moderate level to a good level after the intervention. Similarly, the Noise prevention behavior of participants improved from 75% to 100% after the intervention. The result of the study shows that the noise prevention program had a positive impact on the worker. The increase in hearing noise prevention knowledge, industrial noise prevention attitude, and noise prevention behavior shows that the workers have gained a better understanding of the importance of noise prevention in the workplace.

Keywords: noise exposure, noise prevention

The industrial noise prevention behavior in beverage manufacturing workers

Background

Noise-induced hearing loss, the typical health hazard in the workplace was globally continually recognized and studied. Numerous reports indicated that occupational noise exposure is a significant cause of adult-onset hearing loss.[1-5] Work-related hearing loss in Thailand from 2017 to 2021 was 73 cases registered to worker's compensation.[6] Due to enforcement measures to reduce the prevalence of hearing loss, Thailand's legislation on noise exposure, the threshold limit value is 85 dB(A). It means that any work does not allow operation in the condition of noise exceeded than 85 dB (A) for an 8-hour working shift. Generally, in working conditions in factories, high levels of noise generate from machine and process such as in sawmill factories, food and beverage manufacturing. The excessive noise levels in some areas of beverage manufacturing highlight the need for a study to assess the behavior of workers in terms of industrial noise prevention. By understanding the behaviors of workers, it may be possible to identify areas for improvement and implement measures to reduce the risk of hearing loss.

Objective

To evaluate the effectiveness of the noise prevention program by comparing pre and post score of noise prevention behavior.

Methodology

A quasi-experimental study was designed to assess the effectiveness of the noise prevention program. Data collections were performed during February and April 2018. Thirty workers who work in a beverage manufacturing located in Suratthani province, Thailand were enrolled. The inclusion criteria were worker who working in the noisy area of the production process, and agreed to participate. Noise prevention programs include questionnaires to collect essential information such as demographic data, working position and experience, occupational health and safety training experience, hearing protection usage, etc. The toolbox meetings were held to implementing workplace noise prevention measure such as noise contour and regulation, and the use of personal protective equipment. Assessment of Knowledge and practices before and after the noise prevention program was performed. The questionnaire, knowledge assessment tool, noise prevention attitude, and behavior observation tool were constructed based on theories and factory regulations. Content validity was test validity

by three experts who were familiar the noise and prevention in the factory i.e. occupational health nurse, safety officer, and the chief of engineers. Descriptive statistics were used to summarize the participants' demographic information, attitudes, and behaviors. The pair-t-test was used to compare the pre and post score of noise prevention knowledge.

Results

There were 30 production workers participated in this study. The age of the participants ranged from 22 years to 43 years with 70.0% in age below 30 years. Most of them were male (93.3%), and had ten years or below working experience (96.7%). Almost half (46.7%) had received high vocational. About three-quarters (66.7%) were machine operators. All of them use noise protective equipment (100%) as shown in table 1.

Table 1 Demographic characteristics of participants.

Characteristics	n	(%)
Age (yrs.)		
< 30	21	70.0
30 – 40	5	16.7
> 40	4	10.0
Sex		
Male	28	93.3
Female	2	6.7
Education		
Primary school	1	3.3
Secondary school	5	16.7
High school/ Vocational certificate	5	16.7
High vocational	13	46.7
Bachelor degree	5	16.7
Year of working experience		
≥ 10	29	96.7
< 10	1	3.3
Job position		
Machine operator	20	66.7
Supervisor	2	6.7
Production line assistance	6	20.0
Housekeeping	2	6.7
Previous exposed noise in working condition		
No	22	73.3
Yes	8	26.6
Never got hearing treatment	30	100.0

Audiometric test		
Never	6	20.0
Yes	24	80.0
Type of hearing protection		
Ear plug	24	80.0
Ear muff	6	20.0
Inspect and clean personal hearing protective device		
Yes	28	93.3
No	2	6.7
Occupational safety training experience		
Yes	28	93.3
No	2	6.7

Table 2 pair sample t test result for pre and post measures of hearing prevention knowledge score

Knowledge	$\bar{x}$	s.d.	df	p-value
Pre - test	8.63	0.61	29	0.006
Post - test	8.93	0.25		

The test of hearing prevention knowledge in the factory was determined, consist of 9 questions. The pre-test average score of 8.63 (with a standard deviation of 0.61) with 70% of workers scoring 9 out of 9 on the pre-test. The post-test average score of 8.93 (with a standard deviation of 0.25), with 93.3% of workers scoring 9 out of 9 on the test. The difference in noise prevention knowledge was a significant difference between before and after intervention implementation as shown in Table 2

Table 3 Noise prevention attitude before and after intervention program

Attitude and behaviors levels	before		after	
	n	%	n	%
Noise prevention attitude levels				
Good	19	62.5	30	100.0
Moderate	11	37.5	0	0.0
Fare	0	0.0	0	0.0
Noise prevention behavior levels				
Good	23	75.0	30	100.0
Moderate	25	25.0	0	0.0
Fare	0	0.0	0	0.0

Noise prevention attitude level in the before implement intervention program in good level (62.5%) but after implement intervention program all of participants were at the good level (100%)

Conclusion

The results of the study suggest that the intervention program was effective in improving the workers' knowledge about noise prevention and increasing their attitude towards it. The knowledge, attitude, and behavior toward noise prevention were high and improved after implement intervention program. The high level of knowledge and the positive attitude towards noise prevention, combined with 100% usage of protective equipment, are all positive indicators of the effectiveness of the intervention. The use of noise protective equipment was already mandatory for all workers and the results showed that 100% of participants were using it.

In conclusion, the study demonstrated that the intervention program was effective in improving the workers' knowledge, attitude, and behavior towards noise prevention in the workplace. The results suggest that ongoing monitoring and encouragement of the noise prevention program could lead to long-term improvements in the workers' behavior and compliance with the measures in place.

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Factors affecting the quality of life of public and private workers

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Abstract

The purpose of this research was to review the literature related to factors affecting the quality of life of working people in the public and private sectors. From the literature review, it was found that factors affecting the quality of life of working people in the public and private sectors can be divided into 4 aspects: (1) quality of life physically in good physical condition free from disease and have age-appropriate development It can be observed from the person's health and wellness. (2) mental quality of life. have normal mental state able to adapt to the atmosphere of society at all levels able to control emotions appropriately to various situations (3) social relations Awareness of one's relationship with other people Perception of receiving help from other people in society (4) Environmental environmental awareness That affects life, such as the perception that they live freely, not being imprisoned, having safety and security in life the perception of being in a healthy physical environment

Keywords: quality of life, working people

Introduction

At present, human beings are valuable to organizations, whether in the public or private sectors. Work is extremely important to people’s lives. The development of working people working in the public and private sectors to know how to adapt to have a happy life from work and the working conditions of the organizational system is important. Work determines a person's status and social situation. The nature of work is an essential factor in the quality of human life. Improving the quality of life at work is one way of developing the organization that is seen as an issue that directly impacts staff. The workers of the organization that management should give attention and care. In addition, organizational staff are considered the primary human resource. The organization's personnel are considered the major human resource that the organization exists to ensure a good quality of work life. As a result, this is something that will help operators achieve job satisfaction that will allow the agency to carry out its activities and achieve its objectives (Chatchawan Tasiwat, 2010). Factors affecting the quality of life of people working both in the public and private sectors 1) The physical quality of life is the perception of one's physical state that affects one's daily life. For example, the perception of the health of the body, the perception of feeling comfortable without pain. An awareness of the ability to deal with physical pain, an awareness of the strength to go about day-to-day life. Awareness of independence that does not have to depend on others awareness of their ability to move awareness of their ability to perform their daily routines. 2) The mental quality of life is the perception of the mental state of persons such as the perception of positive feelings that a person has about themselves, perception of their own image, perception of self-esteem, perception of self-confidence, perceived thoughts, memory, concentration, decision-making, and ability to learn about one's own stories, perceived ability to deal with sadness that affects life. 3) Society is the perception of the relationship of people with other people. The perception of receiving help from other people in society Perceiving that one has contributed to others in society including the perception of sexual emotion or sexual intercourse. 4) Environmental quality of life is the perception about the environment that affects the way of life. There is safety and stability in life, the perception of being in a good physical environment free from various pollution. Convenient transportation, financial benefits, health and social welfare facilities.

Quality of life is important and necessary for individuals. It's a valuable thing, and society is something that human beings can determine when they create standards. In order to have a good quality of life and to do self-development and society towards the desired objectives of every person and every family. The developed themselves in terms of education, having good ideas and attitudes, knowing how to manage self, having compassion for other people, having a career, earning income, morality and morality, etc.

For this academic article, the author focuses on important issues related to factors affecting the quality of life of people working in the public and private sectors, including physical, mental, social relations, and the environment. Therefore, this study is to review the literature or study factors affecting the quality of life of working people both the public and private sectors.

Gap of knowledge

A review of 19 studies found that most studies did not in-depth look at the factors affecting the quality of life of workers in the public and private sectors. Thus, leading to initiatives to be made in order to obtain information of interest

Objective

To study the quality of life of people working both the public and private sectors.

Scope of study

This study was a content-oriented study, focusing on factors affecting the quality of life of working people in the public and private sectors. Systematic literature review from 1973-2019

Methodology

1. Methods and keywords used to search for this study reviewed that factors affecting the quality of life of people working both the public and private sectors by searching from Google scholar, Thailis, Thaijo databases and additional documents from the thesis. Words used to search for research in English were Quality of life, Laborer, while Thai words were quality of life, working people.

2. Selection of research for review Inclusion criteria It is research that is consistent with factors affecting the quality of life of people working both the public and private sectors, and can access the full database. The abstract section clearly states that the results of the study was published in a journal in English or Thai language Exclusion Criteria Research is inconsistent with factors affecting the quality of life of people working both the public and private sectors.

3. Data extraction, once the research has been selected according to the criteria, the data of each research will be extracted for selection according to the following topics. Basic research data consists of Name of the author, year of publication, and country of study

-Target population

- rationale and objectives of the research

- inclusion and exclusion criteria - results of the research

- time frame

Literature review results

A total of 19 articles were searched for research articles related to Factors affecting the quality of life of public and private workers, 16 of which were studied in Thailand and 3 were studied abroad.

Concepts related to quality of life

1. The significance of quality of life at work The quality of life at work is the quality of the relationship between workers and their working environment. They also pay attention to the dimensions of interpersonal relationships, which are often ignored by technical and economic

factors when designing work. (Davis, 1977) The quality of life at work refers to the level of employees in an organization to meet the important needs of its members. Dublin, 1981 Therefore, it summarizes the meaning of quality of life at work, that is, happy living conditions have sufficient and fair compensation for life. Meet the important needs of the organization members.

2. The importance of quality of life The quality of life is valuable, important and necessary. For individuals and society, this is the standard that human beings can define to provide Improve the quality of life and achieve personal and social development goals. Each family has its own educational development, good ideas, attitudes and understanding. Self-management, generosity to others, occupation, income, morality and morality, etc. If everyone in society can do this. This means that it can help improve the value and prosperity of itself and the society, develop into an ideal society, and the problems in the society will decrease or disappear such as family problems, economic problems, prostitute problems, crime problems, pollution problems, poisoning problems. We do our best to develop and improve quality. People's lives have met the standards of social needs to help every member of society have a sense of happiness. (Nattapong Thepjaree, 1999:40) Therefore, it can be concluded that the quality of life is important, necessary and valuable for a person, and Society is something that human beings can set standards to improve the quality of life. It can rise and make the self and social development reach the individual's desired goal. Each family has its own educational development, good ideas and attitudes, self-management, and generosity to others. Occupation, income, morality and morality, etc.

3. Elements of quality of life

1. The physical field is the perception of physical health and well-being. No pain. Be aware of the ability to deal with physical pain. Be aware of the power of daily life. Don't rely on the independent consciousness of others, and know your own ability to act. Be aware of your ability to perform daily tasks, your ability to work, and your independence from drugs.

2. The psychological field is the perception of one's own psychological state, for example: Perception of a person's positive feelings for himself, perception of his own image, and feelings of self-esteem. Self-confidence, thinking, memory, attention, decision-making and the ability to learn stories. Be aware of the ability to deal with sadness or worry, and the understanding of various beliefs that affect the way of life. For example, the understanding of spiritual beliefs, religions, the meaning of life and other beliefs that have a positive impact on the way of life. 3. Social relationship is the understanding of the relationship between oneself and others. Recognize the help of others in society, and recognize that you are also the helper of others in society. 4. Environment is environmental awareness. It affects the way of life, such as realizing that you can live independently, not be imprisoned, and your life is safe and stable. Realize that living in a good physical environment, without any pollution, convenient transportation and sources of economic benefits. Health and social workplace. Be aware that they have the opportunity to receive news or practice skills. Be aware that they have recreational activities. Ministry of Mental Health, 2002

Components or indicators of quality of work life

The elements of the quality of work and life are as follows: the creation of the quality of work and life, including various conditions.

1. Full and fair compensation is the compensation obtained from work. It must be enough to live according to a reasonable standard of living in order to obtain fair compensation. This is due to the comparison of compensation for work in similar positions and responsibilities.

2. Considering national and healthy working conditions Working conditions) Workers should not live in a harsh environment. Both the body and work should develop environmental standards to promote health, including voice control. Visual interference, maintaining a healthy and safe environment, is the control of physical condition.

3. Stability and progress of work. (Growth and safety). Employees should improve their work ability, not lead them to do it. In the future, new tasks or tasks requiring more knowledge and skills must be assigned. Opportunities must be provided for the development within the organization. Guidelines or opportunities to improve the quality of work and life

4. Opportunities for human capacity development. The opportunity to develop and utilize employees' ability to work according to their skills and knowledge. This makes employees feel valuable and challenging in their work, making full use of their abilities. Including the feeling of participating in the work. Confidence and when there is a problem. it will take corrective measures and respond in an appropriate way of life, so that a person can succeed in life. Social integration means that workers feel valuable and accepted. And work with a group of colleagues. Feel like part of a group of colleagues. Self-exposure. Good working atmosphere. There is no hierarchy, no caste, no prejudice and mutual destruction. 5. Constitutionalism in an organization refers to what rights employees have and how to protect their rights, which depends on the culture of the organization. Respect individual rights, accept ideological conflicts, and set fair compensation standards for employees. And prepare for work to make it appropriate and relevant, which is an element to convey the quality of work and life. The balance between work and personal life (total living space) means that one must balance life by assigning roles to balance life. This is the division of time, occupation and travel. There must be an appropriate proportion between your leisure time and your family's career development. 8. Social relations refer to the activities or work that employees think are beneficial to the society. Responsible for the society, including their organizations, has made contributions to the society and increased the importance of occupation and birth. Take pride in your organization. For example, employees realize that their organization is responsible for the society in the manufacturing industry. Waste treatment, marketing methods and participation in political activities (Walton, 1973)

Conclusion

The literature review can be summarized as follows: 1. Most of the physical health quality of life were at good levels of quality of life. 2. Most of the mental quality of life were at good levels of quality of life. 3. Most of the quality of life in relation to social relations were at a good level of quality of life. 4. In terms of environment, most of them had a good level of quality of life as well. But there may be differences in personal factors such as having a stable income. Have a good job, have a good education, have a warm family life. Have good health, freedom and safety in life, etc.

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Development of gel patches for pain relief in primary dysmenorrhea from *Cissampelos pareira* compound extracts containing Yapoktongnoikublohit

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Abstract

Yapoktongnoikublohit (YT)is a herbal formula in traditional Thai medicine that traditionally use as a pain reliever in primary dysmenorrhea. Therefore, it is suitable to be used as an essential substance in the gel patches formula to reduce painful periods. The objectives of this study were as follows: (1) to develop the extraction process of pectin from *Cissampelos pareira* (*C. pareira*) leaves, (2) to develop the extraction process of YT formula, (3) to develop a gel patch containing YT extracts. There were four extraction methods of pectin from *C. pareira* leaves. The YT were extracted using a microwave extraction. The results showed that the fourth method was suitable for pectin extraction from *C. pareira* leaves by sulfuric acid. The extract is green in color, viscous, and able to high-yield extraction of pectin from the *C. pareira* leaves. It was found that the second method of YT extraction by microwave is the successful method. The extract has a dark brown appearance from the concentration of the extraction. Moreover, this method can have rich extracts. The development of gel patches for pain relief in primary dysmenorrhea is 10 formulas. The composition of the suitable formulations is the mixtures by mixing the ratio between 73.92% w/w *C. pareira* leaves extraction, 13.04% w/w YT extract, and 13.04% w/w gelatin. Therefore, it can develop a gel patches formulation containing YT extract to be used in clinical trials to further test its effectiveness on pain relief in primary dysmenorrhea.

Keywords: Gel patches, *Cissampelos Pareira*, Dysmenorrhea, Yapoktongnoikublohit extract

Purpose/Objectives

Dysmenorrhea, known as "menstrual pain" or "period pain," refers to pain experienced just before or during menstruation [1, 2]. It may affect 70-95% of menstruate individuals [3, 4] and is prevalent across socioeconomic status, ethnicity, and nationality brackets. Traditionally, dysmenorrhea is classified into two categories. Primary dysmenorrhea (PD) refers to painful cramps without evident pelvic pathology, while secondary dysmenorrhea is related to the underlying pathology. Several studies have shown that the prevalence of dysmenorrhea varies significantly between 16-91% depending on data collection methods, study definition of dysmenorrhea, and study population. The prevalence of dysmenorrhea was 77.7% in Thailand. It is also a significant public health problem for females because the various symptoms cause physical, mental, consideration, and association discomfort. Although dysmenorrhea is a common disease, it affects women of all reproductive ages and significantly impacts the quality of life, work productivity, and healthcare. [5-7]. Traditional Thai medicine principles are divided into two periods of dysmenorrhea, as before, and the period of menses. The herbal medicinal extracts of the YT recipe (the poultice for the lower abdomen that pushes the blood) were prepared as a gel patch under the instructions provided in the traditional Thai medical textbook. The herbal formula contains *Acorus calamus* L., *Plumbago* indica L., *Piper nigrum* L., *Baeckia frutescens* L., *Zingiber*

officinale Roscoe, *Derris elliptica*, *Allium sativum* L., *Senna garrettiana*, and *Alpinia galanga* L. The constituents, alpha, and beta-asarone, are the predominant bioactive components of *the Acorus calamus*. The pharmacological activities of *Acorus calamus* rhizome include sedative, Central Nervous System (CNS) depressant, anticonvulsant, antispasmodic, cardiovascular, hypolipidemic, immunosuppressive, anti-inflammatory, cryoprotective, antioxidant, antidiarrheal, antimicrobial, anticancer and antidiabetic has been reported. According to reports, plumbagin is one of the main active ingredients of the *Plumbago indica*, which has menstrual ischemia, menstrual irregularities, abortions, mental wounds, joint pains, sprains, bruises, abdominal pain, poisoning, internal swelling, leprosy, sickness, etc. *Zingiber officinale* has several chemical constituents, including gingerols, shogaols, paradols, and zingerone. These have demonstrated anti-inflammatory actions in vitro, inhibiting leukotriene synthesis, the activity of cyclooxygenase enzymes (COX-1 and COX-2), production of interleukins (Il-1 and Il-12). Studies confirmed that among different species of piper, *Piper nigrum or Piper longum* significantly reduced the severity of pain, and their analgesic potencies were mediated by piperine, which induced the inhibition of inflammatory cytokines and prostaglandin E2 or activation of calcium influx. Furthermore, used *C. pareira* to form the gel patches. *C. pareira* is in the family of Menispermaceae. It is a woody climbing vine with leaves up to 30 cm in length. The plant is found throughout warm parts of Asia, East Africa, and South America [8]. It is widespread in the northeast of Thailand. *C. pareira* has Ingredients largely attributed to several alkaloids especially bisbenzylisoquinoline alkaloids [3]. The water extracts from leaves can form a gel in a short time. Thai traditional medical professionals believe that the causes of dysmenorrhea are from four birth elements, the history of the behaviors in the past, and symptoms, so the herbal remedies for dysmenorrhea treatment are established for each patient and depend on the cause from the patient's history. For this reason, the first step of dysmenorrhea treatment was using herbal drugs to excrete waste blood deposited in the body. After that, the patients had to get an adaptogen remedy to balance their health, followed by a blood tonic remedy. These Thai plants in each remedy had scientific data supporting the reasonable use of Thai traditional remedies for reducing pain from dysmenorrhea symptoms. Therefore, this study aimed to develop the extraction process of pectin from *C. pareira* leaves and the extraction process of the YT formula. Moreover, the gel patch containing YT extracts was developed.

Methodology/Approach

Materials: *Plumbago indica*, *Acorus calamus*, *Piper nigrum*, *Zingiber officinale*, *Allium sativum*, *Derris elliptica*, *Baeckia frutescens*, *Senna garrettiana*, *Alpinia galangal*, *Cissampelos pareira*, gelatin, 90% ethanol, sulphuric acid were obtained from the open market and identified by comparing with standard herbarium specimens available in Thaksin university

The *C. pareira* leaves extraction.

There are four methods for *C. pareira* leaves extraction.

Method I: The fresh leave of *C. pareira* was extracted by water. 50 g of *C. pareira* leaf was spun in 375 mL of water at 25 °C. After that, it was poured through a sieve covered with cheesecloth for drainage. The stock *C. pareira* solutions were then stored at 4 °C for 12 h for gel coagulation.

Method II: *C. pareira* leaf was incubated at 45°C at 48 h. The 50 g of dried *C. pareira* leaf was spun in 375 mL of water at 25 °C. The stock *C. pareira* solutions were then stored at 4 °C for 12 h for the gel coagulation, then cut into thin slices to put in a glass plate and taken into the incubator at 45 °C for 2 hours.

Method III: *C. pareira* leaf was incubated at 60°C for 12 h, then took dried *C. pareira* leaf was in the refrigerator at -20 °C for 24 hours. After that, took the dried leaf of *C. pareira* with 60 °C water at a ratio of 1: 100 (w/v), spun it at low speed for 1 minute and sieved it through cheesecloth. The obtained pectin gel (Crude) Compound with 95% ethanol in a ratio of 1:1 (v/v), and left at room temperature for at least 12 hours, filtered through Whatman No. 2 to get pectin gel from *Cissampelos pareira* leaves from dialyzed.

Method IV: *C. pareira* leaf was dried under direct sunlight at temperatures between 30 and 35 °C for 12 h and incubated at 60°C at 12 h. The dried leaf of *C. pareira* was stored at -20 °C for 24 h and was pulverized separately using an electrical food blender. The powder was cleaned with 95% ethanol in a ratio 1:10 (w/v) at 60°C for 60 min, and ethanol was filtered. It was extracted with water adjusted to pH 3 using sulfuric acid at a ratio of 1:50 (w/v), immersed in water at 60 °C for 60 min, and sieved through cheesecloth.

YT extraction

There are two methods of extraction containing YT.

Method I; We take 180 grams of *Alpinia galanga* with 600 ml of distilled water, put in the microwave at medium-high for 2 min, and then take it out to mix for 1 min (repeat 4 cycles) and sieve through cheesecloth. The YT herbs were weighed 3.75 grams each (total weight 30 grams), mixed with 600 ml of *Alpinia galanga*, put in the microwave at medium-high for 2 min, taken it out to mix for 1 minute (repeat 4 cycles), and filtered through Whatman No. 2

Method II; We take 180 grams of *Alpinia galanga* with 600 ml of distilled water, put in the microwave at medium-high for 2 min, and then take it out to mix for 1 min (repeat 4 cycles) and sieve through cheesecloth. The YT herbs were weighing 3.75 grams each (total weight 30 grams), mixed with 600 ml of *Alpinia galanga*, put in the microwave at medium-high for 2 min, take it out to mix for 1 minute (repeat 4 cycles), and filtered through Whatman No. 2. The 400 ml of extract was heated by a hot plate at 90 °C to increase the concentration until 200 ml of extract remains.

The development of a gel patch containing YT extract

The 20 mL of the extracted gel from *C. pareira* leaf was mixed with 2-3 g of gelatin and immersed in the water bath at a temperature of 70 °C until it melted, mixed the extract of YT, and then poured into a square silicone mold size 4*7 centimeter and put in the refrigerator at 4 °C for 24 hours.

Conclusion/Implications/Recommendation

The *C. pareira* was extracted by four methods. We observed the appearance at finish extraction for texture, color, agglomerate, flexibility, and adhesive (Table 1, Figure 1-4). In the previous report, the production of pectin extracted from fresh leave and dried leaves of *C. pareira* was 7.56 and 21.06 %, respectively (based on the dry weight of 100 g. leave of *C. pareira*). Most solids extraction should be dried first to

remove water and then ground thoroughly to increase the surface area in contact with the solvent. It also increases the extraction rate [9].

Table 1 Appearance at finish extraction of *C. pareira* leaf.

Method	Appearance at finish extraction					
	Texture	**Color**	**Agglomerate**	**Flexibility**	**Separation**	**Adhesive**
I	Soft	like dark green jelly	yes	no	yes	no
II	Hard	Dark	yes	no	yes	no
III	be watery	green light	no	no	yes	no
IV	Light	dark light	yes	yes	no	yes

Figure 1 The fresh leave of *C. pareira* was extracted by water (method I)

Figure 2 The fresh leave of *C. pareira* were extracted by water and put in a hot air oven. at 45 °C (method II)

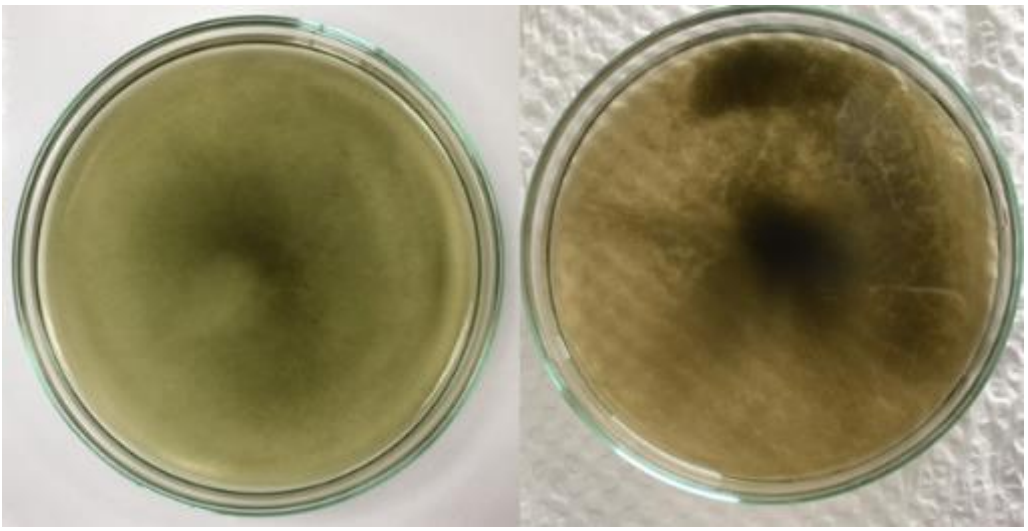
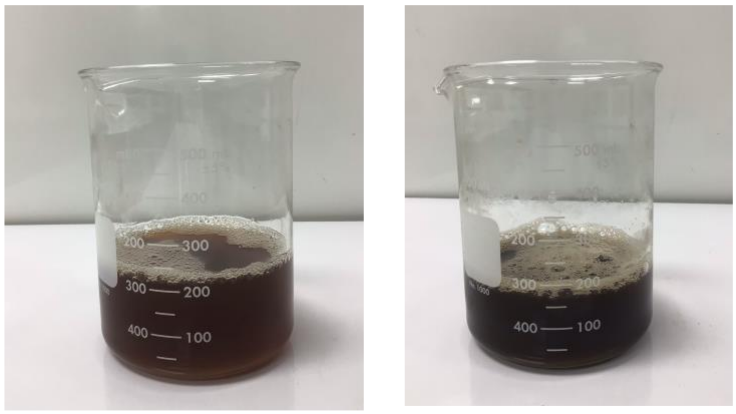


Figure 3 The dried leave of *C. pareira* were extracted with 95% ethanol (method III)

Figure 4 The dried leave of *C. pareira* were extracted by using sulfuric acid (method IV)

The results showed method I of YT extraction is a light brown, specific fragrance. As a result, the extract is lowly concentrated because the amount of water exceeds the number of herbs in the recipe. Method II was the best method for YT extraction because the extract is more concentrated than method I. After that, we evaporated the extract using heat on a hot plate. The temperature is controlled at 80-90 °C until the extract is obtained at the desired concentration. As a result, the extract is dark brown and has a specific fragrance. (Figure 5)



(A) method I (B) method II

Figure 5 The YT extraction by (A) method I and (B) method II

The gel patches containing YT extraction were developed. Blending ten formulations of gel patch were done by mixing *C. pareira* gel YT extracts and gelatin in the ratio (Table 2)

Table 2 The ratio of *C. pareira* gel YT extracts and gelatin in gel patch formula

Formula	*C. pareira* gel (g)	YT extracts (g)	Gelatin (g)
1	20	-	2
2	19	1	2
3	18	2	2
4	17	3	2
5	16	4	2
6	20	-	3
7	19	1	3
8	18	2	3
9	17	3	3
10	16	4	3

We found in formula 1 that the gel patch was homogeneous, semi-rigid, and non-flexible, with no separation or precipitation, green color. When the gel patch was left at room temperature for 30 minutes, after 2 minutes, it was found that the gel dissolved into water. Formulas 2-5. All four formulas of extracts were prepared into a gel patch and stored in the refrigerator at 4 °C for 24 hours. It was found that all four formulas of the gel patch were homogeneous, semi-rigid, lowly flexible, and not separate layers or sediment. It has the natural color and smell of herbs. When the gel was left at room temperature for 30 minutes, after 2 minutes, it was found that it dissolved into water. Formula 6 was stored in the refrigerator at 4 ºC for 24 hours, and then it was found that be homogeneous, semi-rigid, flexible, with no separation or precipitation, and green color. When we left the gel patch at room temperature for 30 min, the gel patch decreased in hardness, was lumpy, and was not adhesive when we applied the gel patch to the skin at 2 min, it was found that the gel patch dissolved but

still had a viscous gel on the skin. Formulas 7-10 were homogeneous, semi-rigid, low flexibility, and had no separation or sediment. It has the natural color and smell of herbs. After we left the gel patch at room temperature for 30 minutes, it was found that it decrees hardness, was lumpy and did not dissolved, and when the gel patch was applied to the skin for 2 minutes, it was found that the gel patch dissolved but still had a viscous gel on the skin. Formulation 9 is the best formula. The gel is homogeneous, semi-rigid, flexible, and does not separate layers or sediment. It has herbs' natural colour and smell (Table 2 and Figure 6). Moreover, formulation 9 had a high ratio of YT, containing more than other formulas.

Table 2 The gel patch appearance at room temperature (30 ºC) and gel appearance when attached to the skin.

Formula	Gel appearance at room temperature (30°C)					Gel appearance when attached to the skin				
				Melting					Melting	
	Touch	Color	Oder	At 2 m	At 30 m	Touch	Color	Oder	At 2 m	At 30 m
1	x	x	x	/	/	-	-	-	-	-
2	/	/	/	/	/	-	-	-	-	-
3	/	/	/	/	/	-	-	-	-	-
4	/	/	/	/	/	-	-	-	-	-
5	/	/	/	/	/	-	-	-	-	-
6	x	x	x	x	/	/	x	x	x	x
7	/	/	/	x	/	/	/	/	/	x
8	/	/	/	x	/	/	/	/	/	x
9	/	/	/	x	/	/	/	/	/	x
10	/	/	/	x	/	/	/	/	/	x

Touch; / = soft, x = hardness Color ; / = brown, x = green
Order; / = herbal order, x = no herbal order
Melting at 2 m and 30 m; / = melting gel patch / x = no melting gel patch

Figure 6 Characteristics of formula 9 gel patch

Conclusion/Implications/Recommendations

The extraction from *C. pareira* leaves by sulfuric acid that method was suitable to be used for extraction of *C. pareira*. The extract is green in color, viscous, and able to high-yield extraction of pectin from the *C. pareira* leaves. It was found that the

second method of YT extraction by microwave is the successful method. The extract has a dark brown appearance from the concentration of the extraction. Moreover, this method can have rich extracts. The development of gel patches for pain relief in primary dysmenorrhea is 10 formulas. The composition of the suitable formulations is formulation 9. We found the mixtures by mixing the ratio between 73.92% w/w *C. pareira* leaves extraction, 13.04% w/w YT extract, and 13.04% w/w gelatin. Therefore, it can be further developing a gel patches formulation containing YT extract to be used in clinical trials to further test its effectiveness on pain relief in primary dysmenorrhea.

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The Development of Flu V-ACCINE Model for Influenza Vaccine Service Systems for 6 Months - 2 Years Old Children in Khuankanoon - Phatthalung

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Abstract

This action research aimed to develop the model for influenza vaccine service systems for 6 months - 2 years old children in Khuankanoon District, Phatthalung Province. This study was divided into two main phases: phase 1) development of conceptual framework of influenza vaccine service systems for 6 months -2 years old children in Khuankanoon by literature review guided by concept analysis as proposed by Walker & Avant and phase 2) development of model of influenza vaccine service systems for 6 months -2 years old children in Khuankanoon by deploying the activities in the conceptual framework into practice. The phase 2 consisted of 4 stages of 1) Flu Vaccine service-assessment of the context 2) Flu Vaccine service-component identifying and gap assessment 3) Flu Vaccine service-nurturing design for minimizing gap and 4) Flu Vaccine service-enhancement for sustainability. The research was conducted during November, 2021 to May, 2022.The sample were 443 of administrators (19), vaccine responsible staff (17), village health volunteers (34), public health officers (60), and guardians of children (313). The research instruments were: 1) in-depth interview for administrator, 2) focused group interview for vaccine responsible staff, 3) focused group interview for village health volunteer, 4) questionnaire of knowledge attitude motivation practice and community learning for public health officer and 5) questionnaire of knowledge attitude belief perception practice and community learning for guardians of 6 months -2 years old children. The instruments were assessed for content validity and reliability. Then, the 4 stages were concluded as a “Flu V-ACCINE” model for influenza vaccine service systems for 6 months -2 years old children in Khuankanoon. The Flu V-ACCINE model was an original model which required continuous refinement for a more effective model. The model could be applied into management, service and research in vaccine delivery systems.

Keywords: Flu Vaccine; Vaccine service system; 6 months-2years old children; Flu V-ACCINE model

1. INTRODUCTION

The number of flu infected patients worldwide has been decreasing and was lower than outbreak standard. (Bureau of General Communicable Diseases Department of Disease Control, 2021) In Thailand, 2021, there were 5,914 flu patients (8.92: 100,000 population) with no death rate. The comparison with 5 medians a year, being retrospective (2016-2020), was lower than standard. In 2021, Phatthalung province, there were 51 flu patients (9.3:100,000 population). (Phatthalung Provincial Public Health Office, 2021) In Khaunkanoon district, there were 6 flu patients. Of these, three cases were 6 months -2 years old and two cases were 3-4 years old with no death rate. Although the overall number of flu patients decreases, the infection in newborn- 4 years old fluctuates. The infection in newborn - 4 years old children is the most critical compared to those in other age groups. (Dawood FS., 2011) Flu vaccination prevents and minimizes the complications and death rate from flu infection, (Shangyom D, 2018) especially in newborn -5 years old children. (Thanaphatsiriyakun P., 2009 and Abdel-Hady DM., 2017) The severe complication in this group is pneumonia. The hospitalization in 6-23 months old children is the highest and most severe complication compared to those in other age groups as well. (Esposito S, 2012) The aim of the Ministry of public Health is 100% flu vaccine in 6 months-2 years old children. (Bureau of General Communicable Diseases Department of Disease Control, 2021) However, the vaccination in children of 6 months- 2 years old during 2016-2021 was 0.00, 0.00, 5.40, 39.25, 1.95 and 3.32, respectively. (Phatthalung Provincial Public Health Office, 2021)

Flu vaccine service systems performs based on health immunization standards regulating by the Ministry of Public Health (MOPH) (Bureau of General Communicable Diseases Department of Disease Control, 2015) (Petchatree S., 2021) which covers the 7 risk groups such as pregnant woman, elderly over 65 years old, high risks group (DM, HD etc.). Because of the typical epidemic season of the flu virus strain, the flu vaccination annual period in Thailand is during May-September as suggested by the World Health Organization. (World Health Organization (WHO), 2021) The policy of MOPH, National Vaccine Institute (NVI), and the National Health Security Office (NHSO) states that the goal of flu vaccination in the target group should be higher than 80%. (National Health Security Office, 2020) Flu vaccine coverage in Phatthalung province in 2020 and 2021 was 64.66% and 75.25%, respectively. (Phatthalung Provincial Public Health Office, 2021) Khaunkanoon district, the flu vaccination in 6 months -2 years old children has beings lower than the government goal, 39.25%, 1.95% and 3.32%, in 2019, 2020, 2021, respectively which was contrast with the severity of flu infected complication. (Tippayamongkholgul M, 2016) (World Health Organization (WHO), 2021) These statistics implied some obstacles or issues relating to un-coverage of flu vaccine in the province i.e. duration of vaccination (May-August), children guardian attitude as well as client awareness. (World Health Organization (WHO), 2021)

Factors affecting vaccine acceptance from several literatures included 1) provider factors i.e. knowledge, (Goss MD, 2019) attitudes, job motivation (Alolayan A, 2019), and advisory (Boes L, 2019), 2) customer characteristics i.e. gender; age; career; education level; attitudes, (Ramprasad C, 2017 and Carison SJ, 2019), belief, (Chan TC, 2014) perception (Low MSF, 2017 and Glatman-Freedman A., 2019) of risk, vaccine benefit, and severity of flu disease, 3) Service systems i.e. accessibility (Han Y, 2019) appointment guideline, appointment reminder, (Kahn KE, 2018) and community public relations, 4) environment factors i.e. policy, politics, social norm, communication, media influencing, and peer influencing, (Kahn KE, 2018) 5) vaccine

factors i.e. sufficiency, readiness for use, vaccine allocation, vaccine information (safety, complication). (Macias A, 2021 and Santibanez TA, 2020) These factors, as the influencer of vaccine acceptance, are the major antecedents of vaccine service systems. The attributes of vaccine service system included vaccine service management and cold chain system, vaccine service systems, and immunization data storage system. The most expected outcome of antecedents and attributes of vaccine service is "vaccine acceptance". The clarification of antecedents, attributes and consequence of vaccine service is the most important to create the model of vaccine service systems. Walker and Avant concept analysis method proposed 8 steps for clarifying the concept (conceptual framework) which are selection of concept for analysis, aim and objective of analysis, identifying uses of the concept, determining the defining attributes, constructing a model case, constructing additional cases, identifying the antecedents and consequences of the concept, and defining the empirical referents for the concept.

Khuankanoon District, Phatthalung Province is a very strong network, especially the network of public health staff, village health volunteer, community leaders, and stakeholders relating to flu vaccine system. This research, thus, aimed to develop the model of influenza vaccine service systems for 6 months - 2 years old children of Khuankanoon. The result is expected to be applied in Khunkanoon as well as modified for more applications.

2. OBJECTIVES

The objective of this study was to develop the model of influenza vaccine service systems for 6 months - 2 years old children of Khuankanoon District, Phatthalung Province.

3. METHODOLOGY

3.1 Study Design

This research was an action research aiming to develop the model of influenza vaccine service systems for 6 months - 2 years old children of Khuankanoon District. The study divided into two main phases:

Phase 1) development of conceptual framework of influenza vaccine service systems for 6 months - 2 years old children in Khuankanoon by literature review guided by concept analysis as proposed by Walker & Avant (2005) and the preliminary study (Boonyapitak and Choeibuakaew, 2022)

Phase 2) development of model of influenza vaccine service systems for 6 months - 2 years old children in Khuankanoon by deploying the activities in the conceptual framework into practice. The phase 2 consisted of 4 stages of 1) Flu Vaccine service-assessment of the context 2) Flu Vaccine service-component identifying and gap assessment 3) Flu Vaccine service-nurturing design for minimizing gap and 4) Flu Vaccine service-enhancement for sustainability. Then, the 4 stages were concluded as a "Flu V-ACCINE" model for influenza vaccine service systems for 6 months -2 years old children in Khuankanoon.

3.2 Samples

The sample consisted of 443 samples, 19 administrators from Khuankanoon hospital, district public health office, health promoting hospitals, 17 vaccine responsible staff from health promoting hospitals, 34 village health volunteers, 60 public health officers, and 313 guardians of 6 months -2 years old children in Khuankanoon. These samples were the key persons who will drive the model in the future after the researcher fading out from the project.

3.3 Study Instruments

The research instruments were: 1) in-depth interview for administrator, 2) focused group interview for vaccine responsible staff, 3) focused group interview for village health volunteer, 4) questionnaire of knowledge attitude motivation practice and community learning for public health officer and 5) questionnaire of knowledge attitude belief perception practice and community learning for guardian of 6 months - 2 years old children. The instruments were assessed for content validity and reliability of measure. (Boonyapitak and Choeibuakaew, 2022)

3.4 Data collection

There were 2 main phases of model development. The data collection in each phase depended on the purpose of data utilization as shown in Table 1.

Table 1: Activity, tool, data, and data analysis of the Flu V-ACCINE model development

Activity/Tool	Data	Data analysis
1.Policy and support of administrators	In-depth interview	Thematic analysis
2.Role of vaccine responsible staff	Focused group interview	Thematic analysis
3.Role of village health volunteers	Focused group interview	Thematic analysis
4.Knowledge attitude motivation practice and community learning of public health officers	Level of knowledge attitude motivation practice and community learning	Descriptive statistics (Mean/SD/Percentage/ Frequency)
5.Knowledge attitude belief perception practice and community learning of guardians of 6 months - 2 years old children	Level of knowledge attitude belief perception practice and community learning	Descriptive statistics (Mean/SD/Percentage/ Frequency)

4. RESULTS

The research was conducted during November, 2021 to May, 2022.The result of phase I was a **"**Flu-V-ACCINE" framework of vaccine service systems for 6 months - 2 years old children in Khuankanoon District, Phatthalung Province as shown in the figure 1 and detail in table 2.

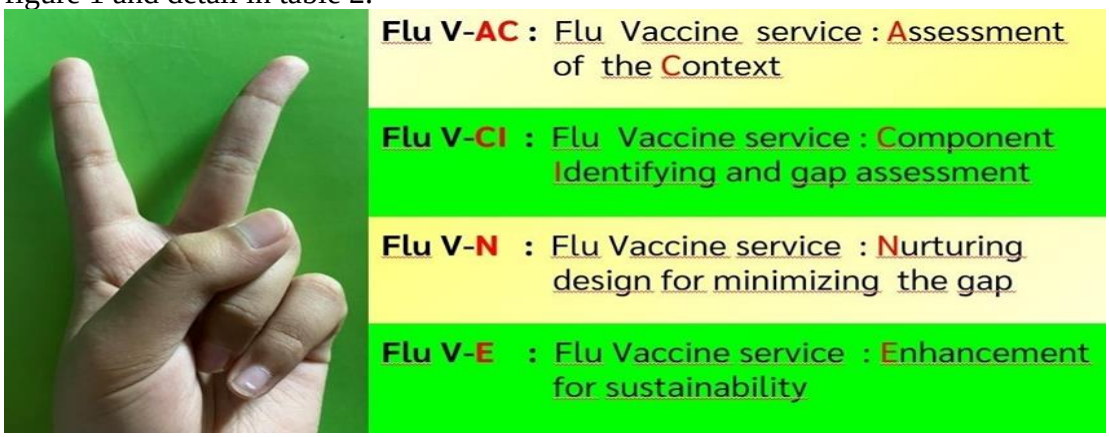

Figure 1: Flu V-ACCINE conceptual framework of vaccine service systems for 6 months - 2 years old children in Khuankanoon District, Phatthalung Province

The result of phase II remained the conceptual framework as shown in figure I with the change of detail after the implication of Flu V-ACCINE conceptual framework, the appropriateness was determined and summarized. There were 4 steps confirmed: 1) Flu V-AC: Flu vaccine service -Assessment of the Context, 2) Flu V-CI: Flu vaccine service - component identifying and gap assessment, 3) Flu V-N: Flu vaccine service - nurturing design for minimizing gap, and 4) Flu V-E: Flu vaccine service - enhancement for sustainability. The detail of a particular stage was presented in table 2.

Table 2: The description for action of Flu V-ACCINE model for vaccine service systems for 6 months - 2 years old children in Khuankanoon District, Phatthalung Province

Steps	Description for actions
1. Flu V-AC: Flu vaccine service -Assessment of the Context	1. Identifying the involved persons in flu vaccine service systems for 6 months - 2 years old children 2. Exploring the flu vaccine service systems for 6 months - 2 years old children 3. Assessing factors affecting the flu vaccine acceptance by the guardians of 6 months - 2 years old children 4. Assessing factors affecting flu vaccine service management for 6 months - 2 years old children of public health staff
2. Flu V-CI: Flu vaccine service-Component Identifying and gap assessment	1. Identifying the component in flu vaccine service systems for 6 months - 2 years old children 2. Assessing the gap in flu vaccine service systems for 6 months - 2 years old children
3. Flu V-N: Flu vaccine service -Nurturing design for minimizing gap	1. Gap analysis and bring to the plan 2. Nurturing design for minimizing gap in flu vaccine service systems for 6 months - 2 years old children
4. Flu V-E: Flu vaccine service -Enhancement for sustainability	1. Assessing the developing in flu vaccine service systems for 6 months - 2 years old children 2.Comparing Assessing factors affecting flu vaccine service management for 6 months - 2 years old children of public health staff 3. Comparing the vaccine service system implementing by Khaunkanoon district with the MOPH vaccine delivery guideline 4. Assessing knowledge, attitude, job motivation, vaccine service performance, and learning organization of involved healthcare staff 5. Compare Assessing factors affecting the flu vaccine acceptance by the guardians of 6 months - 2 years old children

5. CONCLUSION

The Flu V-ACCINE model for vaccine service systems for 6 months - 2 years old children in Khuankanoon consisted of 4 steps. This is the first model developed for flu vaccine service systems for 6 months - 2 years old children in community hospitals. Thus, the refinement of the model should be further examined. Moreover, the model could be applied for a vaccine service system for children, research and management.

6. SUGGESTIONS

1) The authorized administrators should take this result into the plan and implementation for more effectiveness of the vaccine system application for example, the route of vaccine delivery should be set and the driver should be well trained

2) The involved staff should encourage the policy enactment in mandating the Flu vaccine in 6 months - 2 years old children

3) Application of the Flu V-ACCINE is introduced. However, the content validity and reliability should be reexamined for more fitness for use

4) Encouraging continuous learning on Flu vaccine service system is suggested to creating sustainability of the Flu V-ACCINE model

5) The refinement of the Flu V-ACCINE model is highly recommended to ensure the continuous quality of Flu vaccine system

6) The evaluation of the Flu V-ACCINE model by the experts is critical to conduct

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A review of factors affecting the musculoskeletal disorders of workers in the industrial sector

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Abstract

One of the most common occupational injuries of workers in manufacturing is Musculoskeletal Disorders (MSDs) which have been recognized as a high-risk group. It has been reported that nearly 1.71 billion workers around the world is facing MSDs which is normally presented at neck, shoulder, upper limbs and low back. The effect of disorders directly impacts to health issues, working efficiency, economic loss and indemnity costs. Therefore, the manufactories should recognize and prevent occurred problems. The purpose of this study was to review the factors affecting the musculoskeletal disorders of industrial workers and discussed the basic of their promotion and prevention in term of occupational management. Numerous factors are caused to develop MSDs in industrial workers and also the guideline to control risk of MSDs that will be discussed in this paper.

Key words: Musculoskeletal disorders; industrial; workers

1. Introduction

Symptoms of Musculoskeletal Disorders (MSDs) is caused by injury to muscles, ligaments, nerves, bones and joints, and the part that helps support the structure of the body around the back and neck. It leads to muscle pain because of continual exercise, lifted force, vibration, or improper posture movements. (Bruno R. da Costa and Edgar Ramos Vieira, 2010) Therefore, musculoskeletal disease is a main health problem that affects quality of life, healthcare and working performance in professionals. The number of patients of the MSDs is increasing every year and relate to their work.

MSDs has been acknowledged as one of the most common occupational injuries of workers in manufacturing. The intensive epidemiological researches has discovered a high incidence and prevalence of low back musculoskeletal illnesses among workers. Furthermore, work-related musculoskeletal disorders (WMSDs) are among the foremost reasons of occupational diseases. It has been reported that the prevalent of work-related MSDs are 1.71 billion people around the world (Ali Murtoja Shaikh et.al, 2022). Workers are facing a variety of musculoskeletal disorders symptoms such as low back pain (LBP), upper limbs, shoulder and neck pain. Ali Murtoja Shaikh et.al, (2022) reported that elderly woman 18% suffered MSDs and around 33% have low back pain. Moreover, The United States Bureau of Labour Statistics stated that mining workers have low back pain with rate for WRMSDs as 42.5 per 10k full time worker. As the same results in India, the mining worker has been facing a musculoskeletal pain especially lower back with 58.18%. With respect to WRMSDs in Thailand, Social Security Office reported that the WRMSDs patients are increasing 955 case in 2019 to 1033 case in 2021 as show in Fig 1. The most WRMSDs patients was the 25-29 year old. Their occupational was general laborers, controlled machines and hand craft workers

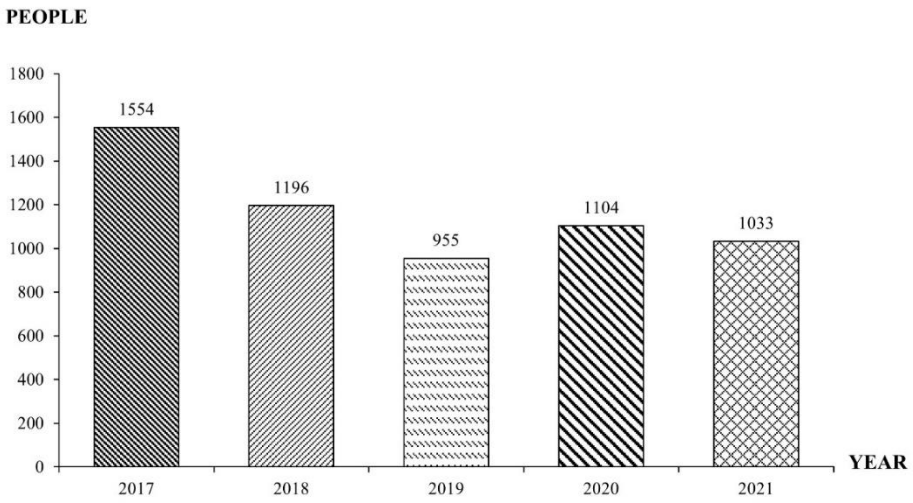

Figure 1 The number of work-related musculoskeletal disorders patients in industrial sector between 2017 and 2021

Figure 1 show that the number of skeletal and musculoskeletal disorders associated with work increasing continuous every year and tend to accumulate chronically disease. So, it might be cause a growing lost-time claim rate (Tyler Amell and Shrawan Kumar, 2001) and a huge cost of compensable claim every year (Collins, O'Sullivan. (2015). Regarding factor related to MSDs, there are various factors involved, such as, repeated exertion or incorrect working postures for a long period of time (Nattanai Yodyingnakchaikon, 2020), repeating the posture using the hands or arms, ergonomic factor and psychosocial factors (Thiphanan Toonsang, and et al., 2018)

Several studies had been reported the prevalence and factor related to MSDs in industrial sector. Therefore, the aim of this study was to review the factors affecting the musculoskeletal disorders of industrial workers. The principal contributory role of factor is presented.

2. Methodology

An extensive review of the rational was performed to categorize the research carried out in WMSDs. Information about research publication were acquired in the international online databases such as Science Direct, PubMed, Web of science, Scopus, ProQuest and Google scholar, and in house database as Thaijo. The scientific paper or articles published between 2001 and 2022 has been selected with the key words of work-related musculoskeletal diseases (WMSDs), musculoskeletal diseases (MSDs), industrial workers, affecting factor of WMSDs or MSDs.

This work employed the following criteria for inclusion of the study: (1) scientific paper or articles published between 2001 and 2022 (2) the research or academic articles examined the factors causing musculoskeletal disorders in industrial worker. (3) studies involved in both domestic and international industrial.

The exclusion criteria were that scientific paper or articles published was not related to factors that cause muscle pain or musculoskeletal disorders and it was not relevant to industrial sector.

3. Results

Work-related musculoskeletal disorders are commonly mentioned to several synonyms including occupational musculoskeletal injuries and complaints. Factors contributing to the onset of work-related musculoskeletal disorders include personal physical, physiological as well as psychological components in addition to sociological.

3.1 Factors affecting abnormalities of bone and muscle system

Work-related musculoskeletal diseases (WMSDs) are symptoms that cause joint related diseases. Muscles, tendons, joint ligaments, nerves and other soft tissues (Chan Pattama Polyong et al., 2017). From the study of factors affecting symptoms of skeletal and musculoskeletal disorders of professional groups in all 9 industries, including gas filling employees, electronics factory workers, the rubber lumber factory, the

automotive industry factory, ceramic worker cha wood furniture quarry worker, glassware industry workers and crocodile bag sewers. The study reviewed that the factors leading to the abnormalities of the skeletal and muscular systems varied with the occupational groups. It was found that there are factors that cause different skeletal and musculoskeletal symptoms according to occupational groups 4 factors: personal factors, ergonomic factor, social psychological factors and factors related to work and working environment.

Personal factors

Individual factors were gender, age, body mass index, education level, exercise work experience, marital status and smoking. The study found that occupational group of gas filling workers, electronics factory workers, rubber wood processing worker, employees in the automotive industry, ceramic production worker, quarry worker and glass industry workers presented individual factors correlated with symptoms of skeletal and musculoskeletal disorders.

With respect to the electronics industry employees, it was shown that most employees had a normal body mass index. The prevalence of muscle pain related from work presented the organ target pain were feet and ankles, hands and knees, and hips and thighs, respectively (Thiphanan Toonsang, and et al., 2018). However, the BMI associated with muscle pain of electronic worker has a positive effect on the incidence of muscle aches. This means that in the electronics factory workers, if the body mass index increases, muscle aches will increase (Thiphanan Toonsang, and et al., 2018). However, several studies of MSDs reported that differed industrial sector worker related to different individual factors as shown in table 1. The employees in the electronics industry have personal factors related to gender, body mass index, work experience (Thiphanan Toonsang, and et al., 2018). Electronic assembly worker has a personal factor on WMSDs including gender, work experience and year of work. Moreover, Gender and age were found in gas filling workers. However, rubber wood processing factory workers have shown the variety of personal factor as gender, body mass index, experience/year of work due to activity and posture during working. According to the automotive industry, body mass index, physical activity were the main factor related to WMSDs. From table 1 presented only educational level has been associated to WMSDs in ceramic workers. Personal factor related to WMSDs of Quarry workers in the mining industry was age, body mass index, work experience/year of work, and it was reported that prevalence of skeletal and musculoskeletal problems among bricklayers was higher than in stone cutters worker. (Dehaghi et al., 2021) among glassware industry workers, namely age, body mass index, education level marital status and smoking which is a personal factor in the onset of symptoms of skeletal and musculoskeletal disorders

Table 1 Personal factor related to WMSDs in each industrial

Industrial worker	Objective	Methodology	Personal factor finding	Author,Year
Electronics industry	Study of muscle pain and factors affecting muscle pain	Using questionnaires	Gender, body mass index, work experience	Thiphanan Toonsang, and et al. (2018).
Electronic assembly	To prevalence and relationships of cervical MSDs and the complex cindividual, physical, psychosocial factors	Using questionnaires	Gender, work experience/year of work	Maimaiti, Wang, and et al. (2019).
Gas filling (Thai gass employees packing staff)	- To determine the prevalence of WMSD - To study factors related to the WMSD	Using questionnaires	Gender, age	Nutdanai Yodyingnakchaiyakron. (2020).
Rubber wood	To assess the ergonomic risk of working posture affecting the musculoskeletal disorders	Using questionnaires & Rapid Entire Body Assessment (REBA)	Gender, body mass index, experience/year of work	Nitchakan Thawornkit, and et al. (2022).
Automotive industry	To study was to determine the prevalence and associated factors with musculoskeletal disorders	Using questionnaire and Modified nordic questionnaire	Body mass index, physical activity	Wamarin Keereewat, and et al. (2022).
Ceramic	evaluate the prevalence and factors of the musculoskeletal symptoms	Using questionnaire and Modified Nordic questionnaires	Educational level	Phudis Raktrakul, and et al. (2021).
Quarry	evaluate the working postures and prevalence of musculoskeletal problems	Using Nordic Musculoskeletal questionnaires & REBA	Age, body mass index, work experience/year of work	Dehaghi , et al. (2021).

Ergonomic factors

General factors have been defined as essential for the development of WMSDs including inadequate recovery time resulting task achievement, high task repeating, as well as incorrect/undesirable posture and high force supplies of a task. Moreover, the physical or mechanical factors, psychosocial factors for example anxiety/stress, additionally, behavioural and social/organizational factors also contribute to the high risk of WMSDs growth. There are several study reported that an aforementioned factor that need to be considered and accounted for factor related to work-related musculoskeletal disorders. Conversely, these factors are joint in variable proportions and there is adequate risk of disorder development (Tyler Amell and Shrawan Kumar, 2001)

Ergonomic factors include working posture and undesirable awkward or poor body postures. It was found that working posture was significant factor associated with skeletal and musculoskeletal disorders in various industrial occupational. The posture can be defined following by standing, working station and physical activity. Regarding the work posture, the electronics industry, rubber wood processing, the automotive industry, ceramic staff, the electronics industry and glass industry workers and wood furniture worker presented an extremely one postural as standing during the period of working time. Moreover, there are some study has been reported that the work station is an important factor related to WMSDs in rubber wood industrial. This is because the working posture of rubber wood converting staff have to move the whole body and gestures to work in a repetitive manner all the time along the work station (Nitchakan Thawornkit, and et al., 2022). The work station is unsuitable for moving the body that may cause employees to experience muscle pain as neck and shoulder pain. In terms of using force to work, glassware worker has to work by forcing for production in various working steps such as pick up and lift up a heavy equipment and melt metal process that can lead to rise WMSDs.

Nitchakan Thawornkit, and et al.,(2022), studied risk of work related Musculoskelatal Disorders in Worker of Rubber wood industries. It was found that results of the ergonomic risk assessment by using REBA presented a very high risk. Muculoskeletal pains was the lower back (90.62%), upper back (83.37%), and shoulder (75.00%) respectively. However, Thiphanan Toonsang, and et al.,(2018) reported high prevalence of pain of the feet & ankle, hand & wrists and hip & thigh in electronics industries.

Social Psychological Factors

This social psychological factors including stress. Maimaiti et al., (2019) reported that the stress or depression factor was an indirect effect toward on WMSDs in the in electronics manufacturing workers. Furthermore, psychosocial factors has a positive effect on muscle pain. This means that if there is more stress, it will affect to increasing muscle aches (Thiphanan Toonsang, et al., 2018).

Working factors and working environment

Factors related to work and the work environment studied were length of work. and vibration There are some study reported that length of work leading to affects symptoms of skeletal and musculoskeletal disorders. With respect to vibration, in the informal labor group, the occupation of rubber wood processing worker and crocodile bag sewers and glass industry employees have an indirectly affects WMSDs (Maimaiti et al., 2019). According to a study of Thitima Chauychoocherd, and et al, the author studied The results show that wood furniture industry workers can face the problem from WMSDs that bone and muscle abnormalities within 7 and 12 days of working day. Moreover, there have multiple sclerosis in the lower back, buttocks/thighs, shoulders and knees ranked the top within 4 in 7 days. Therefore, the number of working days/weeks is related to abnormalities of skeletal and muscular systems (Thitima Chauychoocherd et al., 2020). However, sewing crocodile leather bags worker has seamstresses but consecutive periods of sitting at work were associated with musculoskeletal disorders (Khwankhae Nunbhakdi et al., 2022). The likelihood of developing abnormalities in the musculoskeletal system is greater compared to informal workers who work 5-6 days/week. The glass industry worker was found that the production of art ware glassware is monotonous, labor intensive, and demands longevity during work shifts. This can lead to the development of musculoskeletal disorders (MSDs).

4. Conclusion

In this study, 9 occupations were employed to review WMSDs in the various industrial sectors, including gas filling workers, electronics industry workers, rubber wood processing factory, the automotive industry, ceramic staff, wood furniture maker quarry worker, glass industry workers and staff sewing crocodile leather bags. The personal factors, ergonomic factor, social psychological factors and factors related to work and working environment were reported that they were the key factors to contributed to the symptoms of abnormalities in the skeletal and musculoskeletal systems. The severity and prevalence of symptoms depend on these factors.

Most industry careers involve monotonous work and have inappropriate working postures. This may be resulting in abnormalities in the skeletal and musculoskeletal systems or various aches and pains. There are levels of prevalence and severity according to work conditions and factors as mentioned above which the study stated ergonomic factors were the most correlated with skeletal and musculoskeletal disorders among occupational groups. The aforementioned factors affect the symptoms of disorders of the skeletal system and muscles of various professional groups. It can be adapted for the prevention, control and reduction of the causes of abnormalities in the skeletal and musculoskeletal system.

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A community-based participatory approach for hypertension prevention

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Abstract

Uncommunicable diseases are a major worldwide public health concern; from the community health survey revealed hypertension was a significant health problem in Ban Lan Khoi sub-district, a small village in Phattalung province, located in the south of Thailand. This study aimed to educate the villagers on the cause and prevention of hypertension. This study was using a participatory approach and focus group. The total of participants was 28, comprised of 5 males and 23 females. Knowledge of hypertension causes and risk factors was introduced. Sodium consumption recommendations, High-sodium diets understanding, and the kind of healthy foods were communicated, and stretching exercises were demonstrated. In conclusion, Participants highly understood the causes of hypertension, and know how to prevent it by themselves. Also, they know how to reduce sodium intake and can select the low level of sodium foodstuffs. Moreover, they were able to demonstrate correct exercise posture reversal.

Keywords: hypertension, sodium consumption

A community-based participatory approach for hypertension prevention

Background

Non-communicable diseases (NCDs) are a major worldwide public health concern; hypertension is one of the leading causes of premature death worldwide. An estimated 1.28 billion adults aged 30-79 years have hypertension worldwide, two-thirds of them leaving in the low and middle-income countries.[1]

The mortality rate caused by hypertension in Thailand has gradually increased from 13.07 per 100,000 person in 2017 to 14.48 per 100,000 person in 2021, but in Phattalung province, located in the south of Thailand, the mortality rate caused by hypertension has been fluctuating. In 2017, it was 20.04 per 100,000 and decreased to 15.66 per 100,000 in 2020, but then increased to 23.73 per 100000 in 2021.[2] In the small village, Ban Lan Khoi, located in Phattalung province, the total villager is 1,314 people (from 510 households). Based on the preliminary survey, it has been found out of 180 households, 19.5% of the participants have a Body Mass Index in the range of overweight and 5.4% of them have a Body Mass Index in the range of obesity. So, it was a reason to explore more about the health problem and address it. Possible solutions could include promoting healthy lifestyle habits and providing education on healthy nutrition and physical activity.

Objectives

1. To explore the health problem in a village.
2. To educate the villagers on the cause and prevention of hypertension
3. To demonstrate the stretching exercises to prevent hypertension.

Methodology

This study was a community-based approach. The study setting was Ban Lan Khoi village, Phattalung province, Thailand. The 1st phase; The preliminary survey of health problems in the village was conducted using a combination of face-to-face interviews and community site visits, followed by the 2nd phase; a participatory approach, the representatives of the villagers are involved in weighting and prioritizing the village's health problem. The 3rd phase; Health education on the causes of hypertension and it effect including prevention measure such as healthy nutrition, reduce sodium consumption and the stretching exercise was educated. This study was conducted from September to October 2022.

Results

A total of 185 villagers was interviewed, more than half were female (65.95%). Based on the result of a community survey, it appears that the villagers are facing a variety of health problems, with hypertension, diabetes, dyslipidemia, heart disease, and muscular fatigue being the most prominent. The focus group of 32 participants was organized to give the villagers a voice and to prioritize their health issues. The result of the focus group revealed that hypertension, muscular fatigue, traffic accident from not wearing helmets, and diabetes were considered to be significant health issues in this village. Then, in the decision-making process to address these health problems, a

prioritization process was used. the criteria were the magnitude of the problem, severity, feasibility, and community concern. Based on this process, hypertension was rated as the most pressing health issue, followed by muscular fatigue, traffic accidents from not wearing helmets, and diabetes. The decision-making process was shown in figure 1.

Figure 1 Prioritizing health problem

Regarding the hypertension problem, a project plan was developed and introduced to participants. The plan consisted of educating the villagers on hypertension causes, sodium consumption recommendations, high sodium diet understanding, the kind of healthy foods as well as stretching exercises demonstrated. A total number of 28 villagers participated in this project, most of them were female (82.14%) and in the age range of over fifty years old, and more than half have underlying diseases. In the beginning, participants were educated about hypertension; its causes and effects, other diseases that can develop from hypertension, healthy and low sodium food, ingredients for food that should avoid, and a stretching exercise demonstration as revealed in figure 2.

(a)

(C)

(b)  (d) 

Figure 2 health education and demonstration exercise: (a-b) healthy diet and food should be avoided. (c-d) stretching exercises demonstration and practice

The evaluation of this study indicates that health education was effective in promoting health knowledge and behavior change among the participants. The results show that all participants (100%) understood the cause of hypertension, indicating that the educational component was effective in delivering this information. Additionally, the participants were able to demonstrate an understanding of healthy food choices and how to prevent high blood pressure, which is a positive outcome. The ability to reduce sodium intake in daily life was high. Almost all of them can demonstrate correct exercise posture of stretching. it was a positive sign that the participants incorporated the information and skills they learned into their daily routines in the future.

Conclusion

Hypertension, or high blood pressure, is indeed a growing concern globally, as it is a leading risk factor for several chronic diseases such as heart disease, stroke, and kidney disease. The increase in hypertension cases is largely attributed to changes in lifestyle and behavior, including the consumption of fast food, frozen food, and high-sodium ingredients, as well as low levels of physical activity. To prevent the onset of hypertension, it is important to educate individuals about the dangers of high sodium intake and the benefits of regular physical activity. Encouraging individuals to adopt healthy eating habits and engage in regular physical activity can help reduce the risk of developing hypertension and other chronic health problems.[3] Health education programs and community-based initiatives can play a crucial role in promoting health literacy and behavior change, and in preventing hypertension and other health problems. Health volunteers, community leaders, and public health organizations can work together to promote healthy lifestyles and reduce the burden of hypertension in their communities.

Acknowledgements

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The Development of ADAPT_ER Model for Self-Management in Type II Diabetes Patients in ThaNangHom Village

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ABSTRACT

This action research aimed to develop the model of Self-Management of Type II diabetes mellitus (T2DM) patients in ThaNangHom village. There were 2 phases of model development consisting of phase I) development of the conceptual framework of self-management of T2DM patients in ThaNangHom village by literature review guided by concept analysis as proposed by Walker & Avant and phase II) development of the model of self-management of T2DM patients in ThaNangHom Village. The research was conducted during November, 2021 to May, 2022. The sample were 89 of household representatives (25), T2DMpatients (25) village health volunteers (31), and public health officers (8), The research instruments were 1) questionnaire of self-management of T2DM patients, 2) questionnaire of self-management support of family in ThaNangHom Village, 3) questionnaire of self-management support of village health volunteer, 4) in-depth interview for public health officers of self-management support of T2DM patients, 5) questionnaire for public health officers of learning organization in T2DMpatients, 6) health assessment form of T2DMpatients. The instruments were assessed for content validity and reliability. These phases 2 consisted of 6 stages of 1) A: Assessment of the context related to self-management of T2DMpatients, 2) DA: Determining and Assuring the Gap for Improvement, 3) P: Preparation for Closing Gap and Improvement, 4) T: Terminating the Gaps, 5) E: Evaluation by comparing those before and after developed, and 6) R: Returning return the model and important data to community for continuous implementing. Then, self-management of T2DM patients in the ThaNangHom Village model was concluded and called “ADAPT_ER model for self-management of T2DM patients” The ADAPT_ER model was an original model which required continuous refinement for more effectiveness.

Keywords: Type II Diabetes Mellitus, Self-management, Model development, ADAPT_ER model for self-management

INTRODUCTION

Diabetes Mellitus is a non-communicable disease, a public health problem, which causes the 9th death in the world. In 2020 (WHO,2020) there were 578 million DM patients and predicted to be 700 million in 2045 (International Diabetes Federation,2021). Ninety percent of the DM patients are type 2 DM. The number of DM patients in Thailand was the 4th below China, India and Japan. Currently, there are about 4.8 million DM patients (Diabetes Association of Thailand,2017), in Thailand and predicted to be 5.3 million in 2040 (Diabetes Association of Thailand, 2017) The most significant for treating diabetes mellitus type 2 patients is to control blood sugar. Factors affecting DM patients' blood sugar control were knowledge, perceptions of self-management competency, self-management behavior, and learning organization in self-management. New cases of DM patients, in Thailand, were 470.19 per 100,000 populations. Only 54.1 % of DM patients got the treatment (2.6 million). Only one third of DM patients, who got treatment, obtained the treatment goal (Service Quality Improvement Report, 2021).

Self-Management is the ability of patients in positive behavior change for better health status. The self-management includes enhancing thinking skill, problem solving, and planning skill in dealing with all related issues. Self-management, therefore, is the key success in healing chronic illness aiming to control the progress of disease and achieve better health (Thadaeng,2020). The protocol for caring DM patients and enhancing self-care ability are significant such as diabetes self-management education (DSME) and diabetes self-management support (DSMS) which is a patient centered aim (Diabetes Association of Thailand, 2017). The protocols lead to the goal attainment including treatment goal, physical and mental care goal, knowledge goal, self-management goal. All goals bring better health and minimize acute and chronic disease complications and create quality of life (Thadaeng, 2020). The 5A's strategies for self-management support in DM patients included 'A-assess, A-advice, A-agree, A-assist, and A-arrange'. The aims of 5A's are to increase the ability of DM disease controlling, sufficient self-care knowledge and skills to create behavioral changes in food control, exercise, medicine taking, and stress management (International Diabetes Federation, 2019).

In 2021, the percentage of DM patients who could control blood sugar was 30.32 over Songkhla province, In ThaNangHom Village, there was 75 T2DM patients, 28 patients (37.33%) could control HbA1c and the rest could not (62.67%). Ten T2DM patients who could not control HbA1C within 2 years were interviewed. Factors causing the problems were food control and eating habits, exercise, medicine taking, stress management. Food control and eating habits included time of having meals, number of meals, and type of food. For exercise, it was found that it was not sufficient or not appropriate exercise. Moreover, patients did not take medicine right following the doctor's prescription and some patients forgot to take medicine. Some patients did not see their doctors and bought from drug stores without any confirmed laboratory test. In addition, BanTahjeen Health Promoting Hospital reported that the major causes of uncontrolled HbA1c level of DM patients were 1) lacking of goal setting committed by both patients and health staff, 2) failure in exploring the root causes of the problems, 3) not sufficient of family supporting, 4) limiting of continuous care, and 5) limiting of patient self-management.

Learning from the problems in blood sugar control by T2DM patients in ThaNangHom Village context, the researchers who have been working in ThaJeen health promotion hospital, thus, had to sustain solving this issue. Therefore, this study aimed to develop the model for self-management of T2DM patients in ThaNangHom Village. The expected result is to encourage behavioral changes relevant to community context of T2DM patients to maintain blood sugar level and without complications as well as the promotion of better living and long term treatment cost reduction. This research aimed to develop the model for self-management of T2DM patients in ThaNangHom Village. The research was involved with two major stages of 1) the development of the conceptual framework of self-management of T2DM patients in ThaNangHom Village by concept analysis methods proposing by Walker and Avant (2005) and 2) the implication of the conceptual framework conducting to ascertain the conceptual framework for further summarization as a model. The model is expected to ensure effective blood sugar control without or less complications based on ThaNangHom context.

PURPOSE

This action research aimed to develop the model of Self-Management of type 2 diabetes mellitus (T2DM) patients in ThaNangHom village.

METHODOLOGY

This action research, there were 2 phases of model development consisting of phase 1) development of the conceptual framework of self-management of T2DM patients in ThaNangHom Village by literature review guided by concept analysis as proposed by Walker & Avant. The sources of content were 35 researches, 9 articles and 6 books and several manuals from the database of ThaiJo, Google Scholar as well as books and documents from the Ministry of Public Health. Self-management (Kenfer & Gaelick, 1988) and 5A's strategies were used as the basis of conceptual framework. Literature was reviewed based on the concept of T2DM, self-management, self-management supports, 5A's strategies and phase 2) development of the model of self-management of T2DM patients in ThaNangHom Village. The research was conducted during November, 2021 to May, 2022. The sample were 89 of household representatives (25), T2DM patients (25) village health volunteers (31), and public health officers (8), The research instruments were 1) questionnaire of self-management of T2DM patients, 2) questionnaire of self-management support of family in ThaNangHom Village, 3) questionnaire of self-management support of village health volunteer, 4) in-depth interview for public health officers of self-management support of T2DM patients, 5) questionnaire for public health officers of learning organization in T2DMpatients, 6) health assessment form of T2DM patients. The instruments were assessed for content validity and reliability. These phases 2 consisted of 6 stages of 1) A: Assessment of the context related to self-management of T2DM patients, 2) DA: Determining and Assuring the Gap for Improvement, 3) P: Preparation for Closing Gap and Improvement, 4) T: Terminating the Gaps, 5) E: Evaluation by comparing those before and after developed, and 6) R: Returning return the model and important data to community for continuous implementing. Then, self-management of T2DM patients in ThaNangHom Village model was concluded and called "ADAPT_ER model for self-management of T2DM patients"

RESULT

This action research aimed to develop the model of Self-Management of T2DM patients in ThaNangHom Village. There were 2 phases of model development consisting of 2 major phases.

Phase I: the development of the conceptual framework of self-management of T2DM patients in ThaNangHom Village by literature review guided by concept analysis as proposed by Walker & Avant. The thematic analysis was used for data analysis. The result showed the "ADAPT_ER conceptual framework for self-management of T2DM patients". ADAPT_ER Conceptual Framework consisted of 1) A: Assessment of the context related to self-management of type II diabetes patients, 2) DA: Determining and Assuring the gap for improvement, 3) P: Preparation for closing gap and improvement, 4) T: Terminating the gaps, E: Evaluation, and 6 R: Returning: Returning the framework for further uses in ThaNangHom purpose, as shown in figure 1

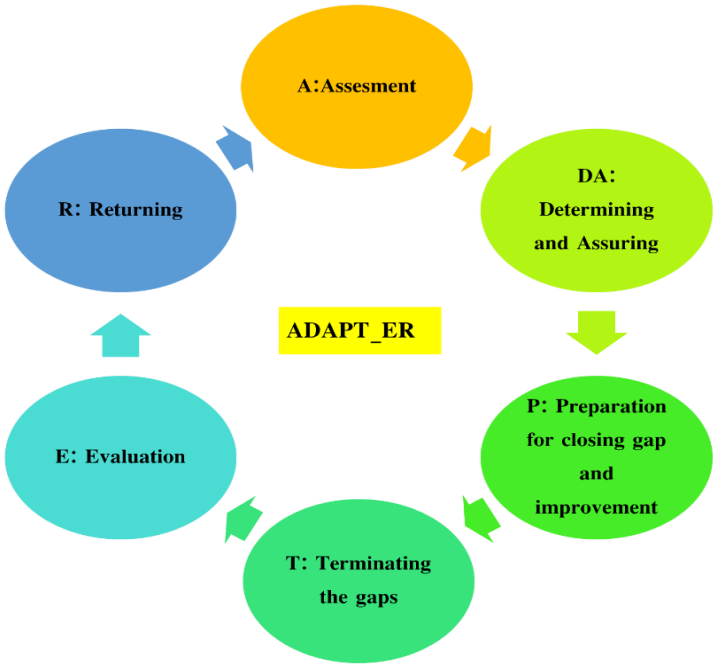

Figure 1. ADAPT_ER conceptual framework of self-management in T2DM patients in ThaNangHom Village

Phase II: the development of the model of self-management of T2DM patients in ThaNangHom Village, The ADAPT_ER conceptual framework of self-management in T2DM patients in ThaNangHom Village was implemented and adjusted for appropriateness in the ThaNangHom context. Then, the self-management of T2DM patients in the ThaNangHom Village model was concluded and some details changed. Then, self-management of T2DM patients in ThaNangHom Village model was concluded and called "ADAPT_ER model for self-management of T2DM patients"

The description of the ADAPT_ER model for self-management of T2DM patients in ThaNangHom Village is detailed below.

A: Assessment of the context related to self-management of the T2DM patients in ThaNangHom

1.Assessment of context relation to T2DM patients consisted of 5 activities 1) identifying the involved persons consisted of T2DM patients, patient's family, village health volunteer, public health personnel, 2) one-year retrospection of HbA1c, 3) assessing knowledge, perception of T2DM patients in self-management competency, 4) self-management behavior, and 5) learning organization in T2DM patient self-management.

2.Assessing T2DM patients includes weight, waist, BMI, and HbA1c

3.Assessing T2DM patient support of healthcare staff in self-management (village health volunteer, public health personnel, patient's family)

DA: Determining and Assuring the gap for improvement

Determining and assuring the gap for improvement from the information in "A" step. Analyze items to develop knowledge, self-management competency, self-management behavior, and analyze items to develop support for families, village health volunteers, and public health personnel, from the 80/20 concept of the Pareto Rule by considering from the value of 20% of the lowest mean and 20% of the highest S.D.

P: Preparation for closing gap and improvement

Taking the gap stated in "DA" step to develop the tools for improvement consisted T2DM self-management guideline, checklist, recording kit, Self-management tracking record system on mobile phone, food sweetness tester, and line group. After that, planning to implement the items that need to be developed into practice, with 4 self-management processes, namely 1) Goal setting 2) Self-monitoring 3) Self-evaluation, and 4) Self-reinforcement, and implement 5A strategies for self-management support in patients with DM , A-assess, A-advice, A-agree, A-assist, and A-arrange.

T: Terminating the gaps

1. Improving the defect or insufficient items detected in "A" by using the tools in "P" step including improving 1) knowledge, 2) perception of T2DM patients in self-management competency, 3) self-management behavior, and 4) learning organization, and provide knowledge, learning exchange forum, practice practical skills , follow up on home visits, follow up by phone.

2. Improving healthcare staff in T2DM self-management support by enhancing 1) knowledge, 2) skill in supporting T2DM patient self-management skills, 3) improving self-skills.

E: Evaluation

After termination the gap in "T" step, the following activities were implemented before making the model conclusion

1. Reassessing the items in "A" step

2. Comparison the items assessing in "A" and reassessing in "E", It was found that weight, waist circumference, body mass index, and cumulative glucose levels (HbA1c) of T2DM patients were all decreased, was shown in table 1, knowledge, Perceived Self-management, self-management behavior and the organization of learning increases, was shown in table 2,

Table 1. Comparison of differences in patient health data before and after development.

Item	Before (n=25)		After (n=25)		difference (Mean1-Mean2)
	Mean	S.D.	Mean	S.D.	
1. weight (kg)	68.40	14.12	65.92	14.00	-2.48
2. waist circumference (cm)	94.80	10.04	90.16	11.33	-4.64
3. BMI (kg/m)	26.83	5.51	25.77	5.46	-1.06
4. HbA1c (%)	7.73	0.96	7.68	1.37	-0.05

Table 2. Comparison of knowledge about diabetes, perceived self-management competencies, self-management behaviors, and learning organization in self-management of T2DM patients before and after development

Item	Before (n=25)			After (n=25)			difference (Mean1-Mean2)	percentage increase
	Mean	S.D.	level	Mean	S.D.	level		
1. knowledge	13.32	2.30	high	14.84	0.47	high	1.52	10.13
2. perceived Self- management	3.64	0.46	moderate	3.99	0.43	high	0.35	7
3. self-management behavior	3.08	0.33	moderate	3.84	0.44	high	0.76	15.2
4. learning organization	2.64	0.79	moderate	3.61	0.73	moderate	0.97	19.4

After the development of the patient's family and village health volunteer, it was found that about knowledge about diabetes, self-management support and learning organization about self-management support in patients with diabetes increased, was shown in table 3,4

Table 3. Comparison of knowledge about diabetes, self-management support, and learning organization in self-management support of patient's family before and after development

Item	Before (n=25)			After (n=25)			difference (Mean1-Mean2)	percentage increase
	Mean	S.D.	level	Mean	S.D.	level		
1. knowledge	14.28	3.18	high	17.56	0.82	high	3.28	18.22
2. self-management support	3.66	0.67	moderate	3.88	0.67	high	0.22	4.40
4. learning organization	3.50	0.72	moderate	3.75	0.71	high	0.25	5.00

Table 4. Compare knowledge about diabetes, self-management support, and learning organization in self-management support by village health volunteer before and after development

Item	Before (n=25)			After (n=25)			difference (Mean1-Mean2)	percentage increase
	Mean	S.D.	level	Mean	S.D.	level		
1. knowledge	15.13	1.84	high	16.81	0.40	high	1.68	9.88
2. self-management support	3.92	0.65	high	4.42	0.49	high	0.50	10
4. learning organization	3.73	0.65	high	4.50	0.52	high	0.77	15.4

The results of interviews on self-management support for T2DM patients of public health personnel revealed that there were many aspects, such as budget support, manuals, knowledge bodies, behavioral assessments, follow up on home visits, etc. (was shown in figure 2) After the development of public health personnel it was found that about learning organization about self-management support in patients with diabetes increased, was shown in table 5.

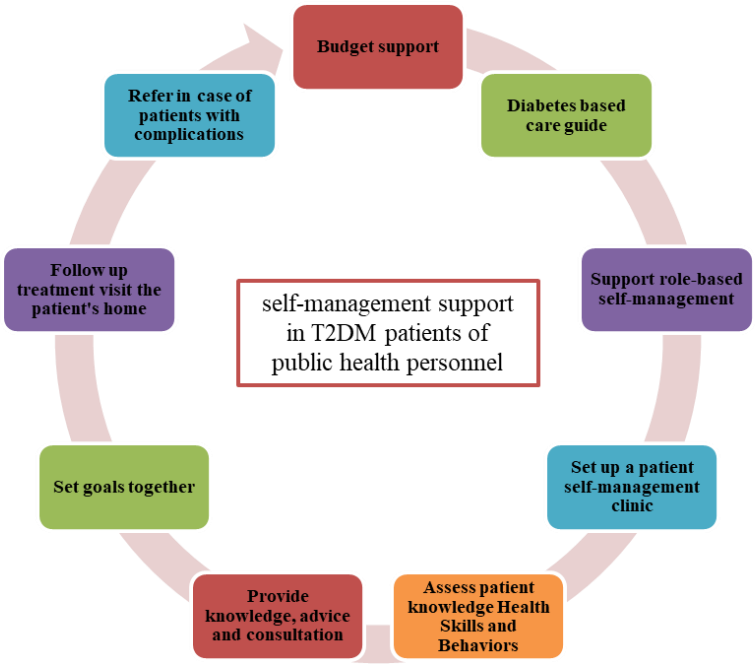

Figure 2. Self-management support for T2DM patients of public health personnel

Table 5. Compare learning organization in self-management support by health personnel before and after development

Item	Before (n=25)			After (n=25)			difference (Mean1-Mean2)	percentage increase
	Mean	S.D.	level	Mean	S.D.	level		
1.learning organization	3.76	0.18	high	4.68	0.23	high	0.91	18.2

R: Returning

Returning the result of comparison in "E" to the T2DM patients, significant persons and responsible healthcare staff for further continuous improvement

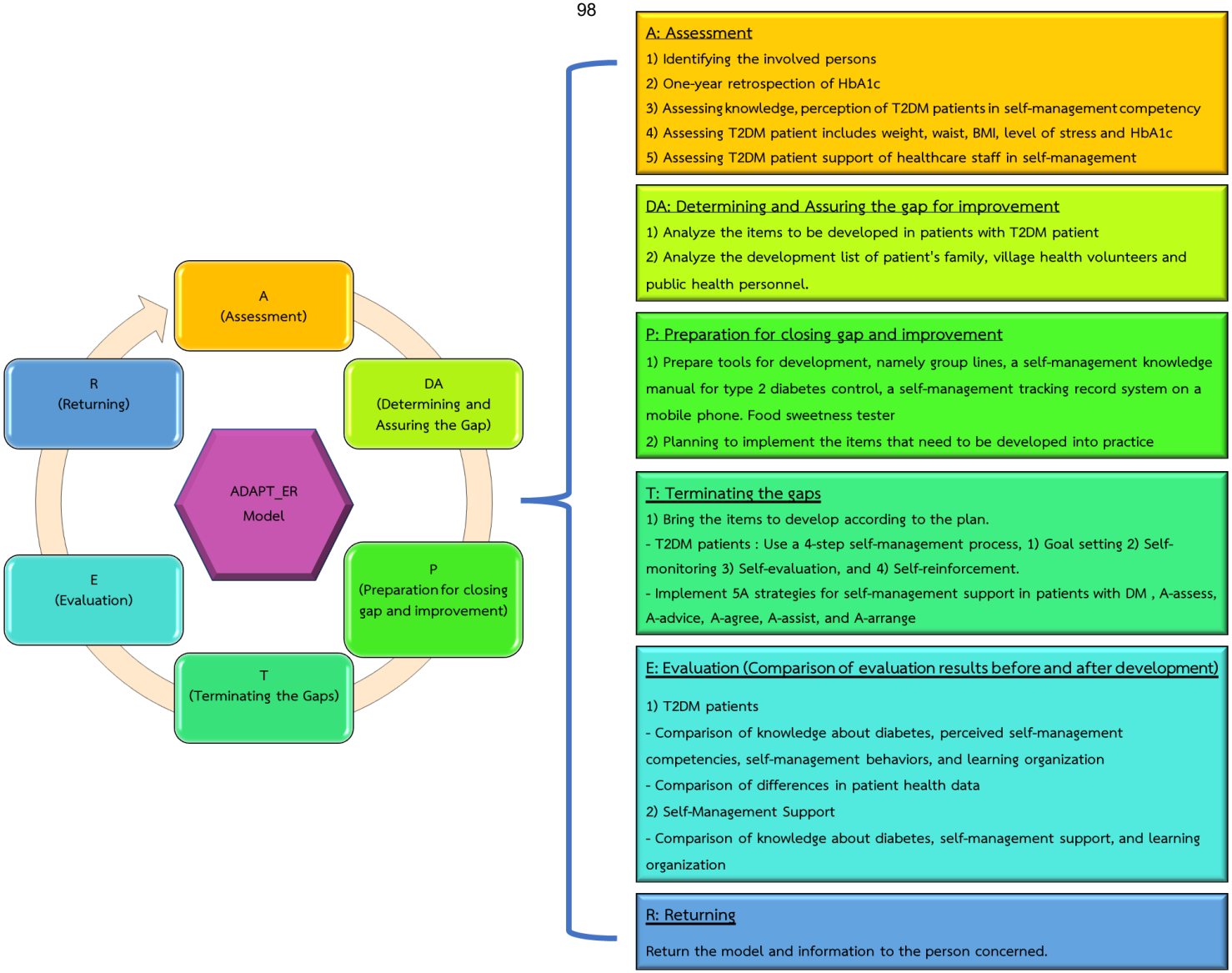

Figure 3. ADAPT_ER model of self-management in T2DM patients in ThaNangHom Village

CONCLUSION AND DISCUSSION

The conclusion and the description of the ADAPT_ER model for self-management of T2DM patients in ThaNangHom Village consisted of 6 stages of 1) A: Assessment of the context related to self-management of T2DM patients, 2) DA: Determining and Assuring the Gap for Improvement, 3) P: Preparation for Closing Gap and Improvement, 4) T: Terminating the Gaps, 5) E: Evaluation by comparing those before and after developed, and 6) R: Returning return the model and important data to community for continuous implementing. Then, self-management of T2DM patients in ThaNangHom Village model was concluded and called "ADAPT_ER model for self-management of T2DM patients" The ADAPT_ER model for self-management of T2DM patients in ThaNangHom Village brought those involved people and institutes to solve the problem together, a patient-centered approach. This was similar to the model of caring for the elderly with diabetes by using the family and community participation process by Phiriyaphan P et al (2018) which consisted of 4 steps: 1) assessing the health of the elderly, their caregivers, and Family and Community Support 2) Bringing guidelines to plan and find solutions to problems together through 3 building activities, namely creating knowledge, development guidelines and create guidelines 3) Implement my own role and 4) reflect the results of the practice and evaluation. The ADAPT_ER model for self-management of T2DM patients in ThaNangHom Village could be applied to be used in other villages as well as in other NCDs.

RECOMMENDATION

1) The authorized administrators should take the research result for planning, policy improvement, the way to operate, support and encourage the self-management in T2DM patients.

2) The health care agency unit could apply the tools and questionnaire into the routine work in assessing some context for further workplace improvement

3) the application of the ADAPT_ER model is suggested to be used in other groups of chronic non communication diseases

4) The refinement of the ADAPT_ER model should be continuously studies for ensuring the appropriateness for use as well as encourage the data presentation such as dashboard display

LIMITATION

The limitation of this study related to the COVID-19 outbreak which affected the delay of some activities in the stage of T (Terminating the gaps) was short which might affect the saturation of some data.

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The Difference of Intrinsic and Extrinsic Motivation Between Genders of University Pencak Silat Athletes in Southern Thailand

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Abstract

This study aims to investigate the differences of intrinsic and extrinsic motivation between male and female university Pencak Silat athletes in Southern Thailand. Online motivation questionnaire (12 items of intrinsic motivation and 12 items of extrinsic motivation) was used for data collection. Seventy-two Pencak Silat athletes were recruited by convenience sampling. The results showed that some components of intrinsic and extrinsic motivation were different between male and female athletes. Male athletes had higher intrinsic motivation than female (practice Pencak Silat because of having fun, having an aptitude for this sport, and would love to learn new skills). In conclusion, our study demonstrated that there were some differences in intrinsic and extrinsic motivations between gender and the differences in most components were very high. The implication suggests that coaches could encourage young athletes to participate in more training and competition in Pencak Silat through motivation reinforcement strategy.

Keywords: Intrinsic motivation, Extrinsic motivation, Pencak Silat, Gender, Southern Thailand

Introduction

Pencak Silat is a word that comes from 2 Malay words, "Pencak" (Pencak) and "Silat" (Slat), which means martial art that is known and popularly played widely in Indonesia, Malaysia, Brunei, Singapore, the Philippines and the southern border provinces of Thailand. Pencak Silat is a martial art that uses both hands and feet to fight. Offensive and defensive are combined with graceful movements to lure opponents before attacking, counter-attacking and defending. This is in line with Maryono (2002) stated that in Pencak Silat competitions, the movements (Langkah) and stances (Sikap Pasang) begin with the offensive and defensive stances.

According to Pencak Silat's technique. Pencak Silat has three categories namely; match singles, doubles and team categories (Ramadiani et al., 2021). It consists of four components including fighting for competitions, martial arts performances, self-defense training and inner strength training, in which every part of the body is used in training, whether it is showing unique postures, use punches to punch the block (defense) and catch the block. Rhythmic movements are combined with both smooth, beautiful, and fast attacks. When practiced for a period of time, it will help body posture, memorizing moves, flexibility, stamina, mental and experience (Saputra et al., 2017; Nugroho et al., 2021; Apriantono et al., 2020). These components of the body are components of physical fitness related to health that enable the body to work or carry out various activities continuously for a long time and efficiently.

In addition to being a sport game that helps strengthen the body, it can also be applied as a healthy activity suitable for young people because it is different from other forms of activity. Block and fall are combined into a training set that will give the trainee a challenge and be fun for the player as well. For the aforementioned reasons, practicing Pencak Silat with a combination of slow and fast movements continuously along with breathing exercises is another form of activity that helps build strength in the body. Various parts of the body result in better physical performance and is another alternative activity which is interesting for young people, especially as a local sport that youth in the southern regions already know well.

The athlete's psychological support can be used to gauge their motivation during practice and performance. You, your coach, your family, and other relevant people or organizations can offer this assistance. The attainment process greatly benefits from psychological support since motivation has a significant impact on training and competition, which impacts athletes' mental performance. Unsatisfactory results will be achieved if the athlete is less driven during the competition. On the other side, if one is extremely motivated, one can achieve satisfactory outcomes. The coach must have a way to increase the motivation of athletes. Some strategies for increasing motivation are setting goals, providing support or feedback, and creating a pleasant atmosphere (Hamdiana, D.C. & Raihan, M., 2022). Similarly, in the Pencak Silat, if athletes are highly motivated, it will affect satisfactory results for the athletes and this could induce more people to participate.

Therefore, this study aims to study the motivation to participate Pencak Silat of youth athletes in the university level, Southern Thailand. Also, this study aims to investigate the differences of intrinsic and extrinsic motivation between gender of Pencak Silat athletes in university level, Southern Thailand.

Method

Subjects

Seventy-two Pencak Silat athletes were recruited in this study by a convenience sampling. There were 44 males and 28 females who join Pencak Silat team of Prince of Songkhla University (Pattani Campus) Songkhla Rajabhat University, Thaksin University (Songkhla Campus), Thaksin University (Phatthalung Campus), National Sports University (Chumphon Campus), Phuket Rajabhat University.

Instrument

The research instrument used in this study was an online questionnaire on motivation to play Pencak Silat in Southern higher education athletes which was adapted from the study of Rakphu (2011).

Data collection

Pencak Silat athletes in universities of southern Thailand were directly interviewed by phone or via social media. They were asked for a permission to participate in this study. The questionnaire was prepared and sent to the subject by QR code that linked in google form. The subjects read the questionnaire and answer by checkbox rating scale of five levels including: 5-the most, 4-more, 3-moderate, 2-low and 1-very low motivation respectively. All of the data were reports by spreadsheet output from google form. Researcher take the returned questionnaire to verify its completeness and put into further analysis.

Statistics

The descriptive statistics was described the characteristics, frequency, and percentage of the data. The inference statistics (Mann-Whitney U test) was analyzed to compare the difference of internal and external motivation between male and female athletes at the significant level 0.05.

Result

Table 1 General characteristics of Pencak Silat athletes

General information	Frequency	Percentage
Gender		
- Male	44	38.9%
- Female	28	61.1%
Weight category		
- =45-<50 kg.	20	27.8%
- >50-<55 kg.	14	19.4%
- >55-<60 kg.	8	11.1%
- >60-<65 kg.	11	15.3%
- >65-<70 kg.	6	8.3%
- >70-<75 kg.	4	5.6%
- >75-<80 kg.	5	6.9%
- >80-<85 kg.	1	1.4%
- >85-<90 kg.	1	1.4%
- >90-<95 kg.	2	2.8%
	-	

- Open >85 kg.	26	-
Competitive experience	20	
- Less than 2 events	26	36.1%
- 3-4 events		27.8%
- More than 5 events	63	36.1%
Competition category	7	
- Fighting	2	87.5%
- Single (Culture and art)		9.7%
- Team (Culture and art)		2.8%

The result from table 1 shows that most of the subjects were male athletes. Most athletes were in the weight category of =45- <50 kilograms, followed by the >50 - <55 kg and >60- <65 kg respectively. While the competitive experience of participating in more than 5 events was 26 athletes, participating in about 3-4 events was 20 athletes and participating in less than 2 events was 26 athletes and most of them compete in a fighting style.

Table 2 The difference of intrinsic motivation between male and female athletes

Item	Intrinsic motivation level					Z	*p*
	Very high n (%)	High n (%)	Moderate n (%)	Low n (%)	Very low n (%)		
I1: Practice Pencak Silat because you like having fun.							
- Male	35 (79.55%)	8 (18.18%)	1 (2.27%)	-	-	-2.88	<0.01
- Female	13 (46.43%)	13 (46.43%)	2 (7.14%)	-	-		
I2: Practice Pencak Silat because you like the excitement of competition.							
- Male	34 (77.27%)	9 (20.45%)	1 (2.27%)	-	-	-1.77	0.07
- Female	16 (57.14%)	11 (39.29%)	1 (3.57%)	-	-		
I3: Practice Pencak Silat because you feel good about practicing.							
- Male	28 (63.64%)	16 (36.36%)	-	-	-	-1.05	0.29
- Female	15 (53.57%)	11 (39.29%)	2 (7.14%)	-	-		
I4: Practice Pencak Silat because you like a challenge.							
- Male	34 (77.27%)	8 (18.18%)	2 (4.55%)	-	-	-1.39	0.16
- Female	17 (60.71%)	10 (35.71%)	1 (3.57%)	-	-		

I5: Practice Pencak Silat because you have an aptitude for this sport.								
-	Male	27	8	9	-	-	-2.00	<0.05
		61.36%	18.18%	20.45%	-	-		
-	Female	11	6	10	1	-		
		39.29%	21.43%	35.71%	3.57%	-		
I6: Practice Pencak Silat because you want to learn a new skill.								
-	Male	32	10	2	-	-	-2.35	<0.05
		72.73%	22.73%	4.55%	-	-		
-	Female	14	6	8	-	-		
		50.00%	21.43%	28.43%	-	-		

Table 2 Continued

Item	Intrinsic motivation level					Z	*p*
	Very high	High	Moderate	Low	Very low		
	n (%)	n (%)	n (%)	n (%)	n (%)		
I7: Practice Pencak Silat because you want to relieve stress.							
- Male	19	15	9	1	-	-0.03	0.97
	43.18%	34.09%	20.45%	2.27%	-		
- Female	10	15	2	1	-		
	35.71%	53.57%	7.14%	3.57%	-		
I8: Practice Pencak Silat because you want to test your abilities against other athletes.							
- Male	25	11	8	-	-	-0.29	0.77
	56.82%	25.00%	18.18%	-	-		
- Female	15	12	1	-	-		
	53.57%	42.86%	3.57%	-	-		
I9: Practice Pencak Silat because you think playing this sport is good exercise.							
- Male	31	12	1	-	-	-1.51	0.12
	70.45%	27.27%	2.27%	-	-		
- Female	15	11	2	-	-		
	53.57%	39.29%	7.14%	-	-		
I10: Practice Pencak Silat because you want to win.							
- Male	27	12	3	1	1	-0.63	0.53
	61.36%	27.27%	6.82%	2.27%	2.27%		
- Female	15	9	3	1	-		

	53.57%	32.14%	10.71%	3.57%	-		
I11: Practice Pencak Silat because you want to improve your skills.							
- Male	34	9	1	-	-		
	77.27%	20.45%	2.27%	-	-		
- Female	15	12	1	-	-	-2.05	<0.05
	53.57%	42.86%	3.57%	-	-		
I12: Practice Pencak Silat because you like new training program.							
- Male	30	12	2	-	-		
	68.18%	27.27%	4.55%	-	-		
- Female	14	14	-	-	-	-1.33	0.18
	50.00%	50.00%	-	-	-		

The result from table 2 shows that male Pencak Silat athletes had intrinsic motivation (practice Pencak Silat because you like having fun) at very high level (79.55%). It was significantly difference ($p<0.01$) when compare to female athletes (46.43% and more = 46.43%). As well as intrinsic motivation (practice Pencak Silat because you have an aptitude for this sport) of male athletes (61.36%) were significant difference when compare to female athletes (very high = 39.29%, moderate = 35.71% and high = 21.43%) ($p<0.05$) and intrinsic motivation (practice Pencak Silat because you want to learn a new skill) of male athletes (very high = 72.73%) were significant difference ($p<0.05$) when compare to female athletes (very high = 50.00%, moderate = 28.43% and high = 21.43%) respectively. On the other hand, other intrinsic motivations were not different between male and female athletes.

While intrinsic motivation in terms of improve their skills, it was found that male athletes had a very high level of motivation (77.27%) compared to female athletes who had a very high level (53.57%) and high level (42.86%) of motivation. On the other hand intrinsic motivation (relieve stress, test their abilities against other athletes, good exercise, win the fight, and like new training program) were not different between male and female athletes.

Table 3. The difference of extrinsic motivation between male and female athletes.

Item	Extrinsic motivation level					Z	*p*
	Most	More	Moderate	Low	Very low		
	n (%)	n (%)	n (%)	n (%)	n (%)		

E1: Practice Pencak Silat because you want fame and glory.								
-	Male	22 50.00%	12 27.27%	7 15.91%	3 6.82%	-	-0.67	0.49
-	Female	12 42.86%	7 25.00%	8 28.57%	1 3.57%	-		
E2: Practice Pencak Silat because you want the prize money from the competition.								
-	Male	27 61.36%	8 18.18%	7 15.91%	1 2.27%	1 2.27%	-1.44	0.14
-	Female	12 42.86%	7 25.00%	8 28.57%	1 3.57%	-		
E3: Practice Pencak Silat because you want the opportunity to travel to different places.								
-	Male	34 77.27%	9 20.45%	1 2.27%	-	-	-4.78	<0.001
-	Female	6 21.43%	15 53.57%	7 25.00%	-	-		
E4: Practice Pencak Silat because you want to the opportunity to become a national representative athlete.								
-	Male	30 68.18%	13 29.55%	1 2.27%	-	-	-3.14	<0.01
-	Female	9 32.14%	15 53.57%	3 10.71%	1 3.57%	-		
E5: Practice Pencak Silat because you want the opportunity to choose the job that you want.								
-	Male	19 43.18%	16 36.36%	8 18.18%	1 2.27%	-	-1.00	0.31
-	Female	8 28.57%	14 50.00%	4 14.29%	2 7.14%	-		
E6: Practice Pencak Silat because you want the opportunity to meet and make new friends.								
-	Male	29 65.91%	13 29.55%	2 4.55%	-	-	-1.78	0.07
-	Female	13 46.43%	11 39.29%	4 14.29%	-	-		

Table 3 The difference of extrinsic motivation between male and female athletes. (Cont.)

Item	Extrinsic motivation level					Z	*p*
	Very high n (%)	High n (%)	Moderate n (%)	Low n (%)	Very low n (%)		
E7: Practice Pencak Silat because you want the opportunity to pursue higher education.							
- Male	29	15	-	-	-	-4.10	<0.001

-	Female	65.91%	34.09%	-	-	-		
		6	16	5	1	-		
		21.43%	57.14%	17.86%	3.57%	-		
E8: Practice Pencak Silat because you want the chance to set new records in the competition.								
-	Male	29	13	2	-	-		
		65.91%	29.54%	4.55%	-	-	-3.44	0.001
-	Female	7	16	5	-	-		
		25.00%	57.14%	17.86%	-	-		
E9: Practice Pencak Silat because you want to develop yourself as an expert in this sport.								
-	Male	27	12	5	-	-		
		61.37%	27.27%	11.36%	-	-	-1.31	0.18
-	Female	12	13	2	1	-		
		42.86%	46.43%	7.14%	3.57%	-		
E10: Practice Pencak Silat because you want to be part of the team.								
-	Male	25	17	2	-	-		
		56.82%	38.64%	4.54%	-	-	-1.16	0.24
-	Female	12	14	2	-	-		
		42.86%	50.00%	7.14%	-	-		
E11: Practice Pencak Silat because you want to have the opportunity to compete internationally								
-	Male	25	17	2	-	-		
		56.81%	38.64%	4.55%	-	-	-1.52	0.12
-	Female	12	11	4	1	-		
		42.85%	39.29%	14.29%	3.57%	-		
E12: Practice Pencak Silat because you want to be successful like an international Pencak Silat athlete.								
-	Male	24	17	2	1	-		
		54.55%	38.63%	4.55%	2.27%	-	-0.98	0.32
-	Female	13	10	4	1			
		46.43%	35.71%	14.29%	3.57%			

The result from table 3 shows that the extrinsic motivation of male athletes (want the opportunity to travel to different places) had a very high level (77.27%) of motivation but female athletes had high level (53.57%) which was statistically significant difference ($p<0.001$). As well as, extrinsic motivation of male athletes (want to the opportunity to become a national representative athlete) had a very high level (68.18%). It was significantly difference from female athletes who had high level (53.57%), very high level (32.14%), moderate level (10.71%) and low level (3.57%) of extrinsic motivation respectively ($p<0.01$). It was also found that the extrinsic motivation of male athletes (want the opportunity to pursue higher education and want the chance to set new records in the competition) (very high level = 65.91% and 65.91%) had significantly differ when compare to female athletes (high level = 57.14% and 57.14%) ($p<0.001$,

p=0.001 respectively). While other extrinsic motivations between male and female athletes were not different.

Discussion and conclusion

This study aims to investigate the differences of intrinsic motivation and extrinsic motivation between male and female university Pencak Silat athletes. Online motivation questionnaire (12 items of intrinsic motivation and 12 items of extrinsic motivation) was used to collect the data. From the results, we found that some components of intrinsic and extrinsic motivation were different between male and female athletes. Male athletes had higher intrinsic motivation than female (practice Pencak Silat because you like having fun, practice Pencak Silat because you have an aptitude for this sport, and practice Pencak Silat because you want to learn a new skill). This result was consistent with the findings of Amado et al (2014) and Iyer (2017) who report that boys were more intrinsically and extrinsically motivated than females. They also scored higher in competence than girls. However, for both boys and girls, self-determined motivation and psychological needs satisfaction resulted in a higher perception of utility of the sport. On the other hand, girls had higher scores on intrinsic motives for sports participation than boys, and that boys had higher scores on more extrinsic motives. (Jakobsen & Evjen, 2018)

While Bollók et al (Bollók, Takács, Kalmár, & Dobay, 2011) report that competition, winning, and exceeding personal goals were crucial for male students. Female students valued external adequacy and other people's opinions more. They held a strong belief in the value of a healthy lifestyle, physical fitness, and athletics as ways to improve attractiveness. Among active teenagers compared to idle youths, the motivational variables were more significant. Young, athletic kids thought that succeeding in sports would be their ticket to prosperity. It can be demonstrated that both intrinsic and extrinsic motivational factors are important for the athletes (Faryal Gul et al., 2021) These results can aid athletic teams in creating coaching schemes that are more inspiring. Athletes will be able to externalize their passion, increase their intrinsic drive, and perform better with an improvement in self-determination perception level.

However, this study did not determine the differences between intrinsic and extrinsic motivation for sports engagement as in the study of Alexopoulos et al (2020) which report that

the motivation of athletes was influenced more by intrinsic motivation than by extrinsic motivation. Whereas, intrinsic and extrinsic motivation among tenpin bowlers were significant gender differences with respect to intrinsic motivation to know, intrinsic motivation to accomplish, intrinsic motivation to experience stimulation, and extrinsic motivation to identify regulation (Teo et al., 2015). In conclusion, our study demonstrated some of intrinsic and extrinsic motivations for gender were difference and most of all motivation components were very high in both gender.

Acknowledgement

We would like to thank all university Pencak Silat athletes in Southern Thailand who volunteered to participate in this study. We also thank all sports science lecturers of Thaksin University who provided the knowledge and guidance that made this study success.

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The Development of Information System (IS) by the Application of Google Apps, Faculty of Health and Sports Science, Thaksin University

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Abstract

Faculty of Health and Sports science, Thaksin University (TSU-FHSS), Thailand is an institute providing the under and postgraduate degrees in public health, Thai traditional medicine, sports science and occupational health and safety under the vision "*Frontier Social Innovation Faculty of Health and Sport Science by 2025*". TSU-FHSS missions are producing hands-on graduates, conducting research, providing academic services, and conserving Thai culture and traditions. There are about 800 students, 40 academic staff and 20 supportive staff. The supportive staff plays a pivotal role in supporting the missions to reach the vision, especially providing information for operated and executive decision makings. This action research aimed to develop a information system (IS) by applying the Google Apps and guiding by 'design thinking process' which included 3 phases: (1) analyzing the information system (2) developing IS by applying Google Apps, and (3) evaluating the TSU-FHSS information system. The input of the developed IS system included data of TSU-FHSS KPIS (key performance indicators). The sample for the satisfied evaluation consisted of 33 TSU-FHSS staff. Then, data were analyzed by descriptive statistics. The results showed that:

(1) There were 2 main databases of e-office and Google data studio (dashboard). e-office consisted of Academic position progress tracking systems, e-meeting, Support system for national and international academic conferences, e-Certificate, Thesis database, and Research results database of professors. The data studio consisted of Student admission statistics, Current academic year, Statistics included undergraduate and Graduate students, Current student status, Meeting room utilization statistics, and Faculty's financial status.

(2) The satisfaction of using the data from information technology showed that the overall satisfaction was rated at a high level (Mean ± SD: 4.44 ± 0.39). to consider each component of satisfaction showed that all components of satisfaction were rated at a high level. The highest score of the components of satisfaction was as follows; usability (4.48 ± 0.44), function requirement (4.47 ± 0.42), performance (4.47 ± 0.42), function (4.41 ± 0.38) and security (4.37 ± 0.44), respectively. The results suggested that the effectiveness of data security should be improved. The information system should be expanded to cover all KPIS in the mission of TSU-FHSS. In addition, the systematic follow-up and evaluation are significant.

Keywords: Google Apps, Information System, Design thinking, Faculty of Health and Sports Science

Introduction

Currently, information technology plays a significant role in the organization management of both public and private ones. Since, every organization must rely on the effective information and a systematic database system which the executives or even service users can access information for decision -making quickly and efficiently.[1] The TSU-FHSS, located in Phatthalung campus, provides higher education both undergraduate and graduate degrees; master degree program in public health; and bachelor's degree program in public health, occupational health and safety , sports science, and thai traditional medicine. The 5 year TSU-FHSS strategic plan, 2021-2025, set the vision of "Frontier social innovation faculty of health and sport science by 2025". There are 4 main missions of MARE: 1) produce manpower equipping with professional competency and core competency of social innovation / entrepreneur in health and sports science (M), 2) provide academic services to transfer social innovation and co-create entrepreneur in health and sports science (A), 3) conduct targeted research as well as research on social innovation/entrepreneur in health and sport science (R), and 4) improve management system and mechanism aiming to performance excellence (E).TSU-FHSS has been driving to the vision by 4 strategies, SMART strategies including: 1) staff core competency enhancement on community involvement and social innovation/entrepreneur in health and sport science (S), 2) creative approach for full range of manpower development in competency of professional and social innovation/entrepreneur in health and sports science (M), 3) faculty-party linkage in academic services and research for social innovation/entrepreneur in health and sport science (AR), and 4) co creating for the total quality organization (T). TSU-FHSS adopted EdPEx (Education criteria for performance excellence) as an operation and management system.[2]

The criteria for performance excellence are based on a set of core values of systems perspective, visionary leadership, customer-focused excellence,valuing people, organizational learning and agility, focus on success, managing for innovation, management by fact, societal responsibility, ethics and transparency, delivering value and results. There are 7 categories of 1) leadership, 2) strategy, 3) customers, 4) measurement analysis and knowledge management, 5) workforce, 6) operation, and 7) results.[3]Of these, the category 4: measurement, analysis, and knowledge management, needs an effective design of data collection and information platform. In addition, as mentioned before on the core value, the management by facts is a value in supporting the striving of category 4.

There are 5 levels of information systems: Transaction processing system, Office support system, management information system (MIS), decision information system (DIS), and executive information system (EIS) as shown in figure 1.

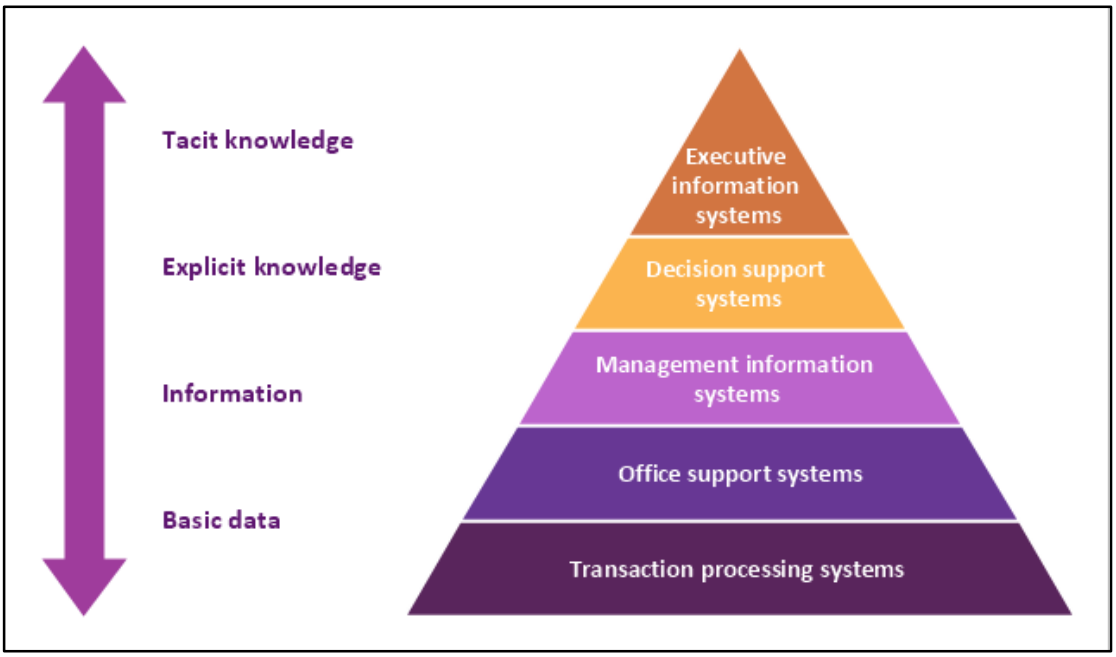

Fig.1. Level pyramid model diagram - Information systems types[4]

In driving MARE and SMART, TSU-FHSS requires an effective e-office, MIS, DIS, and EIS as well as other success factors. It could be assumed that the information system (IS) is one of the key success factors of TSU-FHSS moving. Information system is a basic requirement for the 'principle of management by facts[5]. The executives operate mission-aligned and suitable performance to assure the goal achievement. In addition, problem-solving and decision-making based on facts are more accurate and appropriate. In this study, the researchers applied the Google apps of Google Docs, Google Sheets, and Google Data Studio as tools for developing information systems. Our study expects that the TSU-FHSS will make sufficient decision-making based on the developed TSU-FHSS information system.

Design thinking is a very popular model used for system analysis for improvement. There are 5 steps of the design thinking process. These are empathize, define, ideate, prototype, execute and test.[6] The steps of the design thinking process are very relevant with action research phases. This study, thus, adopted the design thinking process to guide the research phases.

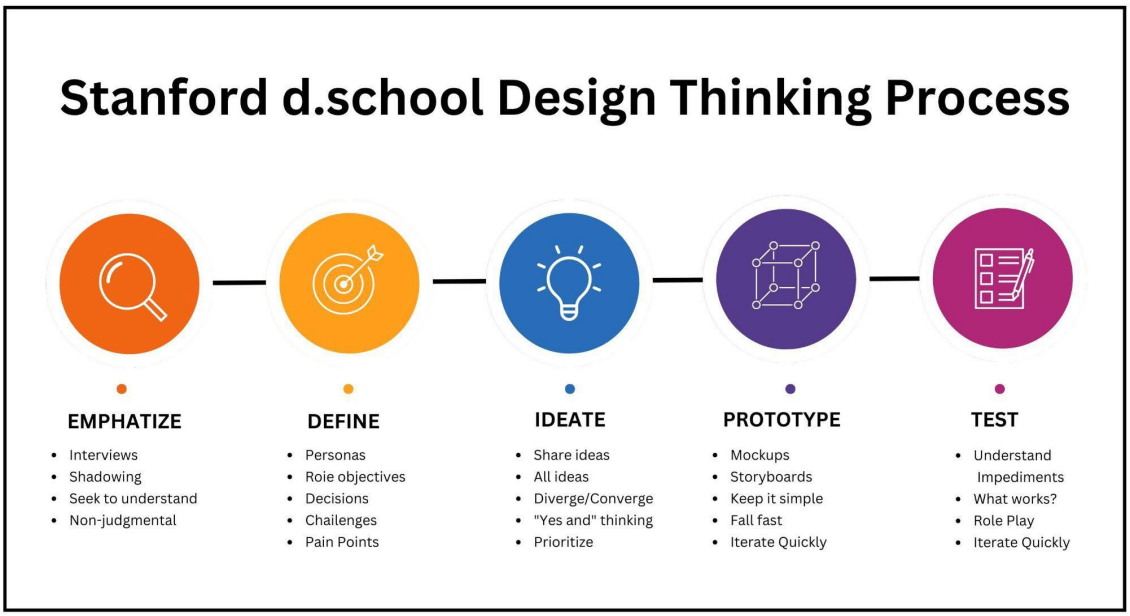

Fig.2. Design thinking process (Re-drawing from the original)[6]

Objectives

1. To analyze the TSU-FHSS information system
2. To develop TSU-FHSS information system by applying of Google Apps
3. To execute and test the TSU-FHSS information system

Research Instrument and Research method

The TSU-FHSS's dean passed the policy of "EdPEx and TSU-FHSS-IS synergy" to push the sufficient of TSU-FHSS-IS. The TSU-FHSS information system (TSU-FHSS-IS) committee was appointed and assigned the roles and responsibilities. Then, TSU-FHSS-IS committee action was designed emphasizing on staff involvement. In addition, the research was done to encourage management by fact and team learning. This research is a part of TSU-FHSS information system improvement. This was an action research consisted of 5 design thinking process which was divided into 3 phases of study: 1) analyzing the TSU-FHSS information system (guiding by design thinking process 1-2), 2) developing TSU-FHSS information system by applying of Google Apps (guiding by design thinking process 3-4), and 3) evaluating TSU-FHSS staff satisfaction in TSU-FHSS information systems (guiding by design thinking process 5) as shown in figure 3.

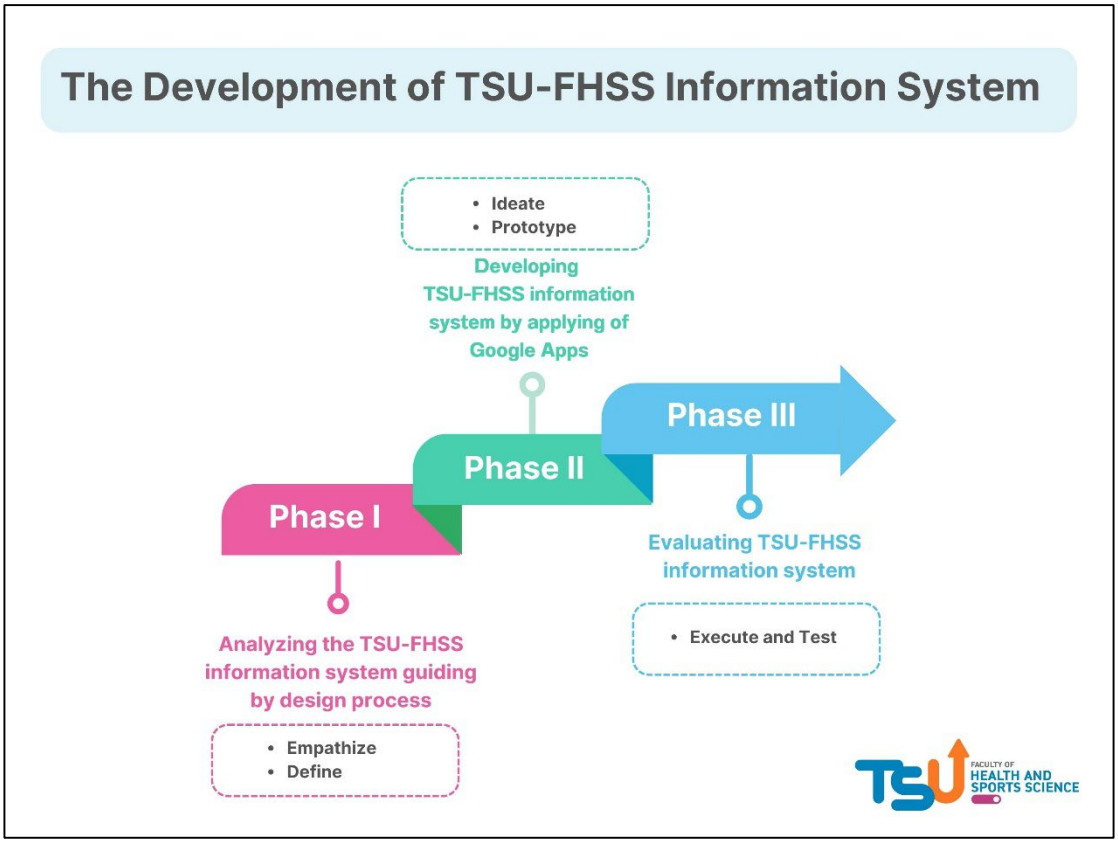

Fig. 3. Conceptual framework of the development of TSU-FHSS Information System

Result

Phase I: Analyzing the TSU-FHSS information system guided by the design thinking process proposed by Stanford D. School model included 2 processes of empathize and define

Empathize

This step focuses on the synergy of understanding all issues including understanding the emotional part (empathize). The TSU-FHSS performance report 2021 and feedback report 2021 were reviewed by administrators and TSU-FHSS-IS committee members. The strength and OFI (opportunity for improvement) were discussed and prioritized for deployment.By this step, it was found that the "information system" needed to be urgently improved to support the category 4 and TSU-FHSS total quality management.

Define

Take the results from the process of exchanging knowledge within the faculty and suggestions from the report on the performance according to the 'emphasize' step ,category 4 (measurement, analysis and knowledge management) was focussed and exploring for pain points, gain points, and solutions (table 1). Information in the table 1 will provide the fruitful input for the following steps.

Table 1 Pain point, gain point and solutions for Category 4 (measurement, analysis, and knowledge management)

Field	Pain point	Gain point	Solutions
1. Data and Information	- Data storage of the TSU-FHSS was not efficient and sufficient and not ready for use. - Required database was not defined and update collected by responsive supportive personnel	- Initiate sufficient and accurate databases with a convenient access and management - Provide real time Information	- TSU-FHSS-IS committee design the action plan for IS development - Request the necessary resources to support the plan
2. Operating system	- TSU-FHSS operating system was limited in data collection - lacking of knowledge and understanding of data storage operating systems	- Requires an operating system to store information and present information efficiently - Requires a freeware operating system - Supportive staff develop their own database based for routine and strategic works	- Encourage the use of operating systems which are supported by the university (such as Google for Education, MS365 and Canva etc.) - Organize an exchanged learning activities, training, workshop regarding information system
3. The presentation of information to support decision-making.	- Majority of data and information were in an a offline form - The presentation of the information is inefficient and not up-to-date - Personnel can't access the database conveniently and timely	- Encourage more accessibility of online data and information as well as real-time one - Increase the potential of internet networks to support 'anytime and anywhere' access	- Create database by using a Freeware operating system to store data in an online format such as Google Drive and present data in a real-time manner through the Google Data Studio Overview system and with both published on

	the TSU-FHSS website

<u>Phase II</u> Developing IS by applying Google Apps

In this phase, researchers together with the TSU-FHSS-IS committee developed the prototypes and discussed the appropriateness with administrators and users. The result will be presented based on 2 processes of design thinking, ideate and prototype.

Ideate

After analyzing the problem by considering the essence of the Pain Point and Gain Point, a meeting has been held to brainstorm the ideas to solve the pain points and encourage to improve the gain points. The TSU-FHSS-IS committee crystallized the idea of an information system for decision-making by applying Google Application in 2 main systems: 1) Dashboard system and 2) e-Office system. This will be conceptualized in Fig.4.

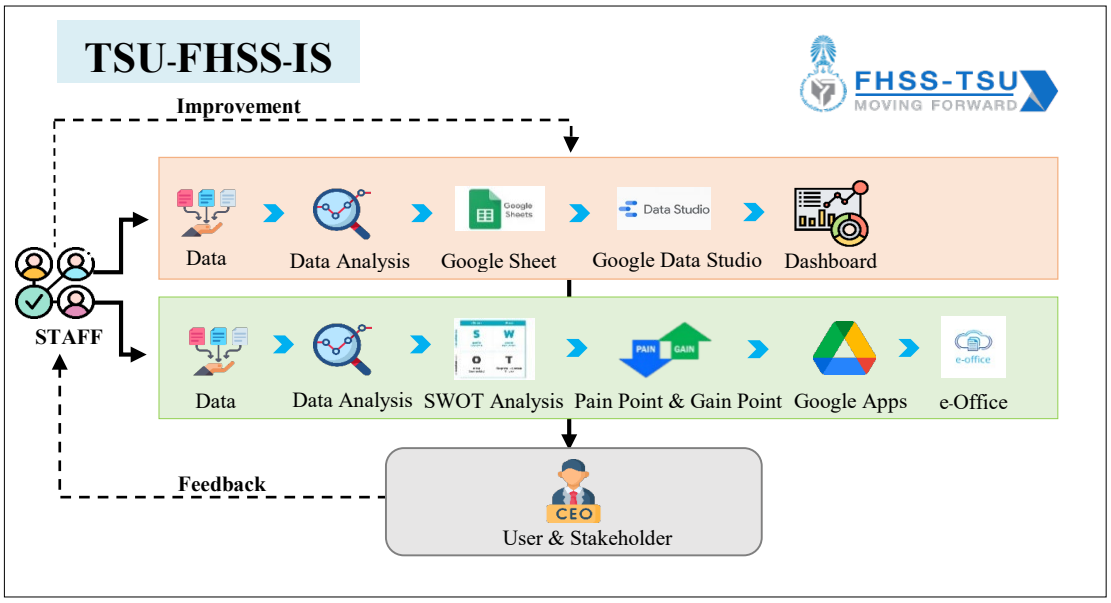

Fig.4. The conceptual framework of information system development for decision-making.

Prototype

The TSU-FHSS-IS for decision-making framework was developed as mentioned earlier. Then, the prototypes were developed by knowledge sharing. There was a prototyping of e-office systems and a prototyping of Google Data Studio systems or dashboard system (Fig.5. and Fig. 6).

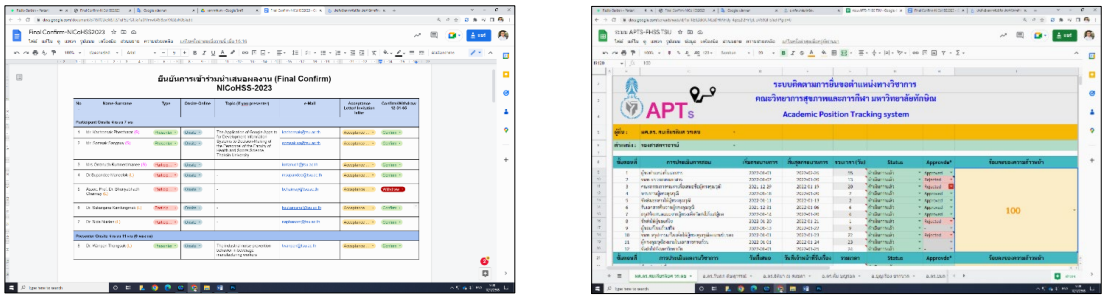

Fig.5. An example of prototyping of e-office systems

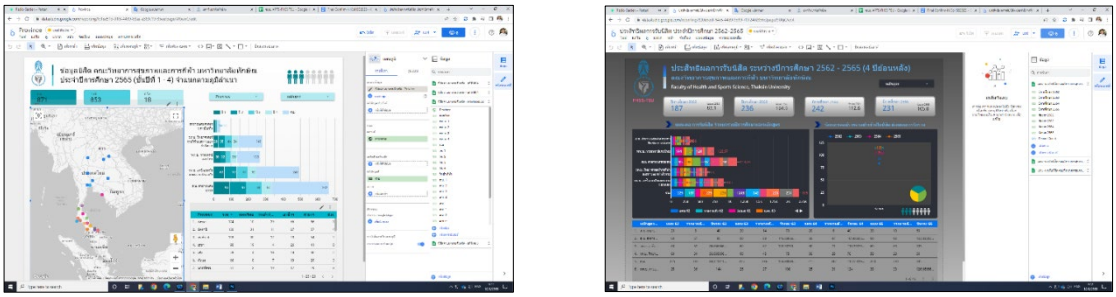

Fig.6. An example of prototyping of Google Data Studio systems

The TSU-FHSS Information system which was developed by researchers facilitated by the TSU-FHSS-IS committee consisted of a dashboard system and an e-office system. The details will be shown in table 2.

Table 2 Decision Information System, Dashboard and e-Office System

Dashboard System	e-Office System
1. Student admission statistics 2. Current academic year 3. Statistics included undergraduate and 4. Graduate students. 5. Current student status 6. Meeting room utilization statistics 7. Faculty's financial status	1. Academic position progress tracking Systems 2. e-Meeting 3. Support system for national and international academic conferences 4. e-Certificate 5. Thesis database 6. Research results database of professors

<u>Phase III</u>: Execute and testing the information system

There were 2 information systems: 1) dashboard system and 2) e-Office system. The dissemination of these 2 systems were done through the Faculty's website to facilitate service recipients, management and other stakeholders to easily access the TSU-FHSS-IS. The evaluation of the TSU-FHSS-IS was done by an electronic self administered questionair (Fig. 7). The e-questionnaire developed by the researchers

included 5 success indicators of usability, function requirement, performance, function, and security.

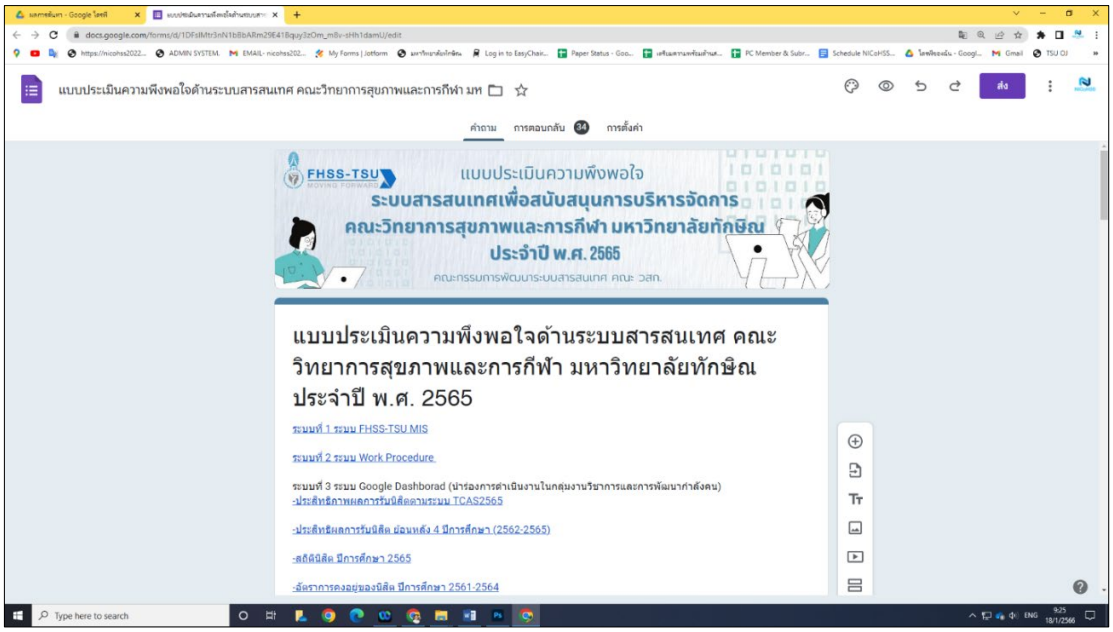

Fig.7. e-questionnaire system

The results of the evaluation of the satisfaction of executives and personnel on information systems for decision-making. of 33 users as follows. The satisfaction of using the data from information technology showed that the overall satisfaction was rated at a high level (Mean ± SD: 4.44 ± 0.3). to consider each component of satisfaction showed that all components of satisfaction were rated at a high level. The highest score of the components of satisfaction was as follows; usability (4.48 ± 0.44), function requirement (4.47 ± 0.42), performance (4.47 ± 0.42), function (4.41 ± 0.38) and security (4.37 ± 0.44)

Table 3 Satisfaction with decision-making information systems

TSU-FHSS Staff Satisfaction	□	S.D.	Level
Usability	4.48	.44	High
Function Requirement	4.47	.42	High
Performance	4.47	.42	High
Function	4.41	.41	High
Security	4.37	.44	High
Total score	**4.44**	**.39**	**High**

Note: The satisfaction was evaluated from the TSU-FHSS-IS users for all phases of TSU-FHSS-IS improvement

The benefit of the TSU-FHSS-IS was evaluated by the committee consisted of:

1. The TSU-FHSS has an efficient decision-making information system, especially the worthiness of exercise power and resources (man, money, material, method, and management). The TSU-FHSS-IS strongly supports the EdPEx criteria.

2. The TSU-FHSS-IS users could access information systems for more convenience, accuracy, and real-time.

3. The process learning from this study could be applied into other project as well as creating the learning organization[7]

Conclusion and Suggestion

This action research consisted of 3 phases. There were 2 main systems developed for decision-making by using Google Apps: 1) Data Dashboard system and 2) e-office system. The satisfaction of the information system was at a high level. The suggestions are:

1. There should be an information system for decision-making covering all missions within the Faculty. In addition, the system should facilitate the performance excellence

2. The sufficient data should be concerned and encouraged as well as periodically evaluated.

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Manual Material Handling Activities Related to Risk of Musculoskeletal Disorders among Elderly in Papayorm District, Phatthalung Province, Thailand

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Abstract

In 2022, Thailand become a full-fledged aging society whose number of its elderly citizens is reach 20% of the total population. Workforce in agricultural sector is mostly aged around and above 60 years. Although the physical capacities are generally depleting with ageing. Moreover, enhanced risks of the aged workers engaged in manual material handling (MMH) tasks are observed as serious concerns, especially with respect to musculoskeletal disorders (MSDs) and safety problems. This study aims to 1) identifying the type of manual material handling activities 2) evaluate the prevalence of musculoskeletal disorders 3) determine the ergonomic risk level of MMH posture. This study was conducted among elderly people who engaged in MMH in Papayorm district, Phathalung Province, Thailand. 281 elderly aged above 60 years who still have a capacity in working were randomly selected. A questionnaire was used in collecting the data and specify the type of MMH. Modified Nordic questionnaire on MMH was performed to assess the prevalence of MSD. Postural analysis was done by Rapid Entire Body Assessment (REBA) method. This result shows that lifting is highest frequently task that elderly performed (61.9%) follow by dragging (24.6%), pushing (20.3%), and bearing (7.8%), respectively. One-year prevalence of musculoskeletal disorder was 69% with reported pain and fatigue after MMH activity of 82.2%. The risk of MMH posture was in moderate to high level, the average final REBA score of 6.7±0.98 indicates further investigation and change soon. Promoting the correct MMH technique are essential for preventing adverse health effect to the elderly people in Papayorm District.

Keywords: MMH Activities, MSDs in Elderly, Awkward Posture

1. Introduction

Musculoskeletal disorders (MSDs) are work-related health problem commonly among the workers engaged in manual material handling (MMH). Awkward posture including exerting force, lifting or moving heavy objects, postures and body movements that against nature in MMH is mostly responsible for MSDs observed among workers [1-4]. It is more common in active and demanding workers related with occupation and job characteristic. MSDs, which is essentially the system of muscles, tendons, ligaments, bones and joints as well as associated tissues are the first ranking occupational disease problem in several countries. In 2017, work-related MDS was accounted 61.6- 74.8% of the total disease, which affecting upper limb region (28.14%), lower limb region (22.7%) and trunk region (14.4%) [5-6]. 10.3% of injuries were caused by manual work particularly MMH and the numbers of injuries keep increasing from 2016 to 2017 by 3.3% [7]. In Thailand, the situation of MSDs and health hazards from occupational and environmental factors during the year 2015 -2018 tend to increase. The prevalence of MSDs was 121.93, 135.26, 167.22 and 189.37 per hundred thousand people respectively [8]. Age is one of a major cause of MSDs which are the physical capacities in working significantly decline with aging, specifically with respect to strength, endurance, speed, and range aspects [9]. Enhanced risks of the aged workers engaged in MMH tasks are observed as serious concerns, especially with respect to MSDs and safety problems [10-11]. In 2022, Thailand become a full-fledged aging society which effect to the higher proportional size of aging workforce especially in agricultural sector that mostly workers aged around and above 60 years [12]. Studying the prevalence of physical symptoms of the elderly in rural Saraburi province, Thailand was found that 93% had at least one physical symptom with the highest prevalence of joint and muscle pain (83%) [13]. In Papayorm district, Phatthalung province, there are 5,409 aging people which 42.38% was in agricultural work. The prevalence of fall risk of this people was 23.72%. It found that age is one of a major factor significantly associated with fall risk among this elderly people. Physical work characteristics of elderly people was report as an ergonomic risk influencing on their physical health problems [14]. Physical factors such as awkward posture, trunk twisting, overhead reaching, repetitive movement, moving heavy object and poor working conditions are always found during MMH work activities of aged people which lead to high risk of MDSs [15]. However, these factors were not diagnosing in any previous research relating to the elderly and the investigation of musculoskeletal pain and discomfort which relating to the MMH task among elderly people was limited. Considering the high risk of MSDs in ageing people, investigation of this problem is very crucial.

The objectives of this study are to determine the prevalence of musculoskeletal symptoms, identify the type of manual material handling activities, and evaluate the ergonomic risk level of MMH task posture among elderly people in Papayorm District, Phatthalung Province, The findings of this study would be beneficial as an early intervention to provide a basis for development of practical solutions to reduce the risk of development of MSDs symptoms among elderly people.

2. Materials and Methods

2.1 Study design

A cross-sectional survey was conducted among elderly people in Papayorm district, Phatthalung Province, Southern Thailand during August to November 2022. The survey was conducted individually using face-to-face interviews in the residence during working time, direct observation of MMH activities and a video-based analysis of the MMH postures using the Rapid Entire Body Assessment (REBA) method. The elderly completed the survey voluntarily.

2.2 Sample size and sampling

Based on a previous study which reported a proportion of MMH risk on MSDs of 76%, the required sample size was 281 subjects. This sample size is also enough to test the hypothesis with a significance level of 0.05

281 elderly aged above 60 years who still have a capacity in working was include in to the study. Participants who had any history of major trauma such as a motor vehicle accident, sports injury, fall from height, potentially serious musculoskeletal condition including cancer, compression fracture, spinal infection, ankylosing spondylitis, spinal stenosis, herniated disc, cauda equina syndrome, arthritis, drug abuse and mental disorder were excluded.

20 elderly who performed MMH task including lifting, dragging, pushing, and bearing object was selected as a representative people for evaluating an ergonomic risk level using REBA technique.

The first step of the sampling procedure was a survey of a number of elderly in the study setting. A proportional to size sampling from 4 sub-district was used. Due to the difficulty of access participants in elderly group with a large area of study setting, a list of 5,409 aged people in Papayorm district was specified by sub-district to 4 clusters. An elderly in each cluster who met the inclusion criteria were randomly selected by convenient sampling.

2.3 Data collection

Data collection took place in 4 sub-districts (Papayorm, Kaotao, Banpraw, Larnkoi) of Papayorm District, Phatthalung Province, Thailand from August to December 2022. Process including interviews using a questionnaire, direct observation and video recording of the actual MMH activities performing. The questionnaire consisted of demographic information, physical ergonomic factors and MMH activities, and MSDs. The reliability of the questionnaire was test by 3 experts with an accepted reliable (IOC, Index of Objective Congruence=0.86). The questionnaire which included the details as described above was pretested among 30 elderly in papayorm sub-district. After the pretest, the questionnaires were corrected for comprehensibility of the questions before administering the questionnaires to the target participants in the study area. In the actual data collection, the selected participants were first screened for eligibility. After complete general interview, the body discomfort chart and analog pain rating scale were completed by all subjects. The items included the pattern and intensity of pain, if any, in any body region during the previous 1 year. After that, a representative participant of each MMH activity was asked to perform an activity and the MMH posture was recorded using a video recorder.

The REBA method (McAtamney, 2000) has been used to evaluate the level of ergonomic risk by observation of the posture of participants while they performed lifting, dragging, pushing, and bearing object. For each task, assessing the posture factors perform by assigning a score

to each region. For each region, there is a posture scoring scale plus adjustment notes for additional considerations. Then score the load / force and coupling factors. Finally, score the activity. A REBA score was produced by a special combination table of risk scores in neck, trunk and legs and upper arms, lower arms, and wrists. A final REBA score of 1 indicates the negligible risk, higher scores show increasingly more unbalanced positions and increase the risk on MSDs.

2.5 Statistics

Descriptive statistics were used to explain the demographic data, physical factors, MMH characteristics, and the distribution of MSDs and REBA scores.

3. Results

31. Demographic data

Table 1 shows that among 281 respondents involved in this research, most of them is female. The average age is 70 years. 64.4% of respondents'BMI is categorized in the healthy weight group, however, overweight and obesity of 20% are noteworthy. The main occupation of respondents is in agricultural work that the workplace located around their residence or nearby.

Table 1. The demographic data of participants (n=281)

Characteristic	Number	%
1. sex		
- male	80	28.5
- female	201	71.5
2. age mean= 69.40±6.540 years, min = 60, max= 89		
3. body mass index		
- <18.5 (underweight)	34	12.1
- 18.5 – 24.9 (healthy weight)	81	64.4
- 25.0 – 29.9 (overweight)	58	20.6
- ≥ 30 (obesity)	8	2.8
4. occupation		
- agriculturist	181	64.4
- merchant	33	11.4
- handicraft	2	0.7
- work for hire	15	5.3
- other	51	18.1
5. workplace		
- around residence or closed place	234	83.3
- outside residence	47	16.7

Table 2 demonstrate the work characteristics of participants. Working hour per day amongst participants is less than 4 hours with a relaxing time between work more than 30 minutes. Enough time in sleeping at night is observed. Almost all participants not perform other job beside their main occupation. The survey of MMH activities found 4 major task usually performed in working including lifting (61.9%), dragging (24.60%), pushing (20.3%), and bearing (7.8%). Lifting,

dragging, pushing, carrying, and bearing overweight more than 10 kg is found for a most. In addition, the frequency of this MMH activity is performed 1-2 time a day.

Table 2. Work characteristics of participants (n=281)

Work characteristics	Number	%
1. working hours per day		
- 1-2 hrs.	85	30.2
- 3-4 hrs.	98	34.9
- 5-6 hrs.	61	21.7
- 7-8 hrs.	32	11.4
- > 8 hrs.	5	1.8
2. relaxing time during work		
- < 30 mins.	70	24.9
- 30-60 mins.	113	40.2
- > 60 mins.	98	34.9
3. sleep hours per night		
- < 8 hrs.	56	19.9
- ≥ 8 hrs.	225	80.1
4. other work beside main occupation		
- no	266	94.7
- yes	15	5.3
5. lifting task		
- no	107	38.1
- yes	174	61.9
6. lifting weight per time		
- < 10 kg	89	51.1
- 10-20 kg	49	28.2
- >20 kg	36	20.7
average lifting weight per time = 15.18±12.424 kg, min= 1 max = 60		
7. lifting frequency		
- 1-2 time/day	139	79.9
- 3-4 time/day	30	17.2
- ≥ 5 time/day	5	2.9
8. bearing		
- no	259	92.2
- yes	22	7.8
9. bearing weight per time		
- < 10 kg	4	18.2
- 10-20 kg	9	40.9
- >20 kg	9	40.9
average bearing weight per time = 23.77±13.320 min = 3 max =50		
10. bearing frequency		
- 1-2 time/da	17	77.3
- 3-4 time/day	3	13.6
- ≥ 5 time/day	2	9.1

Work characteristics	Number	%
11. carrying		
- no	277	98.6
- yes	4	1.4
12. carrying weight per time		
- >20 kg	4	100
average carrying weight per time = 33.75±11.815, min = 25, max = 50		
13. carrying frequency		
- 1-2 time/day	3	75.0
- ≥3-4 time/day	1	25.0
14.pushing		
- no	224	79.7
- yes	57	20.3
9. pushing weight per time		
- < 10 kg	8	14.0
- 10-20 kg	17	29.8
- >20 kg	32	56.1
average pushing weight per time =25.18±14.789 min = 5 max =100		
10. pushing frequency		
- 1-2 time/day	47	82.5
- 3-4 time/day	8	14.0
- ≥ 5 time/day	2	3.5
11. dragging		
- no	212	75.4
- yes	69	24.6
12. dragging weight per time		
- < 10 kg	15	21.7
- 10-20 kg	28	40.6
- >20 kg	26	37.7
average dragging weight per time =21.51±14.493min =3 max 100		
13. dragging frequency		
- 1-2 time/day	66	95.7
- 3-5 time/day	3	4.3

One-week prevalence of MSDs is diagnosed for 43.8% while a long period prevalence of one-year is higher (69.0%). The participants report felt pain and discomfort after MMH activity at sometime and regular level, while a pain intensity is strongest for 1 day to 1 month (Table 3.)

Table 3. Prevalence of MSDs

MDS	Number	%
1. felt pain and discomfort after MMH activity within the past one week		
- no	158	56.2
- yes	123	43.8
2. had any pain or discomfort in different parts of the body during the past 1 year		
- no	87	31.0
- yes	194	69.0
3. frequency of pain and discomfort after MMH activity		
- never	50	17.8
- sometime	193	68.7
- regular	38	13.5
4. pain duration		
- < 1 hr	43	15.3
- 1-24 hr	101	35.9
- 2 day-1 month	106	37.7
- >1 month	31	11.0

Participants rated their average musculoskeletal pain intensity of top five pain regions raking in knee, hip, upper back, lower back, and shoulder, respectively. Knees is the region that participants rate that symptoms occur during work and did not disappear after relax. This very high pain is limited a continuing work (Table 4).

Table 4. Pain intensity after MMH activity during the past 1 year across body regions

Body region	Pain intensity			
	No pain	Moderate pain	High pain	Very high pain
1. left knee	122(43.4)	135(48.0)	18(6.4)	6(2.1)
2. right knee	133(47.3)	126(44.8)	16(5.7)	6(2.1)
3. left hip	152(54.1)	115(40.9)	12(4.3)	2(0.7)
4. right hip	156(55.5)	115(40.9)	8(2.8)	2(0.7)
5. right upper back	177(63.0)	92(32.7)	10(3.6)	2(0.7)
6. left upper back	180(64.1)	89(31.6)	10(3.6)	2(0.7)
7. right lower back	170(60.5)	104(37.0)	4(1.4)	3(1.1)
8. left lower back	171(60.9)	101(35.9)	7(2.5)	2(0.7)
9. left shoulder	174(61.9)	98(34.9)	6(2.1)	3(1.1)
10. right shoulder	175(62.3)	96(34.2)	7(2.5)	3(1.1)

The evaluation of REBA score found that the highest risk of MMH activity is lifting followed by dragging, bearing, and pushing. Mean score of 8 of lifting is categorized to a high risk level suggesting the investigation of work and implement change. However, for the remaining 3 types of MMH, it is classified to a medium risk level which need the further investigation and change soon.

Table 5 REBA score

Task	Mean±SD	Suggestion for improvement
lifting (n=20)	8.10±0.32	high risk, investigate and implement change
dragging (n=20)	6.72±0.28	medium risk, further investigation, change soon
pushing (n=20)	5.84±0.44	medium risk, further investigation, change soon
bearing (n=20)	6.23±0.38	medium risk, further investigation, change soon

4. Conclusion and Discussion

Elderly workers in Papayorm district experience a high prevalence musculoskeletal complaints especially on knees, hip, back, and shoulder, and often take longer to recover from their pain, experiencing discontinue work after pain. Numerous studies have found pain in different body regions, e.g. lower back, neck/shoulders, and knees, to be debilitating among various job groups. Working posture in MMH task is found as an ergonomic risk factor which influencing on MSDs. Our result correlated with a previous study by Syamsiar, et al [10] that conducted a path analysis test to evaluate the effect of age and workload on work posture toward musculoskeletal disorders complain on loading and unloading workers. They found that age was a significant positive effect on the work posture. A significant indirect effect was found between age and MSDs through work posture. This may partially be due to age related physical changes experienced by older workers. Kenny et al. [15] observed a 25% decline in musculoskeletal capacity between the ages of 30 and 65 years, with a more rapid decline between the ages of 60 and 65 years. Work-related injuries present the potential for especially severe consequences for older workers. Dasinger et al. [15] reported that when the age of injured workers increased by 10 years, the return to work (RTW) rate decreased by 15%. whereas pain in neck/shoulders and knees to a larger extent may originate from osteoarthritis or other degenerative chronic musculoskeletal disorders, which tend to progress negatively with age. Our study found ergonomics risk due to postural stress mostly in lifting dragging and pushing. Lifting task is the most crucial for elderly in this study area which need the investigation and implementation change of the working posture. These results support the need for working posture-specific hazard surveillance data. This will ensure that all contributing factors related to awkward work posture to MSD risk can be accurately identified and controlled dependent of age.

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Occupational Health and Safety Risks of Garage Workers in Ban Phrao Subdistrict, Pa Phayom District, Phatthalung Province, Thailand

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Abstract

Working with machinery and equipment can causes risk for injuries. The aim of this study is to explore occupational health and safety risks at work of garage workers. There were 38 respondents in this study which was carried out as an exploratory and descriptive, study in Ban Phrao Subdistrict, Pa Phayom District, Phatthalung Province, Thailand. The result revealed the garage workers have experienced an accident at workplace (13; 34%). The majority work characteristics of garage workers was changing wheel (18; 17%) and characteristic of hazards was cutting and stabbing (12; 39%). Besides, the most an accident experience that facing at work was adjusting or customizing the workpiece (9; 28%). For the severity of the accident of workers who have experienced an accident at work was minor injury or no stopped working (14; 82%). The majority characteristic of working and accident experience were an inadequate lighting in the workplace not too dim or too bright (11; 28.95%), dust, mist, smoke, odor of chemical vapors in the workplace (10; 26.32%), twisting, turning the body in working (9; 23.68%), organized storage of tools and machines without blocking the aisle (9; 23.68%) and lifting and lowering, pushing, pulling, dragging large materials (8; 21.05%) respectively. Moreover, the most work-related diseases were musculoskeletal diseases (7; 18%), respiratory system (3; 8%) and skin diseases (3; 8%). Hazards arising from auto garages could impair the health and well-being of the workers. The knowledge on risk prevention at work was good and behavior was moderate. Therefore, the government or health authority needs to risk assessment, promotion awareness, and evaluation and control such hazards.

Keywords: Occupational Health and Safety, Risk, Garage worker

1. INTRODUCTION

According, the statistics of newly registered cars throughout the year 2020 in Thailand are 41,471,345 vehicles. The statistics of automotive and motorcycle repair enterprises in 2020 are 181,413 garages. In addition, the growth rate from 2019 to 2020 is 3.37%. Industry of formal and informal workers repairs of motor vehicles and motorcycles in 2017 amounted to 6.18 million people (16.42%) (Department of Land Transport, 2022). Besides that, the most operating in the garage is still use workers mainly. Garage workers are faced with various hazards as they carry out their work. There are different occupational safety and health hazards in the categories of physical, biological, ergonomic and psychological hazards(M. P. Witchaya Phetliap, 2020). Working in the garage have an opportunity risk to exposed to the hazard such as toxic waste (Lead, Cadmium, Selenium)(Basu et al., 2015) (benzene, toluene, ethyl benzene, xylene)(P. K. N. L. Witchaya Phetliap, 2020), sanitary facilities was a source of hazards in the

garages due to their slippery nature, machines and equipment in their work places, working benches and floors (Beth Thumbi et al., 2019), slips, trips and falls, trips and falls, vibration, ventilation and lighting(Apreko et al., 2015), heat, noise, dust(P. K. N. L. Witchaya Phetliap, 2020), joint pain and back pain(Haladi et al., 2022; Surada Tanomrat, 2017). Moreover, the health effect of workers exposed the hazardous chemicals in the garage such as DNA damage, blood pressure, blood cells, mean corpuscular volume(Ataro et al., 2018). Hazards arising from garages could impair the health and well-being of the workers. In many developing countries awareness of occupational hazards or health risk is still less. The objective of this study is to find out the occupational health and safety risks of garage workers in Ban Phrao Subdistrict, Pa Phayom District, Phatthalung Province, Thailand led to the proper suggestion or manage health risk of workers effectively.

2. METHOD

2.1. Participants

The research received 38 garage workers from 43 garage workers in this study which was carried out as an exploratory and descriptive, study among garage workers in Ban Phrao Subdistrict, Pa Phayom District, Phatthalung Province, Thailand. The participants were purposively selected according to the inclusion criteria: 1) having experiences for at least 3 months, 2) aged between 18-60 years, 3) speaking Thai and giving consent to study and 4) good health. The exclusion criteria for the participants were temporary garage workers. The surveys were distributed, interviewed and assessed from May to November 2020.

2.2. Data Collection

A structured questionnaire consisted of questions divided into 5 parts: 1) personal demographic information, 2) characteristic of hazards and risks at work of garage workers, 3) characteristic of working and incident experience, and 4) knowledge on risk prevention at work and 5) behavior on risk prevention at work. The knowledge and behavior on risk prevention at work each part consisted of 15 items. The questions were validated in content validity index (CVI) and assess the relevancy of each item of a question by 3 experts. The CVI result was 0.84, which indicated that the questionnaire is reliable. After that, the researchers coordinated with the owners of the garage to contact the garage workers in order to explain to them the research objectives and processes, confidentiality, risks, benefits, and participants' rights. After the garage workers agreed to the participate in this study, they had one-on-one interviews to collect baseline 5 parts of data.

2.3. Data Analysis

Data analysis was descriptive analysis for parts 1 to part 3 of questionnaires. These data were performed by frequency, percentage (%), mean ($\bar{x}$) and standard deviation (S.D.) table. Additionally, the knowledge of the garages were analyzed based on the score and each item was rated on a 2 points Likert scale (yes/pass = 1, no/not pass/ be no = 0), interpreted the mean scale of the knowledge on a 5 point Likert scale (Very poor = 0– 20%, Poor = 21 – 40%, Moderate = 41 – 60%, Good = 61 –80%, Very good = 81 – 100%) and the behaviors of garage workers were analyzed based on the score and each item was rated on a 5 points Likert scale (never = 1, rarely = 2, ever = 3, usually = 4, always = 5) , interpreted the mean scale of the

behaviors on a 5 point Likert scale (Unacceptable = 1.00 - 1.80, Poor = 1.81 – 2.60, Moderate = 2.61 – 3.40, Good = 3.43 –4.23, Excellent = 4.24 – 5.00). There were positive and negative questions. Statistical tests were conducted using SPSS V24.

3. RESULTS

3.1 Personal demographic information

The main characteristics of the workers in Table 1 showed the mean values of type of garages, gender, age, education, working experience, length of working time, health condition, and medical check-up. Besides, the most personal protective equipment (PPE) which the workers wear during work was mask, fabric gloves and safety glasses respectively as following figure 1.

TABLE 1 Personal demographic information among the garage workers (n=38)

Items	Frequency (%)
Type of garage; Car	25 (65.79)
Motorcycle	13 (34.21)
Gender; Male	38 (100.00)
Age; between 29 to 39 years old	14 (36.84)
(average 34.53±5.9yrs.) Min=18 yrs. Max=58 yrs.	
Working experience; 1-5 years	24 (63.16)
(average 5.12±5.08 yrs.) Min=1 m. Max=20 yrs.	
Graduated from; Diploma/High Vocational Certificate	14 (36.84)
Working; 8 hours/day	31 (81.58)
Congenital disease; No	38 (100.00)
Medical check up; No	12 (31.58)

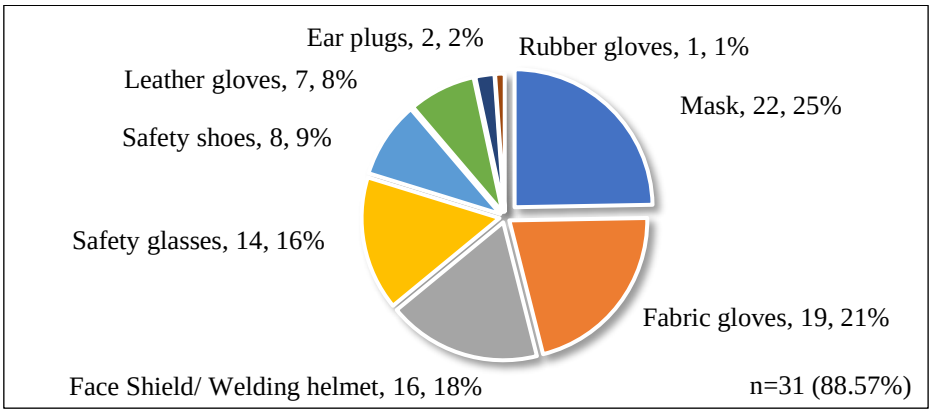

Figure 1 Wearing Personal Protective Equipment (PPE)

3.2 Characteristic of hazards and risks at work of garage workers

The majority job position or duties of the garage workers were changing wheel, recap/changing tires, draining the engine oil and changing auto parts or spare parts respectively. They have had work related diseases as following musculoskeletal diseases, respiratory system and skin disease. Besides, almost half of the garage workers have had an incident experience, main severity of the accident at work were no stopped working and stopped working for no more than 3 days as following figure 2.

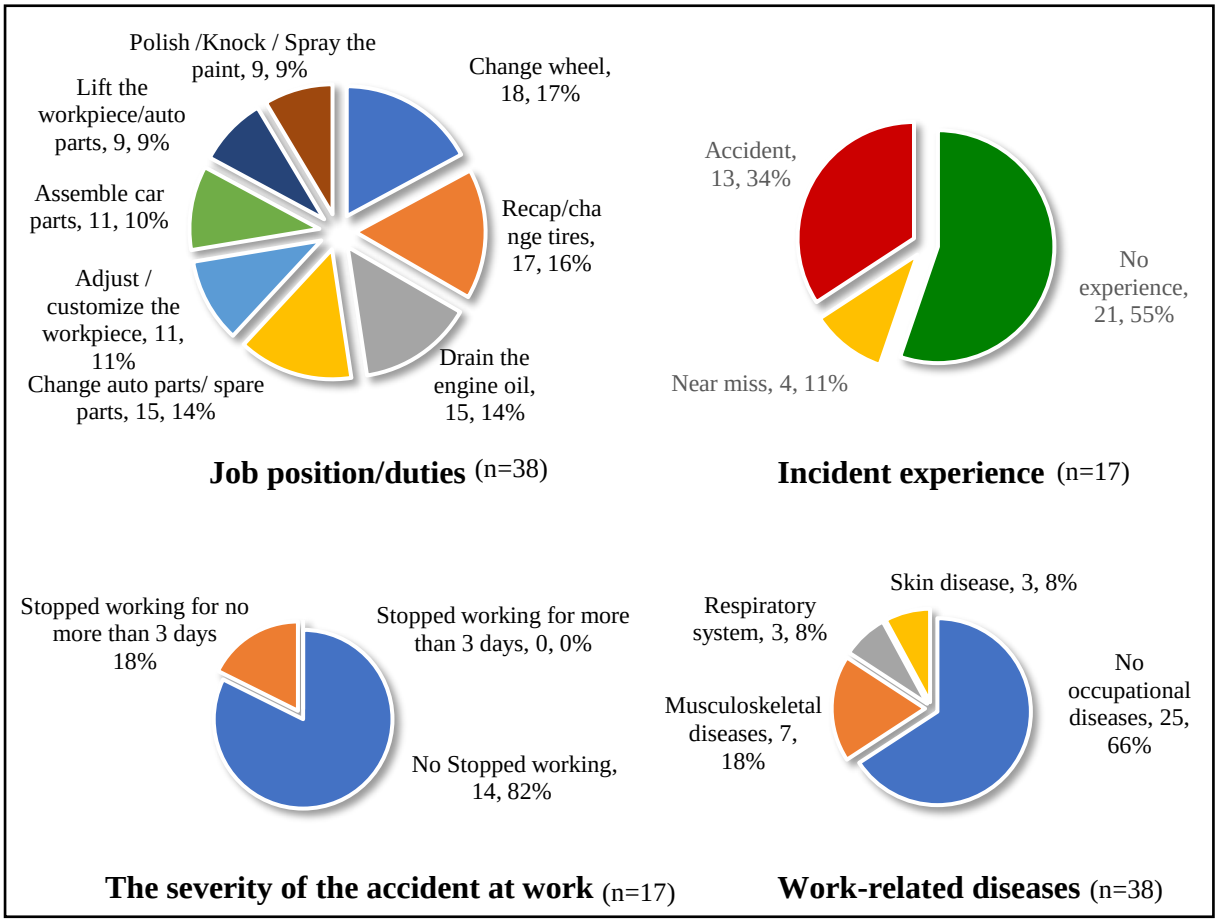

Figure 2 Characteristic of hazards and risks at work of garage workers

3.3 Characteristic of working and incident experience

The risk characteristic of working and incident experience of the garage workers who have had an accident showed top five were 1) dust, mist, smoke, odour of chemical vapours in the workplace, 2) twisting, turning the body in working, 3) lifting and lowering, pushing, pulling, dragging large materials 4) using of welding material without spark splash protection and 5) heat in the workplace as following Table 2.

TABLE 2 Characteristic of working and incident experience (n=38)

Items	Accident	Near miss	No experience
1. Adequate lighting in the workplace not too dim or too bright	11 (28.95)	4 (10.53)	19 (50.00)
2. Dust, mist, smoke, odour of chemical vapours in the workplace	10 (26.32)	1 (2.63)	10 (26.32)
3. Twisting, turning the body in working	9 (23.68)	3 (7.89)	19 (50.00)
4. Organized storage of tools and machines without blocking the aisle	9 (23.86)	4 (10.53)	21 (55.26)
5. Lifting and lowering, pushing, pulling, dragging large materials	8 (21.05)	0	12 (31.58)
6. Use of welding material without spark splash protection	7 (18.42)	3 (7.89)	5 (13.16)
7. Use of material lifting machines or laboursaving device	7 (18.42)	0	11 (28.95)
8. Store dry chemical fire extinguishers in the workplace	7 (18.42)	1(2.63)	18(47.37)
9. Heat in the workplace	6 (15.79)	3 (7.89)	7 (18.42)
10. Use high current electrical equipment	5 (13.16)	3 (7.89)	7 (18.42)
11. Chemical vapours in the workplace	5 (13.16)	0	7 (18.42)
12. Noise engine interferes in the operation	4 (10.53)	4 (10.53)	6 (15.79)
13. Oil stains, wet floors in the workplace	4 (10.53)	0	4 (10.53)
14. Storage/Collecting oxygen tanks in the garage	3 (7.89)	0	5 (13.16)
15. Rough floor in the workplace	2 (5.26)	0	2(5.26)

3.4 Knowledge on risk prevention at work

The overall level of knowledge on risk prevention at work of garage workers who have an accident experience was good. But in specific knowledge, there were some knowledge faced poor. It was a removing protective devices or safeguards, lighting in the workplace, working with chemicals and cleaning the work area as following Table 3.

TABLE 3 Knowledge on risk prevention at work of garage workers who have an accident experience (n=13)

Items	Accident experience (%)		Level
	Yes	No	
1. Accidents are caused by unsafe actions and unsafe conditions.	9(69.23)	4(30.77)	G
2. An act that ignores the slightest safety rules, may not cause serious accidents.	9(69.23)	4(30.77)	G
3. Accidents affect to colleagues, family, employers and the nation.	9(69.23)	4(30.77)	G
4. The best an accident prevention and control are source of hazard.	12(92.31)	1(7.69)	VG
5. The workers working in hazardous areas must wear personal protective equipment (PPE) at all times.	11(84.62)	2(15.38)	VG
6. The workers are exposed to most of the chemical through inhalation and skin respectively.	12(92.31)	1(7.69)	VG
7. The workers can remove protective devices or safeguards when it feels inconvenient to work or causes delays.	8(61.54)	5(38.46)	P
8. The workers must deny to work that is unsafe, such as working with machines that are not protective devices or safeguards.	12(92.31)	1(7.69)	VG
9. Preventing fires requires controlling fuel, air and chemical reactions.	13(100)	0(0)	VG
10. Dim lighting can help protect worker eyes and prevent eye fatigue, eye strain, and dizziness.	9(69.23)	4(30.77)	P
11. Working with chemicals volatile substances should be wear cloth gloves.	8(61.54)	5(38.46)	P
12. Scrap material which contaminated with oil can become a fuel and cause a fire.	12(92.31)	1(7.69)	VG
13. When an accident occurs, it is necessary to investigate the accident immediately to prevent a recurrence.	13(100)	0(0)	VG
14. Machine sound at work if not exposed every day does not cause health effects.	7(53.85)	6(46.15)	M
15. Cleaning the work area should be done after work so as not to waste time working.	10(76.92)	3(23.08)	P
Overall	**9(69.23)**	**4(30.77)**	**G**

Remark: *Very poor (VP), Poor (P), Moderate (M), Good (G), Very good (VG)*

3.5 Behaviour on risk prevention at work

The overall level of behaviour on risk prevention at work of garage workers who have an accident experience was moderate. But in specific behaviour, there were some behaviours faced poor and moderate. It was absent-minded, wearing personal protective equipment (PPE), inadequate rest, lifting and moving and working instead of the colleague as following Table 4.

TABLE 4 Behaviour on risk prevention at work of garage workers who have an accident experience (n=13)

Statement	Always	Usually	Ever	Rarely	Never	x̄±SD; Level
1. Testing all equipment before work such as welding machines, air pumps, pressure gauges, gas cylinders.	4(30.77)	3(23.08)	5(38.46)	0(0)	1(7.69)	3.69±0.28; G
2. Following the operating procedures strictly.	7(53.85)	2(15.38)	3(23.08)	1(7.69)	0(0)	4.08±0.31; G
3. Giving advice to colleagues when see that they are doing something incorrectly.	8(61.54)	3(23.08)	1(7.69)	0(0)	1(7.69)	4.31±0.33; E
4. Following the warnings strictly.	9(69.23)	1(7.69)	2(15.38)	1(7.69	0(0)	4.38±0.34; E
5. Wearing personal protective equipment (PPE) during working, such as gloves, masks, safety glasses, and earplugs.	3(23.08)	1(7.69)	4(30.77)	0(0)	5(38.46)	2.77±0.21; M
6. Checking the neatness of tools, machines after working.	7(53.85)	3(23.28)	1(7.69)	2(15.38)	0(0)	4.15±0.32; G
7. Notifying the supervisor or shop owner immediately when meet the tools or machine broken/ failure/ unfunctional.	10(79.93)	1(7.69)	0(0)	0(0)	2(15.38)	4.31±0.33; E
8. Keeping all sharp tools and equipment safely after finish working.	10(79.93)	1(7.69)	0(0)	0(0)	2(15.38)	4.31±0.33; E
9. Inadequate rest before go to work.	1(7.69)	2(15.38)	4(30.77)	4(30.77)	2(15.38)	2.69±0.21; M
10. Thinking about other things absentmindedly while working.	3(23.28)	0(0)	2(15.38)	4(30.77)	4(30.77)	2.54±0.20; P
11. Removing protective equipment or guards while working.	0(0)	0(0)	6(46.15)	3(23.08)	4(30.77)	2.15±0.17; G
12. Smoking while working.	0(0)	1(7.69)	2(15.38)	1(7.69)	9(69.23)	1.62±0.12; E
13. Teasing or joking with colleagues while working.	0(0)	1(7.69)	3(23.08)	5(38.46)	4(30.77)	2.08±0.16; G
14. Lifting and moving by force instead of the saver.	3(23.28)	3(23.28)	1(7.69)	2(15.38)	4(30.77)	2.92±0.22; M
15. Working instead of the colleague even if it is not duty.	5(38.46)	2(15.38)	2(15.38)	0(0)	4(30.77)	3.31±0.25; M
Overall						**3.31**±0.25; M

Remark: *Unacceptable (U), Poor (P), Moderate (M), Good (G), Excellent (E)*

4. DISCUSSION

The result regarding health risk revealed that work-related diseases as skin disease and respiratory system. So, obviously the garage workers were still less wearing a personal protective equipment (PPE) such as gloves, mask, face shield or welding helmet. The majority of garage workers were involved in mechanical work. Additionally, one of work-related diseases that faced in garage workers were musculoskeletal disease(Haladi et al., 2022) because of their characteristic position for instance lifting hard equipment (machine, material, spare part) during routine tasks, repetitive movement, bending down/over and forcing twist or press during changing or repair and so on. For incident experience of garage workers showed that less than half they have had an accident experience but even the severity of the accident at work affect to them. The highest severity was stopped working for no more than 3 days. In addition, the main characteristic risk in the workplace that indicated as following; 1) unsafe condition was dust, mist, smoke, odour of chemical vapours and heat or ventilation and 2) unsafe act was twisting, turning the body in working, lifting and lowering, pushing, pulling, dragging large materials and using of welding material without spark splash protection. These were health and

safety risk that garage workers face in the workplace. It may be possible effect to health, safety, sanitation and especially their wellbeing.

The majority of the garage workers did not implement effective preventive or control measures for workplace hazards and chemical exposure such as Ethiopia, India, Kenya, Ghana, Dubai and Thailand as well. The important of health and safety prevention of garage workers are awareness programme on prevention of health hazards among garage workers earnestly (Prachande, 2020). Although, the garage workers have knowledge on risk prevention at work of garage workers who have an accident experience was good level but behaviour was moderate level. Obviously, some behaviours expressed sub-standard on safety due to lack knowledge such as wearing PPE, lifting and moving equipment, using safeguard, working with hazardous chemicals and cleaning the work area including safety awareness working in the safe condition and preparation on physical condition. Moreover, the garage workers were not trained (Kambris et al., 2019) or promoted on risk protection and management so that lacked prevention, protection and operated unsafety.

5. CONCLUSION

The results of the study indicate that garage workers have occupational health and safety risk that appropriate and effective safety measures need to be taken by the workers and owner to prevent possible exposure each hazard during routine tasks. The finding indicates that working in the garage effect to worker health. Therefore, appropriate and effective safety management need to be implemented to prevent hazard exposure during routine work. Hazards arising from auto garages could impair the health and well-being of the workers; therefore, it is necessary to risk assessment, promotion awareness, evaluation and control such hazards. Policies and regulations with respect such as to improve safety in the workplace, clean and safe work environment, provide the personal protective equipment; need to be properly enforced and educate the workers related occupational health and safety. Furthermore, the workers, owner and government should recognize the importance of risk management at work so as to reduce undesirable health outcomes. Risk communications at work is therefore important. The development of health promotion/risk reduction programs including risk behaviours. These results can be used to enhance the quality of working life among workers in the garage shops.

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The Development of PERL Model of Coronavirus Disease 2019 Prevention and Control, Bandan Songkhla

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Abstract

This action research aimed to develop the model of Coronavirus disease 2019 (COVID-19) prevention and control, Bandan, Songkhla. This study was divided into two main phases: 1) development of conceptual framework of COVID-2019 prevention and control, Bandan, Songkhla by literature reviewed guided by concept analysis as proposed by Walker & Avant and 2) development of model of COVID-19 prevention and control, Bandan, Songkhla by deploying the activities in the conceptual framework into practice and then summarizing as a model. Phases 2 consisted of 4 stages: 1) preparation prior to the outbreak (P-preparation), 2) encounter the outbreak both in Bandan and other places (E-Encounter the outbreak), 3) recovery after the outbreak (R-Recovery) and 4) learning community (L-Learning community). The research was conducted during November, 2021 to May, 2022. The sample, in phase 2, were 280 of 1) household representatives (174), 2) managers and health care staffs of sub-district administration organization (8), 3) public health officers of KohTaew Health Promoting Hospital: HPH (7), 4) community leaders (4), 5) village health volunteers (15), 6) teachers of the Chumchon Bandan school (11), 7) imam and mosque committee (13), and 8)Grade 4 – 6 students of the Chumchon Bandan school (48). The research instruments were 1) questionnaire of knowledge, attitude, action, perceived susceptibility, participation, and learning organization in COVID-19 prevention and control of people and related parties, 2) questionnaire of knowledge, attitude, action, perceived susceptibility, participation, and learning organization in COVID-19 prevention and control of students, 3) THAI STOP COVID tool by the Ministry of Public Health, 4) focus group interview questions on the readiness of manpower in COVID-19 prevention and control of manager and health care staff of sub-district administration organization, KohTaew HPH and community leaders, 5) questionnaire of action in COVID-19 prevention and control and 6) focus group interview of after action of COVID-19 prevention and control review (AAR) . The instruments were assessed for content validity and reliability. Then, 4 stages were concluded as a “PERL” model of Bandan COVID-19 prevention and control. The PERL model is the original model which requires continuous refinement for more effectiveness. The model could be applied for other communicable disease outbreaks.

Key words: BanDan village, COVID-19, PERL Model

Introduction

In 1918, 103 years ago, Spanish flu infected 500,000,000 people worldwide with 5,000,000 deaths. In the same year, Spanish flu was first spread in southern Thailand, 2,317,662 infected cases and 80,223 deaths (0.95 % death rate, 3.5% mortality rate). The disease vanished in March 1919[(1)]. In 1992, SARS (Severe Acute Respiratory Syndrome) Coronavirus, stain HCoV-229E. Seven cases were reported during 1992-1993.[(2)] Ten years later, in September 2012, MERS-CoVMERS-CoV (Middle East Respiratory Syndrome Coronavirus) was first found in the Middle East region. The information from Bureau of General Communicable Disease, Department of Disease Control, MOPH Thailand reported that there were 1,013 infected cases during 2013-2019.[(3)]

Coronavirus Disease is an infectious disease caused by the SARS-CoV-2 virus. COVID-19 pandemic started in early 2019 in Wuhan city, China. The first reported case in Thailand was on 13 January, 2020 which was the first country reported with COVID-19 infection outside China. All government sectors and private sectors enacted their measures or guidelines to prevent and control the spread of the disease, i.e vigilant measures against the spread of coronavirus by the Ministry of Education (MHESI, 2022). The COVID-19 screening and investigation were strictly implemented for both migrants and those at risk or infected people. During February 2020, there were 40 COVID -19 infected cases. The history of a big number of infected cases emerged from a boxing match on 6 March 2020 which a week after that there were more than 100 infected cases. The Thai government by Office of the Prime Minister immediately declared an emergency situation pursuant to the Emergency Decree on Public Administration in Emergency Situations B.E. 2548 (2005) on 25 march 2020. By that period, the healthcare system in Thailand in dealing with COVID-19 spread was accepted and prominent. Thus, COVID -19 was under control from 2020 to 2021.

From the beginning of January 2020 until December 2021, there were 175 infected cases with one death in BanDan (0.98 % death rate). BanDan is a village with 213 families, 1,012 people is a part of KohTaew subdistrict (Tumbol). Bandan receives primary health care from KohTaew Sub-district Health Promotion Hospital and responsible care by KohTaew municipality and community leaders such as village headman and sub-district headman. Bandan is almost a Muslim village, with only one Buddhist family with 3 members. BanDan has been known as an effective community in prevention and control of Dengue Hemorrhagic fever for years. During the COVID-19 outbreak, BanDan' number of infected cases were less than other villages even though BanDan was an open area and rurban. BanDan management in dealing with this matter is of value to explore to be a lesson. Thus, this qualitative study to develop the model of Coronavirus disease 2019 (COVID-19) prevention and control, Bandan, Songkhla, Thailand.

Methodology

This action research aimed to develop the model of Coronavirus disease 2019 (COVID-19) prevention and control, Bandan, Songkhla. This study was divided into two main phases: 1) development of conceptual framework of COVID-2019 prevention and control, Bandan, Songkhla by literature reviewed guided by concept analysis as proposed by Walker & Avant and 2) development of model of COVID-19 prevention and control, Bandan, Songkhla by deploying the activities in the conceptual framework

into practice and then summarizing as a model. Phases 2 consisted of 4 stages: 1) preparation prior to the outbreak (P-preparation), 2) encounter the outbreak both in Bandan and other places (E-Encounter the outbreak), 3) recovery after the outbreak (R-Recovery) and 4) learning community (L-Learning community). The research was conducted during November, 2021 to May, 2022. The sample, in phase 2, were 280 of 1) household representatives (174), 2) managers and health care staffs of sub-district administration organization (8), 3) public health officers of KohTaew Health Promoting Hospital: HPH (7), 4) community leaders (4), 5) village health volunteers (15), 6) teachers of the Chumchon Bandan school (11), 7) imam and mosque committee (13), and 8)Grade 4 – 6 students of the Chumchon Bandan school (48). The research instruments were 1) questionnaire of knowledge, attitude, action, perceived susceptibility, participation, and learning organization in COVID-19 prevention and control of people and related parties, 2) questionnaire of knowledge, attitude, action, perceived susceptibility, participation, and learning organization in COVID-19 prevention and control of students, 3) THAI STOP COVID tool by the Ministry of Public Health, 4) focus group interview questions on the readiness of manpower in COVID-19 prevention and control of manager and health care staff of sub-district administration organization, KohTaew HPH and community leaders, 5) questionnaire of action in COVID-19 prevention and control and 6) focus group interview of after action of COVID-19 prevention and control review (AAR) . The instruments were assessed for content validity and reliability. Then, 4 stages were concluded as a "PERL" model of Bandan COVID-19 prevention and control.

RESULT AND DISCUSSION

The model was developed by 2 key processes of 1) development of COVID-19 prevention and control conceptual framework and 2) implemented the conceptual framework which was used for model refinement known as PERL model for COVID-19 prevention and control. The PERL model consisted of 4 stages (P- Preparation, E-Encounter of outbreak, R-Recovery, and L-Learning community) as shown in figure 1.

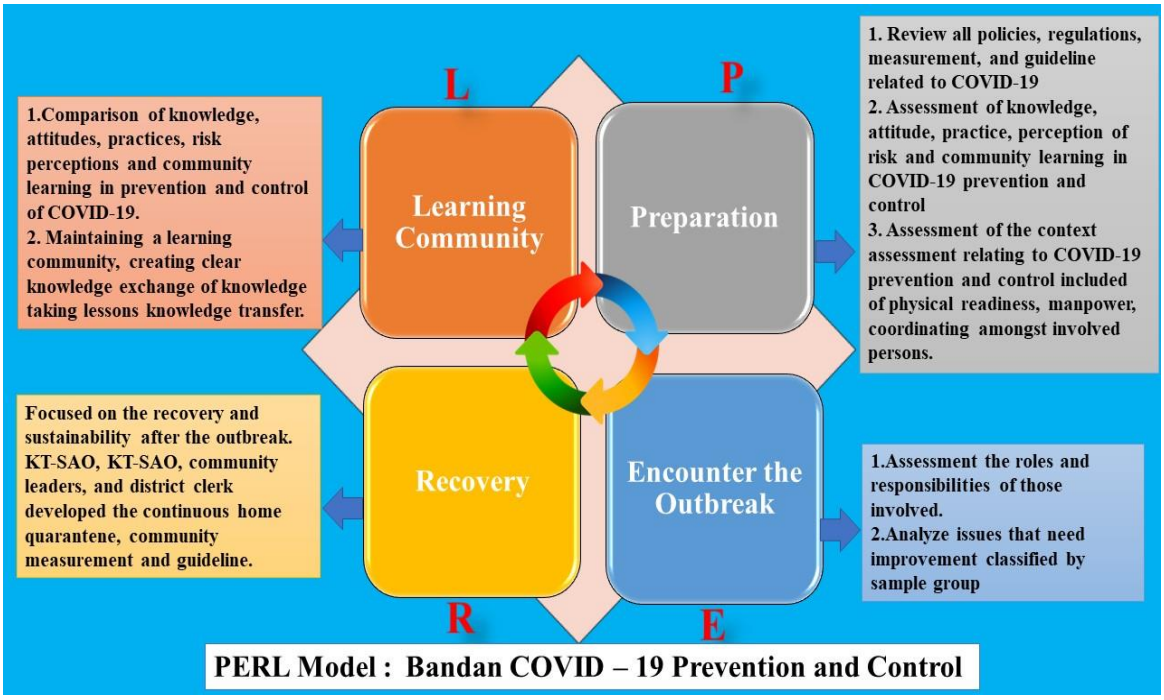

Figure 1 PERL Model of BanDan COVID 19 Prevention and Control

Stage I P-Preparation

This phase consisted of 1) review all policies, regulations, measurement, and guideline related to COVID-19 prevention and control by researchers and authorized persons from KhaoTaew Subdistrict Health Promotion Hospital (KT-SHPS), public health staff from KhaoTaew Subdistrict administrative Organization (KT-SAO), 2) assessment of knowledge, attitude, practice, perception of risk and community learning in COVID-19 prevention and control of household representative, KT-SHPS and KT-SAO administrators, community leaders, village health volunteers, teachers and students, and Islamic leaders, 3) assessment of the context assessment relating to COVID-19 prevention and control included of physical readiness, manpower, coordinating amongst involved persons.

Stage II E-Encounter the Outbreak

This stage aimed to determine roles and responsibilities of 6 groups of involved persons during the outbreak. These were KT-SHPS and KT-SAO staff, community leaders, BanDan village health volunteers, teachers, and Islamic leaders. Then the improvement area was proposed and implemented by the involved persons.

Stage III R-Recovery

This stage focused on the recovery and sustainability after the outbreak. KT-SAO, KT-SAO, community leaders, and district clerk developed the continuous home quarantene, community measurement and guideline.

Stage IV L-Learning Community

This stage focused on the learning community comparison of knowledge, attitudes, practices, risk perceptions and community learning in prevention and control of COVID-19 and maintaining a learning community, creating clear knowledge exchange of knowledge taking lessons knowledge transfer

During this action research was conducted, there was COVID-19 outbreak and infected patients in the village. Therefore, some activities in a particular stage were not conducted on schedule. Moreover, schools and daycare centers were closed. However, the model was solved by strong community involvement as well as changing the route of communications. This research was strong in terms of constructive literature review and strong community participation as well as using appropriate communication technology. In addition, social media was the great influence of the success in COVID-19 prevention and control in Bandan village during the constraint of social distancing.

IMPLICATION AND RECOMMENDATION

1. Authorized persons could apply the model into COVID-19 as well as communication disease prevention. Moreover, the appropriate policy could be announced to promote a more healthy community.
2. The key success factor of this action research was the community participation which guides the others working with community projects.
3. PERL model should be applied for COVID-19 and communicable disease prevention in other communities.
4. Application on mobile phones to facilitate community involvement in disease prevention is suggested.

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Prevention Behaviors of COVID-19 of Thaksin University's Student, Phatthalung Campus

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Abstract

Thailand is facing a continuing problem of coronavirus infection. The vulnerable group including university students were especially affected. The university students mostly are in their youth and come from several areas and may tend to live in crowded places where there is a high risk of spreading the virus easily from person to person such as classrooms, libraries, and dormitory. Self-prevention behavior following with D-M-H-T-T-A measure is significant in reducing of infection. This research aims to evaluated the knowledge, concern, and self-protection behaviors of COVID-19 among Thaksin University's students, Phatthalung campus in the year 2022. Matched case control study conducted among 210 students who had covid-19 infected experience and 210 controls who had no history of infection. The results show that knowledge, concern, and self-protection behaviors of COVID-19 among Thaksin University student was in a good level. No statistically different of knowledge, and self-protection behaviors of COVID-19 between cases and controls but concern about COVID-19 was statistically difference by these two groups. Learning self-defense from COVID-19 infection related experiences may encourage a good prevention behavior for students.

Keywords: COVID-19, Self-prevention behavior, Concern of COVID-19, Knowledge about COVID-19

1. Introduction

The COVID-19 pandemic had spread across the world. By the end of January 2021, COVID-19 caused over one hundred million confirmed infections and two million deaths worldwide [1]. Thailand also experienced the spread of COVID-19. Lock down was implemented to reduce the spread of pandemic but it is not a permanent and welcoming strategy to control the spread. Social and physical distancing by D-M-H-T-T-A (D: Distancing, M: Mask wearing, H: Hand washing, T: Temperature, T: Testing, A: Aplication) implemented is one of a significant measure with helps limit the spread of COVID-19. Based on data as reported by the Ministry of Public Health on 21 December 2022, COVID-19 situation in Thailand is continue to reduce community transmission. Daily COVID-19 cases have stabilised, but remain high in Bangkok, and significant numbers in some provinces in the North, the North-East and in the South of country. Total confirmed cases were 4,718,908 cases, average by 488 new conformed case and 16 deaths per day. Severe cases have decreased by 0.6%, but ventilated cases have increased by 3.9% in the past week. Deaths have increased by 7% in the last 7 days. Cases in Bangkok still make up the greatest proportion of cases. The average daily number of confirmed cases in Bangkok over the past week has increased by 24.1% compared to 1 week prior. [2]. This data shows that COVID-19 is not entirely controlled in Thailand and the new version of COVID-19 still reminds us that the best possible way to deal with COVID-19 is taking pre-emptive strategies. Nevertheless, how individuals form pre-emptive behavior toward COVID-19 is yet to be explored. Moreover, understanding the motivations for preventive behaviors is critical to increasing compliance and improving the effectiveness of containment measures through adequate health campaigns. It is important to understand people behavior to develop effective strategies and ensure high compliance with protective practices.

COVID-19 prevention and control posed greater challenges and more stringent requirements for higher education institutions than for other social organizations. In contrast to other social systems, university have a high density of people, which means that once one student gets it, large-scale pandemic transmission is likely to be triggered due to the high rate of spread of COVID-19 in crowded settlement. The university students mostly are in their youth come from several areas and may tend to live in crowded places where there is a high risk of spreading the virus easily from person to person such as classrooms, libraries, supermarket, and dormitory. Increasing numbers of studies added to the understanding of general public preventive behavior in many countries after the outbreak of COVID-19 [3–8]. However, few have targeted higher education systems [9-10], and most have focused on the role of knowledge and attitudes in predicting students' COVID-19 preventive behavior [11]. Thus, although universities are regarded as effective settings to shape specific knowledge, concern, and self-prevention behaviors of students through institutional interventions [12]. Several studies supported the evidence of the association between the perceived threat of the COVID-19 on people's awareness of disease severity and willingness to adhere to preventive behaviors [13]. The level of concern has been positively linked with promoting behavior. A person with a high social concern is willing to sacrifice their own desires when they think it will harm others [14]. Awareness of COVID-19 affects risk awareness and disease prevention effectiveness [15]. Knowledge is beyond awareness about infectious diseases. Knowledge entails the form of behavior, action, or checklist that enables

one to identify the presence of the disease [16]. Lack of knowledge involves misunderstanding or the inability to isolate the distinguishable signs that describe the presence of an infectious disease [17]. Consistent knowledge of infectious diseases enhances the concern and the behavior to take precautionary actions to avoid the disease.

COVID-19 infection related experiences that can be classified into (1) people with a history of infection, (2) people with a history of close contact, and (3) people with acquaintances who have been infected may also influence the effectiveness of COVID-19 prevention measure and states of emergency. It was reported people who thought they had had COVID19 were more likely to think that they had some immunity to the virus and were less likely to adhere to social distancing measures [17]. Conversely, people with a history of close contact or acquaintances may think that they were likely to be infected and further strengthen the measures against infection and refrain from social behaviors, but these effects have not yet been investigated to our knowledge. There was evidence of a significant difference by COVID-19 infection related experiences compared to people without COVID-19 related experiences. People with a history of COVID-19 infected were less likely self-restraint from most social behaviors. People whose acquaintance had been diagnosed with COVID-19 were significantly more likely to refrain from most social behaviors [18]. Nevertheless, there was no significant difference in any social behaviors for people with a history of close contact only. This study investigated knowledge, concern and self-prevention behavior in COVID-19 among Thaksin university students, the university of The South of Thailand, comparing between students with history of covid-19 infected and student who had not infected. Understanding of these factors is benefit further development effective strategies and ensure the sustainability of the protective practices measure for Thaksin University students.

2. Methodology

2.1 Study design

A matched case control was conducted in Thaksin university' student by self-administrated online questionnaire. Cases were identified by the positive reverse transcription-polymerase chain reaction (RT-PCR) results or a positive antigen rapid test (ATK), who were reported with or without symptoms, between 1st June 2021 and 30th October, 2022. Controls, student who had not a positive result of infection resulting by RT-PCR or ATK, were matched 1:1 with a case by sex, years of study, and faculty they attend.

2.2 Samples size and sampling

A sample size was calculated based on an estimation a proportion of two groups. 210 cases and 210 controls were used for interviewed. Totally, 8 faculties in Thaksin university, Phatthalung campus was classified in to 8 clusters, then a proportional two size cluster sampling was used for sample selection. In each cluster, a desire sample size was chosen by purposive sampling which matched case and control by sex and years of study.

2.3 Data collection

Data was collected using a self-administrated structured online questionnaire including demographic data, history of COVID-19 infections, sign and symptom, personal protection equipment (PPE) used, knowledge, concern and preventive behavior of COVID-19. The questionnaire used the five-point Likert scale that ranged from 1= strongly disagree to 5 = strongly agree for each construct of concern and COVID-19 preventive behavior and two scale of knowledge about COVID-19 (known and unknown). The questionnaire which included the details as described above was pretested among 30 Thaksin university' student. After the pretest, the questionnaires were corrected for comprehensibility before administering the questionnaires to the samples. The reliability of the questionnaire was 0.86.

2.4 Statistical analysis

Descriptive statistic was used to described and compared the quantitative variables. Results of knowledge, concern and protective behavior between case and control was compare using Chi-square test.

3. Results

Table 1 shows that among 210 cases and 210 controls, most of them was female. 39% was in 2nd year study. Participants from health and sports science were highest proportion.

Table 1. Demographic data

Characteristics	Case		Control	
	Number	Percent	Number	Percent
sex				
- male	51	24.3	51	24.3
- female	159	75.7	159	75.7
Year of study				
- 1st year	32	15.2	32	15.2
- 2nd year	82	39.0	82	39.0
- 3rd year	74	35.2	74	35.2
- 4th year	22	10.5	22	10.5
Faculty				
- science	21	10.0	21	10.0
- health and sports science	134	63.8	134	63.8
- law	16	7.6	16	7.6
- education	3	1.4	3	1.4
- technology and community development	9	4.3	9	4.3
- engineering	12	5.7	12	5.7
- agro-and bio-industry	7	3.3	7	3.3
- nursing	8	3.8	8	3.8

Table 2 demonstrated the knowledge about COVID-19 comparing between cases and controls. The result indicated that both cases and controls have a good knowledge. However, some issue related to the COVID-19 transmitting to a newborn and animal were not perfectly clear.

Table 2 Knowledge about COVID-19

items	Case		Control	
	Yes	**No**	**Yes**	**No**
1. Do you know what are the symptoms of COVID-19	195 (92.9%)	15 (7.1%)	199 (94.8%)	11 (5.2%)
2. COVID-19 can contact by touching snot and saliva	201 (95.7%)	9 (4.3%)	200 (95.2%)	10 (4.8%)
3. Elderly are most at risk of contracting COVID-19	198 (94.3%)	12 (5.7%)	189 (90.0%)	21 (10.0%)
4. COVID-19 can be transmitted to the newborn	155 (73.8%)	55 (26.2%)	145 (69.0%)	65 (31.0%)
5. COVID-19 can cause illness in animals	148 (70.5%)	62 (29.5%)	152 (72.4%)	58 (27.6%)
6. Symptoms of COVID-19 similar to the symptoms of influenza	190 (90.5%)	20 (9.5%)	187 (89.0%)	23 (11.0%)
7. Older people are more likely to get severely ill or die from COVID-19	192 (91.4%)	18 (8.6%)	190 (90.5%)	20 (9.5%)
8. COVID-19 do not contact from parcels from delivery	178 (84.8%)	32 (15.2%)	159 (75.7%)	51 (24.3%)
9. Travel restrictions and quarantines can help reduce the spread of COVID-19	194 (92.4%)	16 (7.6%)	192 (91.4%)	18 (8.6%)
10. People infected with COVID-19 most often do not show symptoms	186 (88.6%)	24 (11.4%)	180 (85.7%)	30 (14.3%)
11. Most patients who infected with COVID-19 caused by touching of caught	194 (92.4%)	16 (7.6%)	190 (90.5%)	20 (9.5%)

Table 3 shows a moderately concern of covid-19 for both cases and controls. However, cases seem to be more concern.

Table 3 Concern of COVID-19

items	Case					Control				
	Regular	**Often**	**Sometimes**	**Rarely**	**Never**	**Regular**	**Often**	**Sometimes**	**Rarely**	**Never**
1. You felt frustrated because of the events of COVID-19 happened unexpectedly	19 (9.0%)	38 (18.1%)	68 (32.4%)	48 (22.9%)	37 (17.6%)	11 (5.2%)	34 (16.2%)	76 (36.2%)	59 (28.1%)	30 (14.3%)
2. You felt worried, uncomfortable to go outside during the COVID-19 situation	16 (7.6%)	58 (27.6%)	68 (32.4%)	38 (18.1%)	30 (14.3%)	9 (4.3%)	53 (25.2%)	74 (35.2%)	46 (21.9%)	28 (13.3%)
3. You concerned about preparations to prevent COVID-19 infection such as food hoarding, buying masks etc.	21 (10.0%)	43 (20.5%)	70 (33.3%)	42 (20.0%)	34 (16.2%)	9 (4.3%)	38 (18.1%)	74 (35.2%)	55 (26.2%)	34 (16.2%)
4. You can't sleep/have trouble sleeping because thinking about COVID-19	11 (5.2%)	26 (12.4%)	58 (27.6%)	53 (25.2%)	62 (29.5%)	7 (3.3%)	26 (12.4%)	41 (19.5%)	57 (27.1%)	79 (37.6%)
5. You felt anxious, stressed, afraid that you will have a chance to get infected with COVID-19	12 (5.7%)	40 (19.0%)	62 (29.5%)	49 (23.3%)	47 (22.4%)	11 (5.2%)	28 (13.3%)	54 (25.7%)	68 (32.4%)	49 (23.3%)
6. You felt anxious and stressed when you had to go to the class room because of fear to contracting COVID-19	18 (8.6%)	35 (16.7%)	56 (26.7%)	57 (27.1%)	44 (21.0%)	12 (5.7%)	30 (14.3%)	75 (35.7%)	51 (24.3%)	42 (20.0%)
7. You felt anxious and stressed about the economy due to the situation of COVID-19 causing parents income decrease	34 (16.2%)	45 (21.4%)	52 (24.8%)	49 (23.3%)	30 (14.3%)	29 (13.8%)	50 (23.8%)	61 (29.0%)	37 (17.6%)	33 (15.7%)
8. You find it difficult to adjust during the COVID-19 situation	16 (7.6%)	38 (18.1%)	60 (28.6%)	47 (22.4%)	49 (23.3%)	13 (6.2%)	25 (11.9%)	74 (35.2%)	54 (25.7%)	44 (21.0%)
9. You think that COVID-19 affecting your daily life	40 (19.0%)	50 (23.8%)	47 (22.4%)	41 (19.5%)	32 (15.2%)	24 (11.4%)	46 (21.9%)	75 (35.7%)	42 (20.0%)	23 (11.0%)
10. You felt anxious or stressed because you thinks that other people don't want to talk to you if you are infected with COVID-19	16 (7.6%)	35 (16.7%)	58 (27.6%)	52 (24.8%)	49 (23.3%)	12 (5.7%)	25 (11.9%)	56 (26.7%)	60 (28.6%)	57 (27.1%)

Table 4 demonstrated a self-prevention behavior of cases and controls. It indicated that self-prevention behavior of both cases and controls were slightly more than half in a very good level. Most of them were hygiene practice to prevent COVID-19 disease in often and regular.

Table 4 Self prevention behavior of COVID-19

Items	case					control				
	Regular	Often	Sometimes	Rarely	Never	Regular	Often	Sometimes	Rarely	Never
1. You wash your hands with soap or alcohol after handling	53 (25.2%)	95 (45.2%)	58 (27.6%)	4 (1.9%)	0 (0.0%)	57 (27.1%)	92 (43.8%)	55 (26.2%)	5 (2.4%)	1 (0.5%)
2. You washed your hands thoroughly before touching your face, picking your nose and eyes	63 (30.0%)	90 (42.9%)	48 (22.9%)	7 (3.3%)	2 (1.0%)	60 (28.6%)	97 (46.2%)	43 (20.5%)	9 (4.3%)	1 (0.5%)
3. You wear a mask every time when in public	129 (61.4%)	59 (28.1%)	18 (8.6%)	4 (1.9%)	0 (0.0%)	129 (61.4%)	56 (26.7%)	22 (10.5%)	3 (1.4%)	0 (0.0%)
4. You avoid sharing things with others, such as glasses, inhalers, etc.	94 (44.8%)	87 (41.4%)	23 (11.0%)	4 (1.9%)	2 (1.0%)	101 (48.1%)	73 (34.8%)	32 (15.2%)	3 (1.4%)	1 (0.5%)
5. You cover your mouth and nose with a tissue when you cough or sneeze	99 (47.1%)	77 (36.7%)	30 (14.3%)	3 (1.4%)	1 (0.5%)	94 (44.8%)	85 (40.5%)	27 (12.9%)	2 (1.0%)	2 (1.0%)
6. You avoid gatherings with large numbers of people.	77 (36.7%)	81 (38.6%)	48 (22.9%)	3 (1.4%)	1 (0.5%)	76 (36.2%)	82 (39.0%)	49 (23.3%)	3 (1.4%)	0 (0.0%)
7. you carry a hygienic mask and hand sanitizer when going out on errands	77 (36.7%)	91 (43.3%)	34 (16.2%)	7 (3.3%)	1 (0.5%)	76 (36.2%)	82 (39.0%)	44 (21.0%)	4 (1.9%)	4 (1.9%)
8. You always promote your health such as exercising to strengthen your immune system	55 (26.2%)	87 (41.4%)	57 (27.1%)	11 (5.2%)	0 (0.0%)	59 (28.1%)	78 (37.1%)	66 (31.4%)	6 (2.9%)	1 (0.5%)
9. you stand or sit at least 2 meters away from others	53 (25.2%)	87 (41.4%)	62 (29.5%)	8 (3.8%)	0 (0.0%)	48 (22.9%)	88 (41.9%)	60 (28.6%)	13 (6.2%)	1 (0.5%)
10. You eat freshly cooked food every time	116 (55.2%)	73 (34.8%)	21 (10.0%)	0 (0.0%)	0 (0.0%)	103 (49.0%)	81 (38.6%)	24 (11.4%)	2 (1.0%)	0 (0.0%)

Items	case					control				
	Regular	**Often**	**Sometimes**	**Rarely**	**Never**	**Regular**	**Often**	**Sometimes**	**Rarely**	**Never**
11. You change a mask when it gets dirty	116 (55.2%)	71 (33.8%)	20 (9.5%)	3 (1.4%)	0 (0.0%)	111 (52.9%)	74 (35.2%)	19 (9.0%)	6 (2.9%)	0 (0.0%)
12. You closely monitor the latest information about the outbreak of COVID-19	58 (27.6%)	96 (45.7%)	46 (21.9%)	10 (4.8%)	0 (0.0%)	66 (31.4%)	89 (42.4%)	43 (20.5%)	10 (4.8%)	2 (1.0%)
13. You clean the surfaces you use, such as knobs, desks, and other items	56 (26.7%)	71 (33.8%)	64 (30.5%)	17 (8.1%)	2 (1.0%)	38 (18.1%)	91 (43.3%)	59 (28.1%)	20 (9.5%)	2 (1.0%)
14. You notice yourself when you have a fever, cough, runny nose	72 (34.3%)	97 (46.2%)	32 (15.2%)	7 (3.3%)	2 (1.0%)	73 (34.8%)	87 (41.4%)	38 (18.1%)	11 (5.2%)	1 (0.5%)
15. If you need to buy a new mask, you choose a standard hygienic mask	100 (47.6%)	74 (35.2%)	21 (10.0%)	15 (7.1%)	0 (0.0%)	95 (45.2%)	76 (36.2%)	25 (11.9%)	13 (6.2%)	1 (0.5%)

Table 5 demonstrated that knowledge and self-prevention behavior for COVID-19 of cases and control was not difference. However, concern about COVID-19 was a statistically difference between these two groups. Cases was higher concern than controls.

Table 5 The difference of knowledge, concern, and self-prevention behavior between case and control

variables	Case		Control		$\chi 2$	df	p-value
	Number	Percent	Number	Percent			
1. Knowledge about COVID-19					0.383	2	0.536
- Very good	199	94.8	196	93.3			
- Good	7	3.3	9	4.3			
- Moderate	4	1.9	5	2.4			
2. Concern about COVID-19					0.458	3	0.044
- Very high (4)	17	8.1	9	4.3			
- high (3)	72	34.3	60	28.6			
- moderate (2)	67	31.9	86	41.0			
- low (1)	54	25.7	55	26.2			
3.Self-prevention behavior of COVID-19							
- Very good	120	57.1	114	54.3	0.347	2	0.556
- Good	88	41.9	90	42.9			
- Moderate	2	1.0	6	2.9			

4. Conclusion and suggestion

The results show that knowledge, awareness, and self-protection behaviors of COVID-19 of Thaksin University student was in a good level. No statistically different of knowledge and self-protection behaviors of COVID-19 between case and control group. However, COVID-19 infected experience was related to concern about COVID-19. This may reflect a successful control measure by the government and the university that can encourage to a good knowledge and appropriated prevention behavior of COVID-19 to University's students. Learning self-defense from COVID-19 infection related experiences may encourage a good prevention behavior of students. The university should organize activity to sharing of COVID-19 infection experiences for the students which will be influencing on the effectiveness of COVID-19 control in university.

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The Development of Conceptual Framework of Food and Nutrition Literacy in An Early Adolescence

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ABSTRACT

Food and nutrition problems lead to several diseases, especially non communicable diseases (NCDs). Food consumption is one of major factors affecting NCDs such as hypertension, diabetes mellitus, and cardiovascular disease. Early adolescence is the first age that has his/her own decision of choosing food. Therefore, this study aimed to develop a conceptual framework of food and nutrition literacy in early adolescence. Data was drawn from literature review in PubMed, Science Direct, Google Scholar, TCI sources. Thematic analysis was applied for data analysis. The result showed the 3 dimensions of 1) antecedent of food and nutrition literacy, 2) attribute of food and nutrition literacy and 3) consequence of food and nutrition literacy. The antecedents of food and nutrition literacy consisted of demographic characteristics, interaction factors, and social factors. The attributes of nutrition literacy consisted of 3 levels. Basic level or functional literacy comprised understanding and accessibility. Interactive level consisted of communication and media literacy. Critical level consisted of decision making and self-management. The model could be applied into practice, research and policy to improve food and nutrition literacy in early adolescence. The conceptual framework could be used to develop the adolescence's food and nutrition literacy questionnaire as well. The related policy should be passed to assure problem solving in food and nutrition literacy as well as to promote sustainable development.

Keyword: Food and nutrition literacy, Early adolescence, Conceptual framework, Non communicable diseases (NCDs)

INTRODUCTION

Inappropriate food consumption leads to non communicable diseases (NCDs) i.e. hypertension, cerebrovascular disease, diabetes. In 2018, the survey reported that 6-14 years old children were the most foundation of eating behavior compared to other age groups. (Jiraporn Ruangying et al. 2016: National Statistical Office. 2018). It was found that adolescence took fast junk food, crispy snacks, and high fat food more than 3 days a week. Currently, social media is crowned with westernized foods and it is very easy to get these. These foods contain high fat and sugar, less fruits and vegetables. This consumption style leads to growth problems, over nutrition, as well as malnutrition. The information during 2019-2021 by Department of Nutrition, Ministry of Public Health, stated that 6-14 years old children with a well-proportioned body was 60-65.5 % (standard= above 60%); short body was 5.5, 8.9, and 9.6, respectively; overweight and obesity was 10.9-13.6% (Bureau of Nutrition, 2021). In the late 5 months of 2022, 6-14 years old children with a well-proportioned body was 55.7% (standard= above 60%). Inappropriate food consumption causes the delay of growth and development. In the pregnant adolescence, there will be 7 times more chances of anemia than adult pregnancy as well as the chance of neonatal death. Department of Health (2022), MOPH reported that the neonatal death per 1000 live births during 2018-2020 was 4.41,4.5,4.2, respectively which was higher than the goal of 3.6.

An early adolescence is the first age group of those who decide to select food by themselves as well as develop the eating behaviors which will be the foundation of the coming ages. Food and nutrition literacy, thus, very critical for those right decisions. Food and nutrition literacy consists of the ability of understanding, accessibility, communication and media literacy, decision making and self-management for appropriate behavior in food selection. The one who had good level of food and nutrition literacy tend to have good consumption behavior while the lower of literacy tend to reject good food consumption (Sukanya Kunwapi, Kesinee Saranritthichai. 2022; Chutima Onkhao and others.2021 ;Joulaei, H. et al. 2018; Liao IL. et al. 2016; Patel, P. et al. 2013). Food and nutrition literacy has been applied from the health literacy concept. There were rare studies on food and nutrition literacy in Thailand, especially those literacy in an early adolescence. The conceptual framework of food and nutrition literacy in adolescence, was very limited in Thailand and international sources. This study, therefore, will develop the conceptual framework of food and nutrition literacy of an early adolescence in Thailand. The study will be expected to be a foundation of management and research in food and nutrition literacy in an early adolescence as well as lead to the policy to reach an ultimate goal of sustainable development.

OBJECTIVE

To develop the conceptual framework of food and nutrition literacy in early adolescence

METHODOLOGY

This descriptive research aimed to develop the conceptual framework of nutrition literacy in early adolescence guided by theory construction by Walker and Avant (2005) which were adopted only 5 steps from the eight steps. Step 1 identifying the concepts, which were 'health literacy', 'early adolescence', 'food and nutrition literacy in early adolescence'. Step 2. determining the aims of the analysis: the aim was to develop a conceptual framework of food and nutrition literacy in an early adolescence. Step 3 Identifying all uses of the concept discovered: the sources of the concepts discovered were PubMed, Science direct, Google scholar, text books, articles, researches. Step 4: determining the defining attributes: this step, the thematic analysis was used for concept analysis to determine the attributes of food and nutrition literacy. Step 5 identifying antecedents and consequences: this step, the thematic analysis was used for concept analysis to determine the antecedents and consequences. Then, antecedents, attributes, and consequences of food and nutrition literacy in an early adolescence were related and became the conceptual framework of '*food and nutrition literacy in an early adolescence*'.

FINDINGS

The conceptual framework of food and nutrition literacy in an early adolescence was presented in figure 1 Antecedents consisted of 1) demographic characteristics, 2) interaction factors and role model, and 3) social factors. The attributes of food and nutrition literacy in an early adolescence consisted of attributes of food and nutrition literacy consisted of 3 levels. Basic or functional literacy comprised understanding and accessibility. Interactive level consisted of communication and media literacy. Critical level consisted of decision making and self-management.

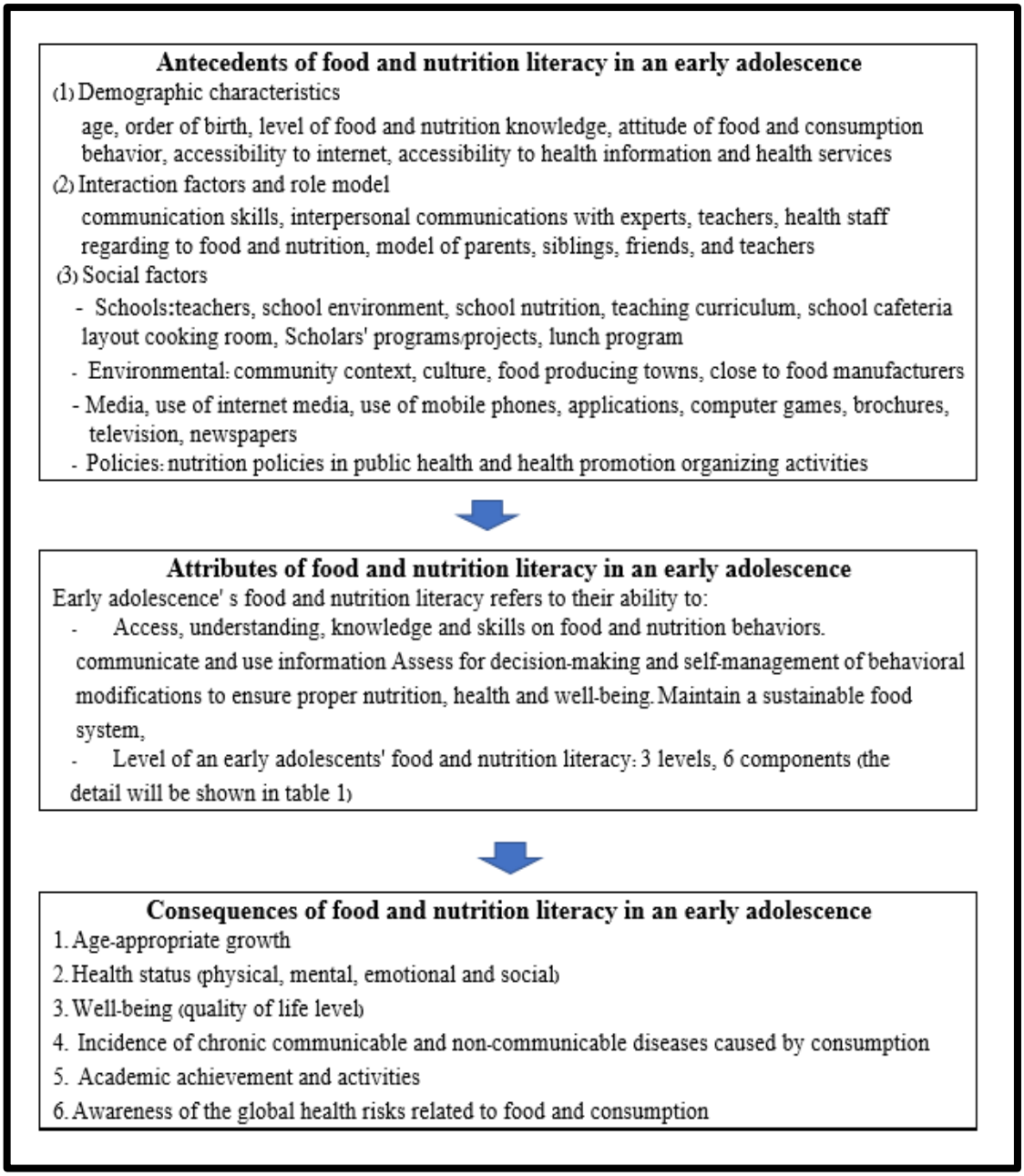

Figure 1 The conceptual framework of food and nutrition literacy in an early adolescence

Table 1 Attributes and sub attributes of food and nutritional literacy of the 3 levels

Attributes of food and nutritional literacy	Sub attributes of food and nutritional literacy
Level 1 Basic nutrition Literacy	1. **Accessibility to food and nutrition information**: searching, using search tools, checking, filtering information
	2. **Cognition**: knowledge and skills in food and nutrition, such as food ingredients, knowing how nutrients affect health. simple cooking
Level 2 Communicative/Interactive nutrition Literacy)	3. **Communication skills**: explaining, persuading, suggesting, spreading information, exchanging information and cooking skills to consume healthy food
	4. **Media literacy**: choosing to use accurate information, following dietary guidelines expense planning healthy cooking
Level 3 Critical nutrition Literacy	5. **Data evaluation and decision-making**: food choices and healthy cooking. and application of knowledge reading food labels
	6. **Self-management**: behaviors/habits healthy eating safe food, changing healthy food consumption behavior, avoid risk factors, noise factors that are harmful to health

CONCLUSION AND RECOMMENDATION

The conceptual framework of food and nutrition literacy of an early adolescence was developed which was the first step in model development which will lead to further research and guideline for food and nutrition literacy. The conceptual framework could be used to develop the adolescence's food and nutrition literacy questionnaire as well. The related policy should be passed to assure problem solving in food and nutrition literacy as well as to promote sustainable development.

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The Development of Drowning Prevention Model in Senior Elementary School Students in HuaSai Sub-district

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Abstract

Although drowning is a significant health problem, it is less attention. The World Health Organization reported that drowning is most common cause of death. HuaSai sub-district is the area which has a plenty of canals, ditches, irrigation canal, and ponds. In 2021, two senior elementary students drowned. The objective of this research was to develop a model of HuaSai sub-district drowning prevention in senior elementary students. The study consisted of 2 phases: 1) development of conceptual framework of HuaSai sub-district drowning prevention in senior elementary students by concept analysis guiding by Walker & Avant from literature review, 2) development of model of HuaSai sub-district drowning prevention in senior elementary students by deploying the activities in the conceptual framework comprising of 5 stages of 1) F: Factor Relating to Drowning Assessment 2) A: Analyzing the Gap for Improvement, 3) S: Skill Improvement, 4) T: Treating to Close the Gap, and 5) Learning: Learning Community for Drowning Prevention. The study was conducted during November 2021 to May 2022. The sample consisted of senior elementary students (75), student guardians (75), teachers who teach in senior elementary schools (3), and responsible staff (20) (village health volunteers, community leaders, sub-district administrative organization representatives, public health official representatives). The research tools were 1) knowledge, attitude drowning prevention skills of senior primary school and community communication in drowning prevention, 2) the support roles in environment management, 3) questionnaire for teachers with swimming lessons experience educating and guidelines for preventing drowning of students in schools. And 4) interview: Roles, policies and advocacy drowning prevention for primary school students in HuaSai sub-district. Then, the model was concluded as the 'FAST Learning model'. This original model requires the repeat applications for more effectiveness.

Keywords: conceptual framework, drowning prevention, senior elementary students

Introduction

Drowning is the condition of fluid obstruction in the respiratory tract. There are two types of drowning, fatal drowning and nonfatal drowning. Nonfatal drowning brings minor to serious complications as well as disabilities which affects the increasing dependency. Approximately 90% of drownings take place in freshwater (rivers, lakes, and a relatively small number of swimming pools); the remaining 10% take place in seawater. Drownings in other fluids are rare, and often related to industrial accidents. Contributors to drowning include carelessness, low senses of awareness, insufficient protective environment, accident, and inability to swim. Inability to swim is the most common cause of drowning in every age range. Drowning is a serious cause of death in children below 15 years and elevated as a worldwide public health problem (Petrat Bunak. 2016). During 2011-2021 in Thailand, there were 780 deaths from drowning in children below 15 (35.4% of below 4 years old, 39.7% of 5-9 years old, 24.9% of 10-14 years old children). Thus, drowning is one of the common public health problems of Thailand as well as worldwide. Factors affecting drowning include persona, environment and social elements. Personal factors are gender, age, knowledge, attitude, swimming skills, self-awareness and guardian's raising behavior (Lauren A. Petress and Jennifer D. Blitvich (2014), Mosharaf Hossain et al. (2015). Environmental factors are risky water sources, climate, and environment management. The risky environment includes unsafe zones such as no warning sign, no french, life vest and other lifeguard items. Social factors are regulation, law, measures, policy, support from community and related sectors. In HuaSai Sub-district, two senior elementary students drowned. The prevention of drowning, therefore, has to enhance personal factors, create a standard environment, and deploy all legislation issues as well as promoting the support from community and related sectors. Related sectors and persons in HuaSai sub-District consist of HuaSai health promoting hospital, HuaSai municipality, BanNongBon school, BanLumKlong school, and BanEmon school, school teacher, village health volunteer, and student guardian, and senior elementary students. This study, thus, aimed to develop the conceptual framework of HuaSai drowning prevention in senior elementary students which expected to be the first material for the next research on "The development of HuaSai drowning prevention model for senior elementary students"

Research methodology

This action research aimed to develop HuaSai drowning prevention model for senior elementary students. The study included two major steps. The first step: development of the conceptual framework guided by theory construction proposed by Walker and Avant (2005). In this step, the concepts were identified as consisting of drowning, senior elementary students, self-management, and self-management support. Data and information of the identified concepts were drawn from in databased of ThaiJo, Google scholar, PubMed, springer, Scopus, Wiley and online library. regulation and measures from Ministry of Public Health and Ministry of Interior. Ten merit maker is the community measure in prevention of drowning, passed by the Ministry of Public Health was used for the major source of literature. Merit maker are policy, management, situation and required information, management of risky water source, measure for child center, knowledge transferring, swimming for survive, CPR course, communication and public relations, and research and evaluation. Thematic analysis was used for data grouping and theme description which became the FAST-Learning conceptual framework. Step 2: implementing the FAST-Learning conceptual framework included 5 actions during the study was conducted during November 2021 to May 2022.

First, Factors relating to drowning assessment, the data was collected from in databased of ThaiJo, Google scholar, PubMed, springer, Scopus, Wiley and online library. regulation and measures from Ministry of Public Health and Ministry of Interior. Ten merit maker is the community measure in prevention of drowning, passed by the Ministry of Public Health was used for the major source of literature. Merit maker are policy, management, situation and required information, management of risky water source, measure for child center, knowledge transferring, swimming for survive, CPR course, communication and public relations, and research and evaluation. This dimension consists of the assessment of factors affecting drowning elementary students in HuaSai sub-district: 1. senior

elementary students (75), 2. student guardians (75), 3. teachers who teach in senior elementary schools (3), and 4. responsible staff (20)

Second, Analyzing the gap for improvement, researchers used data from the first action to identify the area of improvement which included skill improvement.

Third, Skill improvement, researchers delivered the skill improvement corresponding to the finding in the second action.

Fourth, Treating to close the gap, researchers and authorized organization (schools, sub district health promoting hospital, subdistrict administrative organization, senior elementary school students, student guardians) run the activities to close the gap such as student training on drowning protection, Searching for problem solving and environment management, in a community, selecting the model family of safety environment, involved organization splay the support roles in environment management and community communication in drowning prevention

Fifth, Learning community for drowning prevention, in this activity, the researchers assessed the 5 aspects of learning community consisting of 1. learning, 2. organization, 3. people, 4. knowledge and 5. technology

Findings

The FAST-Learning model consisted of 5 series activities as shown in figure 1.

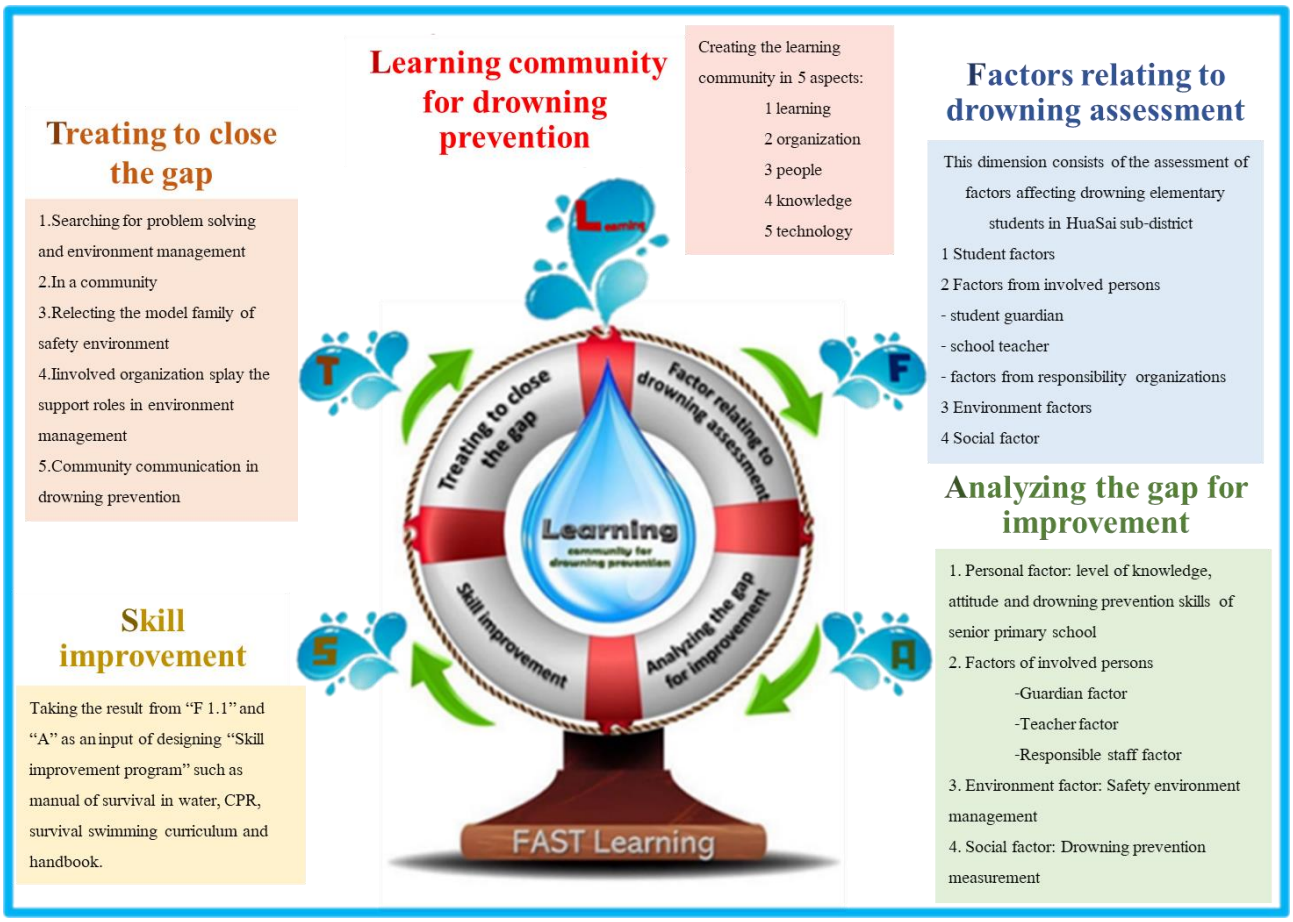

Figure 1 FAST-Learning model for drowning prevention in senior elementary school students.

The details of an individual activity will be described .

1. Factors relating to drowning assessment

1. Senior elementary students: The knowledge factor, atitude factor and Learning community for drowning prevention was moderate and child skills factor in drowning prevention have a low total.

2. Student guardians: The knowledge factor, atitude factor and Learning community for drowning prevention was moderate and Parent perceptions of children's drowning prevention skills have a low total.

3. Teachers who teach in senior elementary schools: The knowledge factor, Measures to prevent drowning, School environment management and Learning community for drowning prevention at a very good level.

4. Responsible staff: Define roles Policy/Measures the support and learning community is very good.

2. Analyzing the gap for improvement

1. Senior elementary students: 1. The knowledge factor, Plan to educate students by using leaflets and training on drowning prevention education for upper elementary school students. 2. Attitude factor, make a development plan by informing the situation, severity, and importance of drowning prevention. along with determining the roles and characteristics of upper elementary school students. 3. child skills factor in drowning prevention, Plan development by practicing skills for helping people drowning. Practice basic life-saving skills (Basic CPR) and practice water survival skills. (With the situation of the outbreak of COVID-19 therefore unable to practice water activities) 4. Learning community for drowning prevention, make a development plan by informing them of their roles and responsibilities. participatory and the development and exchange of knowledge on drowning prevention together as a group. Make an appointment for school activities

2. Student guardians: 1. The knowledge factor, Plan development by educating along with giving examples of incidents related to the drowning problem of upper elementary school students 2. Attitude factor, Plan development by finding ways to prevent drowning together. Review laws and measures to prevent drowning. 3. Parent perceptions of children's drowning prevention skills, Plan development by introducing exchanges of knowledge with children. 4. Learning community for drowning prevention, Plan development through training and knowledge exchange. Give me the opportunity to ask questions. Assign community collaboration roles. and participation in development Individuals at home and on the phone

3. Teachers who teach in senior elementary schools: 1. Knowledge transfer, make a development plan by preparing a plan to attend a survival course teacher training. 2. Measures to prevent drowning in schools, make a development plan outlining the problem. and determine guidelines/measures for drowning prevention in schools and organize individual drowning prevention activities in schools 3. Learning community for drowning prevention, Plan development by educating and support for training teachers in survival courses Inform them of their roles participation in development and sharing knowledge about drowning prevention at school.

4. Responsible staff: Learning community for drowning prevention, Development plan by training to educate Inform them of the roles and responsibilities of being involved in the development Individual sharing of knowledge about drowning prevention By calling representatives of community leaders, representatives of the President of the Sub District Administration Organization and doing group activities among representatives of village health volunteers and representatives of public health officials Take place in Hua Sai Hospital.

3. Skill improvement

1. Senior elementary students: Knowledge, Conduct activities through educational training organized in group activities at schools and through vinyl, brochures and videos. Attitude, Conduct

activities by informing the seriousness of the situation and the importance of drowning prevention. by sampling the news. and Skills, 1. Practice water survival skills. by using images and teaching through videos (The situation of the outbreak of COVID-19 Can't do water activities) 2. Teaching skills to help drowning people (yelling, throwing, filing), educating through vinyl media. Brochures and videos Practice basic skills 3. Teach basic life support skills (Basic CPR) by using mannequins to practice Basic CPR and watch accompanying videos.

2. Student guardians: Knowledge, Educate individuals through online media, telephone calls, and visit their homes. Attitudes, inform the situation, severity, and importance of drowning prevention. by sampling the news and Parent perceptions of children's drowning prevention skills, sharing knowledge with upper elementary school students

4. Treating to close the gap

Factors from responsibility organizations and Environment factors, The roles and responsibilities of each organization should be defined. knowledge is developed together with a drowning prevention manual and drowning prevention equipment to be used to transfer knowledge to upper elementary school students. Environmental management in Tambon Hua Sai community by providing warning signs for dangerous water sources. To schools, hospitals and in the community as a model for environmental management.

5. Learning community for drowning prevention

1. Senior elementary students: The situation, severity, and importance of drowning prevention are informed. define roles and participation in development Share knowledge about drowning prevention together in a group activity at school through online media, brochures and vinyl.

2. Student guardians: There is training to exchange knowledge. Give them the opportunity to ask questions and assign collaborative roles in the community. and participation in individual development at home and over the phone.

3. Teachers who teach in senior elementary schools: Educate and encourage teachers to attend a teacher training course in survival. Determine roles and responsibilities to participate in development. and exchange knowledge about drowning prevention with the community individual at school.

4. Responsible staff: Training Assign roles to play a part in development. and exchanged knowledge about drowning prevention together, one by one, by telephone to representatives of community leaders and sub-district administrative organization representatives. The representatives of the volunteers and public health officials will do group activities at Hua Sai Hospital.

Learning community development for drowning prevention among upper elementary school students in Hua Sai Subdistrict should be directed. Clearly define the roles of those involved. Along with supporting resources, people, budgets, technology and attending a drowning prevention course for upper elementary school students. to complete drowning prevention work and exchange knowledge with the community

limitation/barrier

limitations/obstacles of this study namely, the situation of the outbreak of Coronavirus Disease 2019 (Covid-19) and the presence of patients with Coronavirus Disease 2019 (Covid-19) in the research area, causing some activities to have to modify methods and not be as specified

1. Step 3. Skill improvement, Water Activities (Practice swimming skills, buoyancy, rescuing drowning people and training in the use of equipment in the water) could not do the activities as planned, so it was changed to teaching by watching videos and doing basic training at the school instead. As for the students who were unable to attend the activities, the researcher conducted

individual activities by making phone calls and attending home activities. and Group activities in exchange between students and parents need to be converted into individual activities by phone calls and home activities.

2. Step 5. Learning community for drowning prevention, Organizing group activities in exchange of learning and learning communities of teachers and responsible parties, the researcher summarized the problems from the assessment and conveyed them into individual activities by telephone calls and doing activities at home.

Suggestion

1. In order to create a sustainable factor for drowning prevention among elementary school students in Hua Sai Sub-district, the participation of all involved in the process is required.

2. Drowning prevention implementation should be monitored annually to compare outcomes.

3. In future research, a water survival skills training course should be developed. Skills for helping drowning people and practicing basic life support (Basic CPR) skills suitable for upper elementary school students.

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The Relationship of PohTanKlai's Moral Conduct, Faith and Sustainable Development

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ABSTRACT

PohTanKlai or Phrakhru Phisit Atthakarn was born in Changklang district, Nakornsrithamarat province in B.E 2419. He was ordained as a novice at the age of 19 in B.E. 2438. He left the body on 5th December B.E 2513. He passed away 53 years ago, however the faith in him still remains. Thailand faced with great suffering during his lifetime from the war and changing governing from monarchy to democracy. PohTanKlai's moral conduct, thus, focused on relieving suffering for both mental and physical to encourage quality of life. There are very rare studies exploring PohTanKlai's moral conduct, faith in PohTanKlai as well as the effects of these to sustainable development. This study, therefore, aimed to explore the level of PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development. The relationship among these were examined. The sample were 81 Buddhist monks and 591 Buddhists who lived in Changklang and Chawang district. The data was collected during November, 2022 to January 2023 using the questionnaire developed by researchers with the IOC ranging of .060 -1.00 and Alpha Cronbach coefficient for dimensions ranging of .96 -.98. Descriptive statistics and Pearson correlation were used for data analysis. The result revealed that PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development as perceived by the sample was at the highest level (mean = 4.28, 4.48, and 4.44, respectively). There was significant relationship between PohTanKlai's moral conduct and faith in PohTanKlai (r = .84), PohTanKlai's moral conduct with sustainable development (r= .76), PohTanKlai's moral conduct and sustainable development (r = .87), and faith in PohTanKlai with sustainable development (r = .76). This study could be applied to study other monks. Sustainable development could be achieved by conducting moral works and embedded faith to people.

Keywords: PohTanKlai, Moral conduct, Faith, Sustainable development

INTRODUCTION

Thawach Ratanil, monk resides at SuanKhan temple and is a philosophyprinciple of PohTanKlai, reported the information of PohTanKlai in his review study of "PohTanKlai Moral Conduct in Health Aspect" in 2022 (Ratanil, 2022). PohTanKlai or Phrakhru Phisit Atthakarn left the body on 5th December B.E 2513 with the age of late 95, tuning to 96 within months. He maintained a priesthood for a full 74 years which turned to 75 years. He was born in Changklang district, Nakornsrithamarat province on 28th March, B.E 2419 and was ordained as a novice at the age of late 19 in B.E. 2438. During his lifetime, Thailand faced a lot of suffering from war and governing rule change. PohTanKlai passed away for 53 years, however

the faith still remained in both monks and Buddhists (Ratanil & Choeibuakaew, 2023). His moral conduct which led to the existing faith from the old days up until now.

PohTanKlai's moral conduct consisted of 6 aspects. Ratanil & Choeibuakaew (2023) conducted the in-depth interview and summarized PohTanKlai's moral conduct. The first, the monastic order governing the sangha, PohTanKlai ruled the monks by showing moral conduct and let the monks rule each other. He spoke less but his words always came true which people named him "PohTanKlai Vajasit" (Phraratchavaraporn.2005). Vajasit means "the words come true". Secondly, he established SounKhan as a Dhamma school and the place for Dhamma examinations. The third, public welfare was very prominent because of during his lifetime, Thailand faced with great suffering of world war I (B.E.2475-2461), poor economic after the world war I (B.E. 2462-2474), changing the governing rule from monarchy to democracy by seizing power and crisis before world war II (B.E. 2475-2483), world war II (B.E. 2484-2488), and early cold war (B.E.2488-2513). Therefore, PohTanKlai's moral conduct was much focused on people's survival and less suffering both physically and mentally. PohTanKlai's public welfare will be summarized in table 1. The fourth, religious places and facilities were important to bring peace to Buddhists during the suffering time. Many temples, temple chapels, principle image of Buddhist, image of Buddhist, temples were built which will be shown in table 1. The fifth, education support aspect, he established 4 formal schools for KhaoLuang hillside's children as well as offered SounKhan temple to be a residence for children who came to school in Changklang area. The sixth, propagating Dhamma in Thailand and other countries, he delivered the Dhamma of Lord of Buddha to Thai people as well as Chinese people in Penang, Malaysia and Singapore.

Table 1 Religious Facilities and Public Welfare Work Establishing by PohTanKlai

Items	Details
Bridges	15 Bridges over the river: north sela, south sela, north kudduan, south kudduan, nhae, la-eye, thungbhoon-wat thanamai, thungbhoon-thapoh, min, jundee, na, bheek, tai temple, tabhee-tanpoh
Local roads and mountain drill	20 local roads: Jundee market- Sounkhan temple, Maprang-ngam temple, Bannangsam, Khaochongkorp, Saira, Pruborn, Napee-Thoungbhon, Pru-intanin, Bantungnamai, Yangnailum, Hhuerklong, Tri-ngam, Peeknhuer, manoawan, Manaowan-Jundee, SouthLukchang, Wattai, and Jundee-Kaothong, There were 2 road from mountain drill: Hutalu and Kuansoong
Pagoda and Mondop	9 pagodas : Hatsoong temple, Tai temple, Suankhan temple, Thumkamin, Kuansawan, Jundee temple, Kongkaleap temple, Kokmaidang, and Mondop covered footprint of Buddha at Khaokaewpisadan-Phuket
Temples	4 buddhist temples: Maprang-ngam, Boranaram, Pisit-Attagaram, and Prainae

Principal Buddha image and Buddha image	Principal Buddha images and Buddha images in the following temples: Haadsoong, Sounkhan, Yangkom, Samakeenukul, Maprang-ngam, Umpawan, Khun-ngern, Boranaram, Wangtawan-auk, Sounkhan (renew), Khunsan, Jundee, Lakchang, Buddhathiwat, and footprint of Buddha mondop at Khaokaewpisadan-Phuket
Temple chapel	Temple chapels : Haadsoong (Tanpor), SounKhan, Yangkom, Samakkeenukul, Maprang-ngam, Umpawan, Khun-ngern, Boranaram, Wangtawan-ouk, SounKhan (renew), Khuansan, Jundee, Lakchang, Buddhathiwat

Source: The history and moral conduct of PohTanKlai Vajasit (Ratanil and Choeibuakaew, 2023)

Faith is the strong belief, loyalty, complete trust or confidence in someone or something and tends to follow or react as though Phrathammakittiwong (Thongdee Suratecho, 2005). In Buddhism, faith (Pali: *saddhā*, Sanskrit: *śraddhā*) refers to a serene commitment to the practice of the Buddha's teaching and trust in enlightened or highly developed beings. Faith may not only be devotion to a person, but exists in relation to Buddhist concepts like the efficacy of karma and the possibility of enlightenment .). The faith of Buddhists to PorTanKlai consisted of 6 aspects. First, acceptance and following, consist of trust and following PohTanKlai words to do good, following PohTanKlai footstep and devotion for religious support and monk education etc. Second; social integration; Buddhists are together in preserving culture and tradition (such as bathing PorTanKlai's image), center of peace, and worship etc. Third, performing value behavior, the one who trusts PohTanKlai lives with the intention of doing good for the benefit of living and society. In addition, the faith in PohTanKlai brought the prayer of the PohTanKlai warship. Fourth, powerful and mindfulness, these are having the power to strive to the goal, contribution to PohTanKlai intention for success, and doing good in the buddhist way etc. Fifth, bravery in good deeds includes no fear of doing good and moving forward, self-confidence, defeating obstacles, etc. Sixth, the spiritual anchor, PohTanKlai still influences the sense of warmth and safety. So, Buddhists bring PohTanKlai images with them or worship at home.

Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs (UN, 2002). The World Summit on Social Development in Copenhagen in 1995 (UN, 1995) stressed sustainable development's key role in securing global social development. (Svatava Tomáš Hák and Janoušková, 2016). The 17 sustainable development goals were announced and widely implemented and monitored via appropriate indicators. The 17 goals consist of 1) end of poverty in all its forms everywhere, G2) end hunger, achieve food security and improve nutrition and promote sustainable agriculture, G3 good health and well-being, G4 education quality, G5 gender equality, G6 clean water and sanitation, G7 affordable and clean energy, G8 decent work and economic growth, G9 industry innovation and infrastructure, G10 reduce inequality, G11 sustainable cities and communities, G12 responsible consumption and production, G13 climate action, G14 life below water, G15 life on land, G16 peace justice and strong constitution, G17 partnership for the goals. The moral conducts of PohTanKlai affect the

Buddhists' faith. Currently, the faith in PohTanKlai brings 2 aspects of sustainable development. These are 1) health and peace and 2) strengthen the means of implementing for sustainability. Health and peace come from the faith to PohTanKlai are almshouse in the temples, renovating PorTanKlai image, Prabandhomrattanasanti as the center of spiritual anchor and peaceful, annual bathing PohTanKlai image, PohTanKlai hospital. The strengthened means of implementing for sustainability includes mobilizing resources, people, and agencies in establishing and operating "PohTanKlai hospital" and "PohTanKlai railway station", success of all events under PohTanKlai's name. His intense intention to build hospitals for KhaoLuang hillside people has been responded to by starting PohTan Klai hospital in Changklang district in January, 2016. (PohTanKlai hospital, 2022) The budget was allocated from the government and donation from Buddhists who were faithful to PohTanKlai (Prime Minister's Office. Bangkok Metropolis, 2016) The donation is continuous to show the faith to him representing the faith to PohTanKlai, especially to PohTanKlai Vajasit hospital.

It could be claimed that PohTanKlai is a good example of the connected person from the past to present and assured future. This is a type of sustainable development influenced by PohTanKlai. There are very rare studies exploring PohTanKlai moral conduct. The material regarding the faith in PohTanKlai is limited only to the short sentences in leaflets or social media. The systematic study on the faith is not found in Thailand. The sustainable development affected by the faith in PohTanKlai is not examined systematically as well. Therefore, this descriptive study aimed to explore the PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development by using a quantitative approach. The study will be of great benefit for future research as well as encouraging monk moral conduct, Buddhists' faith, and promoting sustainable development.

OBJECTIVES

1. To explore the level of PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development
2. To explore the relationship of PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development

METHOD

This study was a part of a doctoral dissertation. Approximately 90 % of data was completely collected, 672 Buddhist monks and Buddhists, which was analyzed for the purpose of this descriptive study. Data was collected from November, 2022 to January 2023 by self-administered. The questionnaire was developed by the researchers with the IOC (item objective congruence) ranging from 0.66-1.00. The Alpha Cronbach for the reliability of measurement were .96-.98. Descriptive statistics were used for analyzing demographic data and level of PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development. Pearson correlation was used to determine the relationship of PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development. This research conducted based on IRB approval from Thaksin university (REC No.0354.2022)

RESULT

The characteristics of the monk sample are presented in table 2. There were 81 monks of the temples in Changklang and Chawang districts. Age ranged from 18 to 86 years old, of 51.86 % being over 60 and 21-30 years old. The majority of monks were ordained below 10 years (74.07%). Fifty-two percent of the sample completed primary and high school degrees. The sources of PohTanKlai information were word of mouth communication, leaflets and books, and internet, respectively.

Table 2 Demographic Data of Buddhist Monks (N= 81)

Items	Statistics	
	Number	**%**
1. Age (Min-Max =18-86)		
2.1. Below 20 years old	2	2.47
2.2. 21-30 years old	17	21.00
2.3. 31-40 years old	9	11.11
2.4. 41-50 years old	14	17.28
2.5. 50-60 years old	14	17.28
2.6. Over 60 years old	25	30.86
3. Number of years being Buddhist Monks (Min-Max =1-36)		
3.1. Below 10 years	60	74.07
3.2. 11-20 years	11	13.58
3.3. 20-30 years	7	8.64
3.4. Over 30 years	3	3.71
4. Formal education		
3.1. Primary School	24	29.63
3.2. High School	28	34.57
3.3. Vocational certificate	5	6.17
3.4. High Vocational certificate	1	1.23
3.5. Bachelor Degree	17	20.99

3.6. Higher Than Bachelor Degree	4	4.94
3.7. Others	2	2.47
5. Buddhist Monastery		
4.1 Chang Klang District	20	24.69
4.2 Chawang District	61	75.31
6. Sources of PohTanKlai Information (answer 1 or more)		
5.1. Direct contact with PorTanKlai	25	30.86
5.2. Words of mouth communication	72	88.89
5.3 leaflets and books	36	44.44
5.4. Internet	27	33.33
5.5 Others	2	2.47

There were 519 Buddhists who completed the questionnaire. The majority of the sample was female, 41-60 years old, completing primary and high school degrees, receiving PohTanKlai information by word of mouth communications. There was 33.50% of the sample who got PohTanKlai information directly from him. The domiciles were 59.56 % in Changklang and 40.44% in Chawang district. The detail will be shown in table 3

Table 3 Demographic Data of the Buddhist Samples (N=591)

Items	**Statistics**	
	Number	**%**
1. Gender		
1.1. Male	169	28.60
1.2. Female	422	71.40
2. Age (Min-Max =19-85)		
2.1. Below 20 21-30 years old	2	0.34
2.2. 21-30 years old	46	7.78
2.3. 31-40 21-30 years old	94	15.91

2.4. 41-50 21-30 years old	152	25.72
2.5. 51-60 21-30 years old	186	31.47
2.6. Over 60 21-30 years old	111	18.78
3. Formal Education		
3.1. Primary School	121	20.47
3.2. High School	179	30.29
3.3. Vocational certificate	39	6.60
3.4. High Vocational certificate	39	6.60
3.5. Bachelor Degree	181	30.63
3.6. Higher Than Bachelor Degree	28	4.74
4. Domicile		
4.1 Chang Klang District	352	59.56
4.2 Chawang District	239	40.44
5. Sources of PohTanKlai Information		
5.1. Direct contact with PorTanKlai	198	33.50
5.2. Word of mouth communication	465	78.68
5.3 leaflets and books	274	46.36
5.4. Internet	212	35.87
5.5 Others	-	-

The mean score of PohTanKlai's moral conduct, faith in PohTanKlai, and sustainable development was at the highest level of 4.28, 4.48, and 4.44, respectively which was shown in table 4. The highest score aspects were 1) performing value behavior and 2) powerful and mindfulness with the mean of 4.50. The lowest one was education support with a mean score of 4.13.

Table 4 Mean and Standard Deviation of PohTanKlai's Moral Conduct, Faith in PohTanKlai, and Sustainable Development

Aspect	Mean	SD	Interpretation
1. PohTanKlai moral conduct	**4.28**	**.71**	**highest**
1.1. Monastic order governing the sangha	4.36	.74	highest
1.2. religious education	4.26	.74	highest
1.3. Education support	4.13	.88	high
1.4. Propagating of Dhamma	4.29	.84	highest
1.5. Religious places and facilities	4.25	.89	highest
1.6. Public welfare	4.36	.75	highest
2. Faith to PohTanKlai	**4.48**	**.61**	**highest**
2.1. Acceptance and following	4.47	.66	highest
2.2. Social integration	4.47	.69	highest
2.3. Performing value behavior	4.50	.66	highest
2.4. Powerful and mindfulness	4.50	.65	highest
2.5. Bravery in good deeds	4.42	.69	highest
2.6. Spiritual anchor	4.49	.66	highest
3. Sustainable development	**4.44**	**.66**	**highest**
3.1. Health and peace	4.44	.71	highest
3.2 Strengthen the partner collaboration for sustainability	4.45	.69	highest

In table 5, at the significant level of 0.05, there was significant relationship between PohTanKlai's moral conduct with faith in PohTanKlai (r = .84) and PohTanKlai moral conduct with sustainable development (r = .87), and faith to PohTanKlai and sustainable development (r = .76). The 6 dimensions of PohTanKlai's moral conduct were significantly related with 6 aspects of faith in PohTanKlai with the "r" ranging from .56 to .84. The 6 dimensions of PohTanKlai's moral conduct were significantly related with 2 aspects of sustainable development, with the "r" ranging from .57 to .70. The 6 dimensions of the faith in PohTanKlai and the 2 aspects of sustainable development were significantly related, with the "r" ranging from .57 to .85.

Table 5 The Relationship of PohTanKlai's Moral Conduct, Faith in PohTanKlai , and Sustainable Development

Variables	**PohTanKlai's moral conduct**	**Faith in PohTanKlai**	**Sustainable development**
PohTanKlai's moral conduct	1.00	.84	.76
Faith to PohTanKlai	.84	1.00	.87
Sustainable development	.76	.87	1.00

CONCLUSION, DISCUSSION AND RECOMMENDATION

The level of PohTanKlai's moral conduct, faith in PohTanKlai and sustainable development were at the highest level. There was a strong correlation between 1) PohTanKlai's moral conduct with faith in PohTanKlai both for the total score and a particular aspect, 2) PohTanKlai's moral conduct with sustainable development both for the total score and a particular aspect, and 3) faith in PohTanKlai and sustainable development both for the total score and a particular aspect. This study assured that PohTanKlai's moral conduct brought faith and sustainable development. The study could be applied to study in other monks. Sustainable development could be achieved by conducting moral work and initiating faith. The questionnaire could be applied to other studies.

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