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Effectiveness of Health Behaviour Modification for Chronic Non-communicable Disease Patients with Health Coaches at Khiensa Hospital, Surat Thani Province

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ABSTRACT

Background: Patients with chronic noncommunicable diseases often struggle to control their blood sugar and blood pressure levels, and they frequently experienced physical, mental, and self-care practice issues that needed to be addressed. However, they may not receive adequate guidance, or the guidance they receive may be mismatched to their needs, or they may be misunderstandings between providers and patients. Therefore, medical treatment alone is insufficient; lifestyle and behavioural changes are also required throughout treatment.

Objectives: This quasi-experimental study aimed to investigate the effectiveness of health behaviour modification for chronic non-communicable disease patients through health coaching at Khiensa Hospital, Surat Thani Province.

Methods: The study included 550 participants who underwent a three-month health behaviour change process for patients with chronic non-communicable diseases. Each group of ten participants was supervised by a single health coach. Health literacy, health behaviour modification, and blood sugar levels were assessed before and after participating in the process using structured questionnaires. The data were analyzed by using a paired t-test to compare the mean scores of the effectiveness of health behaviour modification for chronic non-communicable disease patients through health coaching using STATA.

Result: The results showed that the average health literacy scores related to chronic noncommunicable diseases increased significantly from 162.0 to 170.2 after intervention. Similarly, the average health behaviour modification scores increased significantly from 51.4 to 55.1. Furthermore, average blood sugar levels decreased from 114.1 mg/dl to 109.2 mg/dl. Our statistical analysis revealed that the significant differences in the average scores of health literacy, health behaviour modification, and blood sugar levels before and after participating in the process ($t=170.3$, 151.6, and 95.0, respectively, $p<0.001$).

Conclusion: The Ministry of Public Health should develop policies to support and prioritize holistic patient care and promote proactive health promotion services for patients through intensive health promotion program activities led by health coaches to enhance the effectiveness of care for chronic non-communicable disease patients.

Keywords: Health coaches, Behaviour modification, Health literacy

1. Introduction

Data from the World Health Organization (WHO) in 2023 showed that 15 million people worldwide died from chronic non-communicable diseases annually, accounting for 71% of deaths globally [1]. In 2018, 320,000 Thais died from chronic non-communicable diseases, or an average of 37 people per hour [2]. Diabetes and hypertension, in particular, affected 4 million and 16 million Thais, respectively [3].

In Surat Thani province, the incidence rates of diabetes over the past 3 years (2021-2023) were 5,623.7, 5,959.7, and 6,191.6 per 100,000 population, respectively [4]. In Khiensa District, the diabetes incidence rates for 2021-2023 were 6,215.2, 6,431.1, and 6,590.4 per 100,000 population, respectively, and the hypertension rates were 13,538.9, 13,726.9, and 14,054.9 [5]. At Khiensa Hospital, it was found that patients with chronic noncommunicable diseases were unable to control their blood sugar and blood pressure levels, often experiencing physical, mental and self-care practice issues that needed to be addressed. However, they did not receive proper guidance or received guidance mismatched with their needs, or there were misunderstandings between providers and recipients. International academic evidence suggested that medical treatment alone was insufficient; lifestyle and behaviour modifications were also needed during treatment. Literature reviews showed that health coaching can benefit patients with diabetes and kidney impairment, improving kidney filtration rates, lowering creatinine levels, and reducing glycated haemoglobin (HbA1c) levels after going through the health coaching process [6].

Therefore, enabling patients to properly take care of their own health without excessive reliance on medication and appropriately reducing complications from chronic non-communicable diseases by modifying suitable self-care behaviours regarding diet, medication, and exercise plays an important role in overcoming NCDs. This study aimed to investigate the effectiveness of health behaviour modification for chronic non-communicable disease patients through health coaching at Khiensa Hospital, Surat Thani Province.

2. Methods

2.1 Study Area

This study was conducted in Khiensa District, Surat Thani Province in 2023. The sample consisted of chronic non-communicable diseases patients from NCD

Clinic Khiensa Hospital from January to September 2023.

2.2 Study Design

This study was a quasi-experimental study. The population consisted of patients with chronic non-communicable diseases, namely diabetes and hypertension, according to the patient registry from Khiensa District, Surat Thani Province in 2023, with a total of 7,960 cases [4]. The samples were selected by assessing the risk of cardiovascular disease (CVD Risk) in patients with diabetes/hypertension. It was found that 6,368 patients were screened and classified into moderate risk, high risk, and very high-risk groups.

2.3 Sample size and sampling

The samples were selected by purposive sampling by selecting the high-risk group (Risk 20-30%), 359 cases, and the very high-risk group (Risk>30%), 191 cases, totalling 550 samples. The sample selection criteria were: 1) Diagnosed with type 2 diabetes or hypertension and registered in 2023, 2) Diabetic/hypertensive patients at high risk (Risk 20-<30%) and very high risk (Risk >30%) when screened and assessed for CVD risk, 3) Able to move or self-care normally, 4) Have a smartphone and able to use it, 5) Able to communicate in Thai and willing to participate in the research and complete the 3-month process.

Exclusion criteria: 1) Having health complications affecting blood sugar or blood pressure control, 2) Having an emergency in diabetes or hypertension affecting health, such as shock from low blood sugar, and 3) if the volunteer wishes to withdraw from the research.

2.4 Data Collection

The research instruments used were:

Personal factor questionnaire, including gender, age, religion, BMI, blood pressure, blood sugar, whether the person has hypertension/diabetes, attendance at doctor appointments, adherence to prescribed medication, other self-care methods, and the number of daily medications.

Chronic non-communicable disease health literacy assessment, including health knowledge and understanding, access to health information and services, communication skills to enhance expertise, decision-making skills, self-health condition management, and media literacy awareness. A 5-level rating scale from strongly agree to strongly disagree. Scores are interpreted

based on following criteria: high (>80%), moderate (60-80%), and low (<60%).

Assessment of health behaviours affecting chronic non-communicable diseases in the past month, including dietary habits, exercise, smoking/alcohol use, emotional management, and personal hygiene practices.

Assessment of health behaviour modification based on 3 self-concepts, including: self-efficacy, self-regulation, and self-care. A 4-level scale: regular, often, occasionally, never. Scoring levels are based on same criteria as health literacy.

Blood sugar (FBS) level record with 3-level scale: normal (70-99 mg/dl), prediabetes (100-125 mg/dl), and risk of diabetes (≥126 mg/dl)

Research Procedure Steps:

The researchers and research assistants, including professional nurses responsible for non-communicable disease control at Khiensa Hospital, organized training for health coaches to develop the potential of public health personnel in caring for patients with chronic non-communicable diseases. A total of 55 public health personnel from the Khiensa health network attended, including those from sub-district health promotion hospitals, the Khiensa District Public Health Office, and Khiensa Hospital.

The health coaches were divided into zones to take care of the samples according to the guidelines for modifying health behaviours of chronic patients. The health coach was assigned 10 samples by creating a Line group for communication and sharing. The health coaches followed up on caring for the samples according to the guidelines for modifying the health behaviours of non-communicable disease patients, which included: developing a personal care plan, providing encouragement, motivation and building trust with the samples, providing individual health education and promoting health literacy about chronic diseases, monitoring behaviour changes based on the 3 self-concept, coordinating with doctors for the samples to receive health services, providing continuous long-term care and follow-up.

The participants participated in the health behaviour modification process were guided by the health coaches for 3 months. After 3 months, a post-intervention assessment was conducted using the same questionnaires to evaluate health literacy, health behaviour modification based on the 3 self-concepts, and blood sugar levels.

2.5 Data Analysis

Quantitative data analysis of personal characteristics, health literacy, and behaviour modification was done using numbers, percentages, means, medians, standard deviations, maximum, and minimum values. To compare health literacy scores, behaviour modification, and blood sugar levels between pre- and post-intervention, the Paired t-test was used.

2.6 Ethical Clearance

This study was approved by the Human Research Ethics Committee of Surat Thani Hospital, Surat Thani Province (REC no. 66-0147).

3. Results

The study found that before participating in the process, 47.3% of the samples had a high level of health literacy. The scores for health literacy ranged from a lowest score of 64 to a highest score of 210. After participating in the process, 64.5% of the samples had a high level of health literacy. The lowest score was 66 and the highest score was 210 after the intervention.

Regarding behaviour modification, before participating, 46.2% of the samples had a moderate level of behaviour modification, with the lowest score of 24 and the highest score of 68. After participating, 58.5% of the samples had a high level of behaviour modification, with the lowest score of 29 and the highest score of 68.

For blood sugar levels, before participating, 43.1% of the samples had normal blood sugar levels, with the lowest value of 67 mg/dl and the highest value of 296 mg/dl. After participating, 46.2% of the samples had normal blood sugar levels, with the lowest value of 67 mg/dl and the highest value of 287 mg/dl. Details are shown in Table 1.

Table 1: The number and percentage of the sample group, classified by level of health literacy, behavior modification, and blood sugar levels before and after participating in the process (n=550)

Factors	Before		After	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Health Literacy				
Low	66	12.0	31	5.6
Moderate	224	40.7	164	29.8
High	260	47.3	355	64.6
Mean (±SD)	162.0 (25.6)		170.2 (23.4)	
Median (Min: Max)	166.0 (64: 210)		175.0 (66: 120)	
Behavioural Modification				
Low	56	10.2	33	6.0
Moderate	254	46.2	195	35.5
High	240	43.6	322	58.5

Factors	Before		After	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Mean (±SD)	51.4 (9.0)		55.1 (8.5)	
Median (Min: Max)	52.0 (24: 68)		56.0 (29: 68)	
Blood Sugar Level (n=548)				
Normal (70-99 mg/dl)	237	43.1	254	46.2
Prediabetes (100-125 mg/dl)	137	24.9	164	29.8
Risk of DM (≥126 mg/dl)	174	31.6	130	23.6
Mean (±SD)	114.1 (31.2)		109.2 (27.0)	
Median (Min: Max)	105.0 (67: 296)		102.5 (67: 287)	

The pretest and post-test average scores of health literacy were 162.0 (±25.6) and 170.2 (±23.4), respectively. This indicated that the health literacy level after entering the program was statistically significantly improved (t = 170.3, p<0.001). Similarly, the average behaviour change score had improved from 51.4 to 55.1, which was also statistically significant (t = 1.6, p<0.001). Furthermore, an average blood sugar level was found to have decreased from 114.1 to 109.2 mg/dl, which was a statistically significant difference after intervention (t = 95.0, p<0.001) (Table 2).

Table 2: Comparison of average health literacy scores, behavior change, and blood sugar levels of the sample group before and after participating in the process (n=550)

Factors	Before		After		t	p-value
	Mean	SD	Mean	SD		
Health Literacy	162.0	25.6	170.2	23.4	170.3	<0.001
Behavioural Modification	51.4	9.0	55.1	8.5	151.6	<0.001
Blood Sugar Level (n=548)	114.1	31.2	109.2	27.0	95.0	<0.001

4. Discussion

In our settings, the results illustrated that before and after participating in the process, the sample group had higher average scores for health literacy about chronic diseases, behaviour change, and decreased blood sugar levels than before joining. When testing for statistical differences, the average scores for health literacy, behaviour change, and blood sugar levels before and after the process were significantly different.

Health coaches created personalized care plans by assessing health status, literacy, and self-care behaviours. They built relationships, encouraged patients, and reinforced motivation for self-care and changing health behaviours to reduce complications from diabetes and hypertension. This resulted in the sample group having reduced blood sugar levels, consistent with a study by Srirat Intha and Kiriya Khumnan (2023) [7], which found that

after receiving a motivational interviewing program along with using health coaches for people with hypertension with stage 3 chronic kidney disease, there was a reduction in sodium intake from 1.22 to 0.77 grams, an average systolic blood pressure reduction from 133.69 to 127.28 mmHg, an average diastolic blood pressure reduction from 82.44 to 78.18 mmHg, and an average increase in glomerular filtration rate from 51.59 to 53.14 ml/min/1.73 m^2. Moreover, individual health education increased a sample group's health literacy by encouraging motivation, decision-making, and the development of skills for controlling health behaviours. Health coaches stressed six skills: accessing, interpreting, assessing, analysing, selecting, and sharing health information. Therefore, the sample group had improved health literacy, behaviour change, and blood sugar levels, consistent with a study by Natthaporn Prombut (2023) [8] on the effects of a health literacy promotion program on diabetes prevention behaviours among the diabetes risk group in Srakoo Sub-district, Suwannaphum District, Roi Et Province, which found that the diabetes risk group participating in the health literacy promotion program had a higher average score for overall diabetes prevention behaviour than the control group and a lower overall average blood sugar level (DTX) than the control group ($p<0.01$). This was also consistent with a study by Rattanaporn Klaarob *et al.* (2021) [9] on the effects of a health literacy program for type 2 diabetes patients with uncontrolled blood sugar levels, which found that after the experiment, the experimental group had higher average health literacy and health behaviour scores than before, and the experimental group had a significantly lower average cumulative blood sugar level than the control group at the 0.01.

Furthermore, health coaches tracked behaviour change in a sample group to assess health behaviours associated with chronic noncommunicable diseases such as diabetes and hypertension. They discovered that the group still practiced unhealthy habits. The coaches emphasized learning about nutrition, healthy eating, exercise, media literacy, and developing personal objectives to address current issues. This finding was consistent with a study by Wida Limsaungsukun et al. (2021) [10] on the effects of a health literacy development program on self-care behaviours among elderly people aged 60 years and older with type 2 diabetes, which found that after joining the program, the experimental group had higher average self-care behaviour scores than before and higher

than the control group with statistical significance ($p<0.05$). Similarly, a study by Saiphone Sarin et al. (2019) [11] on the effectiveness of a health literacy development program in type 2 diabetes patients at risk of chronic kidney disease, also found that after participating in the program, the sample group had higher average health literacy and self-management behaviour scores than before with statistical significance at the 0.05 level. So, the health coaches assisted the sample group's doctor visits by coordinating with healthcare providers and emphasizing the significance of keeping appointments. Having someone coordinate with the doctors made the sample group feel more at ease and eager to see them as arranged. During the long-term support process, the health coaches supervised the sample group for three months via LINE, phone conversations, and occasional home visits. Because the health coaches were from the community and were given zones for easy follow-up, the sample group received constant monitoring, and the coaches could easily and swiftly provide advice or answer queries.

5. Conclusion

Through health coaching at Khiensa Hospital in Surat Thani Province, chronic non-communicable disease patients' health literacy and health behaviour modification can improve, while blood sugar levels are effectively reduced. The study found that health coaches' individualized approach, continuous reinforcement of motivation, and enhancement of health literacy led to improved behaviour modification in patients with chronic non-communicable diseases. The participants developed skills in analysing information, making discerning choices, controlling daily life practices, and modifying behaviours in areas like dietary intake, exercise, stress relief, environmental health care, avoiding vices, and personal hygiene. This enhanced their ability to prevent and mitigate risks of chronic disease complications. Therefore, the health coach approach should be expanded to include other health service units and patient groups such as those with heart disease, stroke, and mental health. The Non-Communicable Disease Control Division should provide training and enhance skills for public health personnel and health coaches. The Office of Health Region 11 should implement proactive service support for chronic non-communicable diseases.

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