Journal of Posthumanism
2025
Volume: 5, No: 6, pp. 3475–3490
ISSN: 2634-3576 (Print) | ISSN 2634-3584 (Online)
posthumanism.co.uk

DOI: https://doi.org/10.63332/joph.v5i6.2476

Development of a Lifestyle Modification Model for Diabetes Prevention among Population at Risk in Health Region 7 Ministry of Public Health

Myntlaplus Kitmethachaiyaphong[1], Prapapen Suwan[2]

Abstract

This research was a research and development (R&D) study aimed at developing a lifestyle modification model to prevent diabetes among at-risk populations. The study was conducted in three phases. Phase 1 involved diagnosing the current situation and identifying problems related to lifestyle behaviors among at-risk individuals. Quantitative data were collected from 380 participants using questionnaires, while qualitative data were gathered through in-depth interviews with 20 individuals, including at-risk persons and stakeholders. The results showed that overall lifestyle behavior was at a moderate level ($\bar{X}$ = 2.56, SD = 0.42). In Phase 2, a preliminary model was developed based on the data from Phase 1, in collaboration with five key stakeholders. The prototype model was tested with six groups of at-risk individuals (5 participants per group). After the initial testing, the model was revised and improved based on feedback and results to achieve the desired outcomes. The final model was then prepared for implementation in the next phase. Phase 3 focused on the implementation and evaluation of the developed model. A 4-week trial was conducted with an experimental group and a comparison group, each consisting of 30 participants. Quantitative data were analyzed using descriptive statistics and t-tests, while qualitative data were analyzed using content analysis. The results indicated that the experimental group showed significant improvements in lifestyle behaviors related to diabetes prevention compared to the comparison group ($p < 0.05$). Additionally, qualitative findings revealed positive changes in health awareness, motivation, and behavioral adherence. In conclusion, the developed lifestyle modification model proved to be effective and practical for diabetes prevention among at-risk populations and could be applied in community health settings.

Keywords: *Lifestyle Modification Model, Diabetes Prevention, Risk Population.*

Introduction

Non-communicable diseases (NCDs) have emerged as a predominant global health challenge, accounting for approximately 74% of all deaths worldwide, equating to around 41 million fatalities annually. These diseases, encompassing cardiovascular ailments, cancers, chronic respiratory conditions, and diabetes, not only lead to premature mortality but also impose substantial economic burdens on healthcare systems and societies at large. In Thailand, the impact of NCDs is particularly profound. Recent data indicate that NCDs are responsible for approximately 400,000 deaths each year, representing 74% of all mortalities in the country. This alarming statistic underscores the urgent need for comprehensive public health strategies to address the escalating prevalence of these chronic conditions. Among the various NCDs, diabetes mellitus has shown a significant upward trend in Thailand. As of 2024, over 6.5 million Thai individuals are living with diabetes, with an estimated 40% remaining undiagnosed. This

[1] Student, Doctor of Philosophy in Public Health Program, Western University, Thailand, Email: bewberryz@gmail.com, (Corresponding Author)
[2] Associate Professor, Director, Doctor of Philosophy in Public Health Program, Western University, Thailand, Email: prapapens@gmail.com

hidden burden poses a considerable challenge for healthcare providers, as undiagnosed individuals are at increased risk for complications such as cardiovascular disease, nephropathy, neuropathy, and retinopathy. The northeastern region of Thailand, designated as Health Region 7 and encompassing provinces like Khon Kaen, Maha Sarakham, Kalasin, and Roi Et, has witnessed a notable rise in diabetes prevalence. Between 2020 and 2024, the rate increased from 8,105.45 to 9,449.24 per 100,000 population. This surge highlights the necessity for region-specific interventions that consider local socioeconomic and cultural factors influencing health behaviors.

Addressing the diabetes epidemic requires a multifaceted approach, with lifestyle modification being a cornerstone of prevention and management. Key behavioral risk factors contributing to the development of diabetes include unhealthy diets, physical inactivity, tobacco use, and excessive alcohol consumption. These behaviors are often influenced by broader social determinants of health, such as education, income, and access to healthcare services. To effectively mitigate the impact of diabetes, public health initiatives must prioritize the promotion of healthy lifestyles. This includes encouraging balanced nutrition, regular physical activity, smoking cessation, and moderation of alcohol intake. Moreover, community-based programs that engage local stakeholders can enhance the effectiveness and sustainability of these interventions. Recent strategies have evolved to incorporate a more holistic understanding of NCD prevention, moving beyond the traditional "4x4" model—which focuses on four diseases and four risk factors—to a "5x5" framework. This expanded model includes mental health and environmental factors, such as air pollution, recognizing their significant roles in the development and progression of NCDs. In the context of Thailand, integrating culturally appropriate health promotion activities is essential. For instance, leveraging traditional community structures and local health volunteers can facilitate the dissemination of health information and support behavior change. Additionally, employing digital health tools, such as mobile applications and telemedicine, can improve access to care, particularly in rural and underserved areas.

Furthermore, policy-level interventions, such as implementing taxes on sugar-sweetened beverages and regulating food marketing, can create environments that support healthy choices. These measures, combined with individual and community efforts, form a comprehensive strategy to combat the rising tide of diabetes and other NCDs. In conclusion, the escalating prevalence of diabetes in Thailand, particularly in regions like Health Region 7, necessitates urgent and coordinated public health responses. By addressing behavioral risk factors, enhancing community engagement, and implementing supportive policies, it is possible to curb the diabetes epidemic and improve health outcomes for the Thai population. Non-communicable diseases (NCDs) have emerged as a predominant global health challenge, accounting for approximately 74% of all deaths worldwide, equating to around 41 million fatalities annually. These diseases, encompassing cardiovascular ailments, cancers, chronic respiratory conditions, and diabetes, not only lead to premature mortality but also impose substantial economic burdens on healthcare systems and societies at large. In Thailand, the impact of NCDs is particularly profound. Recent data indicate that NCDs are responsible for approximately 400,000 deaths each year, representing 74% of all mortalities in the country. This alarming statistic underscores the urgent need for comprehensive public health strategies to address the escalating prevalence of these chronic conditions. Among the various NCDs, diabetes mellitus has shown a significant upward trend in Thailand. As of 2024, over 6.5 million Thai individuals are living with diabetes, with an estimated 40% remaining undiagnosed. This hidden burden poses a considerable challenge

for healthcare providers, as undiagnosed individuals are at increased risk for complications such as cardiovascular disease, nephropathy, neuropathy, and retinopathy. The northeastern region of Thailand, designated as Health Region 7 and encompassing provinces like Khon Kaen, Maha Sarakham, Kalasin, and Roi Et, has witnessed a notable rise in diabetes prevalence. Between 2020 and 2024, the rate increased from 8,105.45 to 9,449.24 per 100,000 population. This surge highlights the necessity for region-specific interventions that consider local socioeconomic and cultural factors influencing health behaviors. For example, the study by Thipsasajtham and Suwan (2024) developed a community-based health promotion model using anti-aging medicine for pre-hypertension, highlighting the effectiveness of localized approaches in addressing NCDs through lifestyle modification and public participation.

Addressing the diabetes epidemic requires a multifaceted approach, with lifestyle modification being a cornerstone of prevention and management. Key behavioral risk factors contributing to the development of diabetes include unhealthy diets, physical inactivity, tobacco use, and excessive alcohol consumption. These behaviors are often influenced by broader social determinants of health, such as education, income, and access to healthcare services. To effectively mitigate the impact of diabetes, public health initiatives must prioritize the promotion of healthy lifestyles. This includes encouraging balanced nutrition, regular physical activity, smoking cessation, and moderation of alcohol intake. Moreover, community-based programs that engage local stakeholders can enhance the effectiveness and sustainability of these interventions. For instance, Kayadee and Suwan (2022) developed a health literacy model to prevent diabetes among patients with abdominal obesity through community participation in northeastern Thailand. Their findings underscored the pivotal role of community involvement in promoting sustainable health behavior change and reducing diabetes risk. Recent strategies have evolved to incorporate a more holistic understanding of NCD prevention, moving beyond the traditional "4x4" model—which focuses on four diseases and four risk factors—to a "5x5" framework. This expanded model includes mental health and environmental factors, such as air pollution, recognizing their significant roles in the development and progression of NCDs. In the context of Thailand, integrating culturally appropriate health promotion activities is essential. For instance, leveraging traditional community structures and local health volunteers can facilitate the dissemination of health information and support behavior change. Additionally, employing digital health tools, such as mobile applications and telemedicine, can improve access to care, particularly in rural and underserved areas.Furthermore, policy-level interventions, such as implementing taxes on sugar-sweetened beverages and regulating food marketing, can create environments that support healthy choices. These measures, combined with individual and community efforts, form a comprehensive strategy to combat the rising tide of diabetes and other NCDs.

In conclusion, the escalating prevalence of diabetes in Thailand, particularly in regions like Health Region 7, necessitates urgent and coordinated public health responses. By addressing behavioral risk factors, enhancing community engagement, and implementing supportive policies, it is possible to curb the diabetes epidemic and improve health outcomes for the Thai population.

Objectives

1. To develop an appropriate lifestyle modification model for the prevention of diabetes among at-risk populations in Health Region 7 under the Ministry of Public Health, Thailand.

2. To assess the current situation and identify problems related to lifestyle behaviors among at-

risk populations in order to inform diabetes prevention strategies.

3. To implement and evaluate the effectiveness of the lifestyle modification model for diabetes prevention among at-risk populations.

Methodology

This study employed a Research and Development (R&D) approach and was conducted between January and March 2025. The research was implemented in three distinct phases: Phase 1: Diagnosis of the current situation and identification of problems related to lifestyle behaviors among individuals at risk for diabetes. Phase 2: Development of a lifestyle modification model aimed at preventing diabetes in at-risk populations. Phase 3: Implementation and evaluation of the lifestyle modification model through a 4-week intervention involving an experimental group and a comparison group. The experimental group consisted of 30 individuals who participated in the lifestyle modification program, while the comparison group, also consisting of 30 individuals, did not participate in the intervention activities.

Population, The study population comprised individuals at risk of diabetes in Health Region 7 (which includes Khon Kaen, Maha Sarakham, Kalasin, and Roi Et provinces), as defined by the 2023 national screening results. Individuals were considered at risk if they had, A fasting plasma glucose (FPG) level between 100–125 mg/dL or A random plasma glucose (RPG) level between 140–199 mg/dL. A total of 33,111 individuals met these criteria in 2023 (National Health Security Office [NHSO], 2024).

Sample and Key Informants, The key informants and participants were selected from the at-risk population in Health Region 7. A multistage random sampling technique was applied to ensure representation across the four provinces. In the initial stages, sub-districts and villages were selected randomly, followed by random selection of individuals who met the inclusion criteria.

Research Instruments, The research instruments were developed and utilized in accordance with the three phases of the study, as follows, **Phase 1: Diagnostic Tools for Assessing the Current Situation and Problems**, This phase employed both quantitative and qualitative tools to assess lifestyle behaviors and health status among individuals at risk for diabetes. 1. Quantitative Data Collection Tools, A structured lifestyle behavior questionnaire, developed by the researcher, was employed. The questionnaire comprised three major components: 1) Demographic Information, This section collected data on age, gender, marital status, education level, monthly income, preferred dietary choices, the most frequently practiced physical activity (exercise), and commonly used methods for stress relief. 2) Health Status, Information was gathered regarding underlying medical conditions (e.g., hypertension, hyperlipidemia), as well as basic physical health indicators. These included weight, height, waist circumference, hip circumference, and Body Mass Index (BMI). Fasting Plasma Glucose (FPG) levels were also recorded. All health examination results were required to be current (within one month of data collection) and obtained through Subdistrict Health Promoting Hospitals, in alignment with national primary care protocols (Ministry of Public Health, 2023). 3) Lifestyle Behaviors, The lifestyle behaviors of at-risk individuals were assessed using a researcher-developed questionnaire, covering three essential domains, Dietary behavior, Physical activity and Stress management. Each domain included six questions, totaling 18 items. Responses were measured using a 5-point Likert scale, ranging from 1 (“Never”) to 5 (“Always”). The questionnaire was developed based on behavioral theories such as the Health Belief Model (Rosenstock, Strecher,

& Becker, 1988) and Social Cognitive Theory (Bandura, 2004), and adapted to the local cultural and environmental context. The instrument underwent content validity evaluation by a panel of three experts in community health and behavioral science. The Item-Objective Congruence (IOC) scores ranged between 0.67 and 1.00, indicating good content validity. Additionally, the questionnaire was pilot tested with 30 individuals from a similar at-risk population. The internal consistency reliability of the tool, as measured by Cronbach's alpha, was 0.84, indicating high reliability (Nunnally & Bernstein, 1994). **Phase 2: Model Development,** In Phase 2, the researcher designed and developed a lifestyle modification model for diabetes prevention in at-risk individuals. This process involved conducting a three-day participatory workshop, totaling approximately nine hours (three hours per day), with ten members of a local community diabetes network. The workshop utilized a participatory learning approach to collaboratively analyze the current situation, identify key problems, and co-create a prototype intervention tailored to the target population's context. The intervention focused on three core domains of lifestyle behavior: healthy eating, physical activity, and stress management. The conceptual foundation of the intervention was based on Bandura's Self-Efficacy Theory, which emphasizes individuals' belief in their capacity to perform specific behaviors (Bandura, 1997). Additionally, the model incorporated culturally relevant elements from Northeastern Thai culture, such as "Mor Lam Sukkaparb" (a traditional folk performance adapted for health promotion), to enhance participant engagement and reinforce lifestyle behavior change in a culturally sensitive manner. Following the initial model design, the prototype activities were pilot-tested in three small groups, each consisting of five participants. The objective was to assess the feasibility, acceptability, and clarity of the intervention content. The instruments used for data collection in this stage included, 1) Feedback Recording Forms: To gather participants' opinions regarding each session. 2) Activity Evaluation Forms: Designed to assess satisfaction, relevance, and perceived usefulness of the intervention content and 3) Group Discussion Summary Sheets: Used by facilitators to document key discussion points, concerns, and suggestions from participants during the pilot sessions. The feedback collected was systematically analyzed and used to refine and finalize the intervention model before implementation in Phase 3. **Phase 3: Pilot Implementation and Evaluation**, In Phase 3, the researcher implemented the lifestyle modification model developed in Phases 1 and 2 with a sample of individuals at risk for diabetes. The experimental group consisted of 30 participants, while a comparison group also included 30 participants. The experimental group participated in four structured learning activity plans over a period of four weeks. These plans included, 1) Adopting a lifestyle conducive to diabetes prevention, 2) Balanced nutrition for diabetes prevention, 3) Physical activity to prevent diabetes, and 4) Creating an environment that supports diabetes prevention. The intervention consisted of six sessions covering health skills training, self-management, use of local media (such as "Mor Lam" traditional performance), environmental modifications, role modeling, and ongoing follow-up. The program was grounded in the concept of self-efficacy and the local community culture. Meanwhile, the comparison group received the usual standard of care. Data were collected from both groups before the intervention and six weeks after the intervention concluded. The primary data collection instrument was a lifestyle behavior questionnaire, which included sections on personal information, health status, and lifestyle behaviors. This instrument and its scoring criteria were the same as those used in Phase 1.

Instrument Quality Assessment, The quality of the research instruments was evaluated through both content validity and reliability assessments. Content Validity Index (CVI) was examined by five experts, including university faculty and professionals in behavioral science, community nursing, and health service systems from academic institutions and regional hospitals. Each item

was rated for relevance to the theoretical framework using a four-point scale (Polit & Beck, 2006). A CVI of ≥ 0.80 was set as the criterion for acceptable content validity. The results indicated that all instruments demonstrated satisfactory content validity, with CVI values ranging from 0.80 to 1.00. Specifically, the general information questionnaire had a CVI of 1.00, the lifestyle behavior questionnaire ranged from 0.80 to 1.00, and the health status assessment tool ranged from 0.80 to 1.00. These findings reflect the comprehensiveness and appropriateness of the content in addressing the study objectives. Subsequently, the lifestyle behavior questionnaire was pilot-tested among 30 individuals at risk of developing diabetes, selected from a community similar to the actual study population. The internal consistency reliability was measured using Cronbach's alpha coefficient, which yielded a value of 0.926. This indicates a high level of reliability and internal consistency of the instrument (Tavakol & Dennick, 2011).

Research Procedures, Following approval from the Human Research Ethics Committee, the researcher coordinated with relevant local agencies, organizations, and the target population to explain the study's background, objectives, and related information, and to obtain permission for conducting the research. Data collection took place from January 2025 to March 2025. The researcher facilitated the process by organizing briefing meetings and pilot testing of the intervention program, scheduling activities in the following phases, Phase 1: Situational Analysis and Problem Assessment, The researcher requested an official authorization letter from Western University to liaise with local agencies, including local administrative organizations and public health personnel. Quantitative and qualitative data on lifestyle behaviors and biological indicators of individuals at risk for diabetes were collected from four villages in four provinces within Health Region 7. Data collection methods included questionnaires and in-depth interviews, which provided foundational information for subsequent phases. Phase 2: Program Development, A lifestyle behavior promotion program was developed, comprising four main activity plans: appropriate lifestyle, balanced diet, physical activity, and environmental creation. The development was guided by the principles of self-efficacy and the cultural context of Mor Lam (a traditional performing art). Workshops were conducted with 10 community network members, followed by pilot testing with small groups of 5 participants each. Feedback was used to refine the program prototype for formal trial in the next phase. Phase 3: Pilot Testing and Program Evaluation, The researcher implemented the program with both an experimental group and a comparison group, each consisting of 30 participants. Data were collected before the intervention and at weeks 1 and 4 after the intervention, using questionnaires measuring lifestyle behaviors and biological indicators. Biological assessments were conducted by the researcher. All data collection was thoroughly checked for completeness before analysis.

Data Analysis, Phase 1: Situational Assessment and Problem Identification, Quantitative data collected from 380 individuals identified as at risk for diabetes were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations, to summarize lifestyle behaviors and biological indicators (Polit & Beck, 2017). Qualitative data were analyzed through content analysis, involving the categorization of data into themes, examination of relationships among data, and inductive descriptive summarization (Creswell, 2014). Phase 3: Pilot Implementation and Evaluation of the Intervention Model, Pre- and post-intervention data on lifestyle behaviors and biological indicators were collected via standardized questionnaires and analyzed using statistical software. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize data characteristics. Within-group comparisons before and after the intervention were conducted using paired-sample t-tests (dependent t-tests), and between-group comparisons were made using independent-

sample t-tests. The significance level was set at $p < .05$ (Polit & Beck, 2017).

Results

The researcher presents the findings according to the three phases of the study as follows: Phase 1: Situational Assessment and Problem Identification, This phase examined the lifestyle behaviors and biological indicators of individuals at risk for diabetes within Health Region 7, Ministry of Public Health. The results are divided into quantitative and qualitative data, 1.) Quantitative Data Personal, data revealed that the majority of participants were female (74.7%), with an average age of 37.5 years. The most represented age group was 30–39 years (32.1%). Most participants were widowed/divorced/separated (50.8%) and held a bachelor's degree (62.1%). Monthly income was predominantly in the range of 15,001–20,000 THB (26.1%). The majority had no underlying chronic diseases (82.6%), with hypertension and dyslipidemia being the most common conditions among those with illnesses. Body Mass Index (BMI) data showed that most participants were within the normal range (53.95%), while combined levels of obesity class 1 and 2 accounted for 27.4%. Notably, 82.8% of women had waist circumferences exceeding the recommended threshold. Regarding fasting plasma glucose (FPG), most participants (94.7%) were classified as prediabetic (blood glucose levels between 100–125 mg/dL). Blood pressure readings were mostly in the high-normal range, with systolic values between 120–140 mmHg and diastolic values averaging 82 ± 18.19 mmHg. Open-ended questionnaire responses indicated that the most commonly consumed foods were som tam (papaya salad), followed by noodle dishes and grilled pork, reflecting preferences for spicy, flavorful, and convenient foods. Approximately 50% of respondents reported engaging in physical activity, mainly running, brisk walking, and weight training, which are accessible forms of exercise. These data provide a realistic profile of the target population's behavior and are useful for designing culturally and contextually appropriate behavioral interventions for diabetes risk reduction (Polit & Beck, 2017). 2) Lifestyle Behavior Assessment, From the survey conducted in Phase 1 with 380 diabetes-risk individuals in Health Region 7, the overall lifestyle behavior score was at a moderate level ($\bar{x}$ = 2.57, SD = 0.91). Subdomain analysis ranked behaviors from highest to lowest mean scores as follows: dietary habits showed a high average score ($\bar{x}$ = 2.70, SD = 0.95). Participants frequently consumed high-fiber foods and avoided processed foods, with about two-thirds of meals including high-fiber items "often" (32.6%) or "sometimes" (30.5%). Reading nutritional labels and choosing foods with sodium content below 2000 mg per serving was reported as "regular" by 33.2% of participants. The relaxation domain also scored highly ($\bar{x}$ = 2.69, SD = 0.83), reflecting positive social relationships and religious or purposeful living. Specifically, 30.9% of participants "regularly" maintained good relationships with others, and 49.9% did so "sometimes," while 25.5% "regularly" adhered to religious or goal-directed lifestyles. Physical activity showed the lowest moderate mean score ($\bar{x}$ = 2.32, SD = 0.94). Around 40.3% exercised "sometimes" and 23.4% "often," with only 15.3% reporting consistent exercise sessions lasting 20–30 minutes three to five times per week. As shown in Table 1. (Creswell, 2014).

Lifestyle Behavior	**Never (n/%)**	**Sometimes (n/%)**	**Often (n/%)**	**Regularly (n/%)**	**Mean**	**SD**
Overall lifestyle behaviors (3 domains)					2.57	0.91

Lifestyle Behavior	Never (n/%)	Sometimes (n/%)	Often (n/%)	Regularly (n/%)	Mean	SD
Dietary behaviors					2.70	0.95
High-fiber food consumption	74 (19.5%)	116 (30.5%)	124 (32.6%)	66 (17.4%)	2.48	0.96
Reading nutrition labels	54 (14.2%)	87 (22.9%)	113 (29.7%)	126 (33.2%)	2.82	1.01
Consuming lean meat	57 (15.0%)	93 (24.5%)	133 (35.0%)	97 (25.5%)	2.71	1.00
Eating steamed, boiled, baked, or boiled food	40 (10.5%)	113 (29.7%)	155 (40.8%)	72 (19.0%)	2.68	0.88
Avoiding processed foods	33 (8.7%)	84 (22.1%)	130 (34.2%)	133 (35.0%)	2.95	0.90
Consuming fresh fruits and vegetables	63 (16.6%)	127 (33.4%)	98 (25.8%)	92 (24.2%)	2.57	0.96
Physical activity behaviors					2.32	0.94
Regular exercise	73 (19.0%)	155 (40.3%)	90 (23.4%)	62 (16.1%)	2.37	0.92
Exercising ≥ 20–30 minutes	95 (24.7%)	141 (36.6%)	85 (22.1%)	59 (15.3%)	2.30	0.96
Exercising until sweating	76 (19.7%)	121 (31.4%)	132 (34.3%)	51 (13.2%)	2.43	0.91
Not exercising immediately after meals	95 (24.7%)	177 (46.0%)	44 (11.4%)	64 (16.6%)	2.21	0.97
Large muscle group exercises	78 (20.3%)	149 (38.7%)	103 (26.8%)	50 (13.2%)	2.33	0.94
Stretching exercises	84 (21.8%)	152 (39.5%)	105 (27.3%)	39 (10.1%)	2.27	0.91
Relaxation behaviors					2.69	0.83
Maintaining good relationships with others	13 (3.4%)	192 (49.9%)	56 (14.5%)	119 (30.9%)	2.75	0.84
Living according to religion or goals	17 (4.4%)	185 (48.1%)	80 (20.8%)	98 (25.5%)	2.68	0.88
Seeking new learning opportunities	12 (3.1%)	199 (51.7%)	83 (21.6%)	86 (22.3%)	2.65	0.82
Self-reflection and improvement	9 (2.3%)	195 (50.6%)	94 (24.4%)	82 (21.3%)	2.66	0.78

Lifestyle Behavior	**Never (n/%)**	**Sometimes (n/%)**	**Often (n/%)**	**Regularly (n/%)**	**Mean**	**SD**
Appropriate problem-solving	9 (2.3%)	177 (46.0%)	102 (26.5%)	92 (23.9%)	2.73	0.79
Performing daily routines happily	16 (4.2%)	185 (48.1%)	79 (20.5%)	100 (26.0%)	2.69	0.84

Table 1: Frequency, Percentage, Mean Scores, and Standard Deviation of Lifestyle Behavior Practices Among the Sample Population (n = 380)

In-depth interviews were conducted to explore perspectives regarding the promotion of healthy lifestyle behaviors among at-risk populations for diabetes prevention. The study investigated awareness of the severity of the problem, approaches to addressing the issue, understanding of the disease, and the willingness and readiness to collaborate throughout the project. The researcher interviewed two primary groups: individuals at risk of diabetes and diabetic patient representatives, as well as community diabetes network members. The key findings are summarized as follows, 1) Perception of Problem Severity: Both the community members and diabetes network groups concurred that diabetes represents a critical issue within the community. Clear risk factors identified include consumption of high-sugar and high-fat foods, physical inactivity, and accumulated stress, which contribute to long-term health consequences. 2) Problem-Solving Approaches: Recommendations emphasized implementing accessible health activities such as training on appropriate food selection, group exercise programs, and stress management. Additionally, the integration of technology and community networks was suggested to support sustained positive behavioral changes. 3) Understanding of the Problem: Target groups demonstrated basic knowledge about diabetes but lacked deep understanding regarding the disease's pathophysiology, complications, and proper self-management. Therefore, providing clear, contextually relevant information tailored to real-life situations is essential. 4) Readiness and Willingness to Collaborate: Both community members and diabetes network representatives expressed sincere commitment to participate actively in the project, from planning stages to outcome monitoring, offering valuable feedback to refine activities to suit local needs. Phase 2: Development of a Lifestyle Modification Model for Diabetes Prevention among At-Risk Populations, The development of a lifestyle promotion model for at-risk individuals was carried out using a “participatory planning” approach. Five members of the community diabetes network participated in a workshop with researchers over three days (three hours per day) to collaboratively analyze data collected from Phase 1, which included both quantitative and qualitative data from 380 at-risk participants. The goal was to design learning activities appropriate to the community context. This model applied Bandura’s Social Learning Theory as its conceptual framework, emphasizing the interaction between personal factors, behavior, and environment. The focus was on promoting health behavior change through modeling, imitation, reinforcement, and self-reflection, enabling at-risk individuals to effectively adopt healthy behaviors within their own contexts. The conceptual framework guiding the model’s design is illustrated in the accompanying figure. The model development process involved six key steps, 1) Gathering Opinions and Situation Analysis: Meetings were held with the research team and community networks to exchange information and analyze Phase 1 data for shared understanding. 2) Needs Assessment: Data from questionnaires and interviews were compiled to identify problems and define clear, appropriate learning objectives for the target group. 3) Designing Prototype Learning Activities: Four program plans were co-

developed: (1) Healthy lifestyle to prevent diabetes, (2) Balanced diet to prevent diabetes, (3) Physical activity to prevent diabetes, and (4) Creating an environment conducive to diabetes prevention. Objectives, content, and tools were comprehensively defined. 3) Pilot Testing with Subgroups: Prototype activities were tested with four small groups (five participants each) from the at-risk population to assess content suitability, activity format, delivery methods, materials, language appropriateness, participant engagement, and real-world applicability. 4) Reflection and Activity Improvement: Feedback from pilot testing was summarized in a forum to refine content and processes for better suitability before full implementation. 5) Finalizing the Model: Manuals and activity materials were prepared, and roles assigned to network members to facilitate readiness for a four-week trial (Phase 3) covering the four program plans. Evaluation was scheduled for week six. Phase 3: Pilot Implementation and Model Evaluation, The researcher implemented the prototype lifestyle modification model for diabetes prevention with a trial group of 30 participants over four weeks, followed by outcome evaluation at week six. The trial took place in Non Sawang Village, Lub Subdistrict, Mueang District, Kalasin Province. A comparison group of 30 participants from Village 1, Waeng Nang Subdistrict Municipality, Mueang District, Maha Sarakham Province, received standard care. The analysis of the groups' personal characteristics showed no statistically significant differences across 11 factors, including age, gender, marital status, education, income, medical history, weight, height, body mass index, waist circumference, and blood glucose level ($p > 0.05$). The overall Chi-square values were low (0.00–3.13), indicating comparable baseline characteristics between groups, thus supporting reliable comparison of intervention outcomes, As shown in Table 2.

Characteristic	**Experimental Group (n=30)**	**Control Group (n=30)**
Mean Age (years)	50.80 ± 7.04	40.83 ± 8.57
Age Range (years)		
- 25–39	12 (40.0%)	14 (46.7%)
- 40–49	9 (30.0%)	10 (33.3%)
- 50–59	9 (30.0%)	6 (20.0%)
Marital Status		
- Married	22 (73.3%)	24 (80.0%)
Education Level		
- Below Bachelor's Degree	25 (83.3%)	21 (70.0%)
Monthly Income (THB)		
- < 10,000	15 (50.0%)	11 (36.7%)
- 10,001–15,000	10 (33.3%)	8 (26.6%)
- > 15,001	5 (16.7%)	11 (36.7%)
Medical History		
- None	20 (66.7%)	24 (80.0%)
Weight (kg)	30–59: 15 (50.0%)	30–59: 15 (50.0%)
Height (cm)	140–159: 18 (60.0%)	160–169: 13

Characteristic	**Experimental Group (n=30)**	**Control Group (n=30)**
		(43.3%)
Body Mass Index (BMI)	≥ 30 (Obese Class II): 12 (40.0%)	≥ 30 (Obese Class II): 13 (43.3%)
Waist Circumference (> 80 cm)	21 (70.0%)	15 (50.0%)
Fasting Blood Glucose (mg/dL)	100–125: 25 (83.3%)	100–125: 27 (90.0%)

Table 2: Frequency and Percentage Distribution of Personal Characteristics of the Experimental and Control Groups (n = 30 per group)

Lifestyle Behaviors of At-Risk Individuals in the Experimental and Control Groups Before and After the Intervention, The results revealed that the experimental group showed statistically significant improvements ($p < .05$) in overall lifestyle behaviors, including dietary habits, physical activity, and stress management, after the intervention. In contrast, the control group demonstrated no statistically significant changes in any of these aspects. These findings are summarized in Table 3.

Lifestyle Behavior	**Group**	**Pre-Intervention (Mean ± SD)**	**Post-Intervention (Mean ± SD)**	**t**	**p**
Healthy Eating	Experimental	2.60 ± 0.55	3.09 ± 0.49	3.453	.002*
	Control	2.83 ± 0.39	2.64 ± 0.45	0.433	.668
Physical Activity	Experimental	2.19 ± 0.80	2.82 ± 0.62	3.725	< .001*
	Control	2.31 ± 0.39	2.17 ± 0.59	0.004	.997
Stress Management	Experimental	2.88 ± 0.58	3.55 ± 0.54	4.643	< .001*
	Control	2.90 ± 0.64	2.86 ± 0.52	0.633	.532
Overall	Experimental	2.56 ± 0.64	3.15 ± 0.55	4.607	< .001*
	Control	2.68 ± 0.47	2.56 ± 0.52	0.487	.629

Table 3: Comparison of Changes in Specific Lifestyle Behaviors Among At-Risk Individuals Within the Experimental and Control Groups Before and After the Intervention (n = 30 per group)

*$p < .05$ indicates statistical significance.

The analysis of lifestyle behaviors between the experimental and control groups revealed no statistically significant differences in any aspect of lifestyle behaviors before the intervention ($p > .05$). However, after the intervention, the experimental group demonstrated significantly higher mean scores in all behavioral domains ($p < .05$), especially in the overall lifestyle

behavior, which showed a highly significant difference ($p < .001$), as shown in Table 4.

The results revealed that the experimental group exhibited statistically significant improvements in all measured biological indicators after the intervention. These included reductions in blood sugar levels, body weight, body mass index (BMI), and waist circumference ($p < .05$). In contrast, the control group showed no statistically significant changes in any of these indicators. Details are presented in Table 5.

Lifestyle Behavior	**Time Point**	**Experimental Group (Mean ± SD)**	**Control Group (Mean ± SD)**	**t**	**p**
Dietary Behavior	Pre-test	2.60 ± 0.55	2.83 ± 0.39	1.706	.099
	Post-test	3.09 ± 0.49	2.64 ± 0.45	3.172	.004*
Physical Activity	Pre-test	2.19 ± 0.80	2.31 ± 0.39	0.660	.515
	Post-test	2.82 ± 0.62	2.17 ± 0.59	4.678	<.001*
Stress Management	Pre-test	2.88 ± 0.58	2.90 ± 0.64	0.462	.648
	Post-test	3.55 ± 0.54	2.86 ± 0.52	5.007	<.001*
Overall Lifestyle Behavior	Pre-test	2.56 ± 0.64	2.68 ± 0.47	0.787	.434
	Post-test	3.15 ± 0.55	2.56 ± 0.52	4.607	<.001*

Table 4: Comparison of Lifestyle Behavior Scores Between the Experimental and Control Groups Before and After the Intervention (n = 30 per group)

*$p < .05$ indicates statistical significance.

Biological Indicators	**Group**	**Before Intervention (Mean ± SD)**	**After Intervention (Mean ± SD)**	**t**	**p**
Blood Glucose (mg/dL)	Experimental	115.0 ± 8.33	99.9 ± 17.50	4.787	<.001*
	Control	117.2 ± 6.72	118.8 ± 6.96	0.907	.372
Body Weight (kg)	Experimental	60.50 ± 11.60	59.5 ± 5.17	3.354	.003*
	Control	62.09 ± 14.24	62.18 ± 14.23	0.045	.964
Body Mass Index (BMI)	Experimental	29.58 ± 3.81	25.46 ± 3.21	2.770	.009*
	Control	30.29 ± 4.32	31.13 ± 5.08	0.910	.367
Waist Circumference (cm)	Experimental	71.25 ± 1.25	68.43 ± 2.03	7.348	<.001*
	Control	81.23 ± 11.23	81.60 ± 12.55	1.361	.195

Table 5: Comparison of Differences in Biological Indicators Among At-Risk Individuals Within Experimental and Control Groups Before and After the Intervention (n = 30 per group)

*$p < .05$ indicates statistical significance.

Biological indicators of at-risk individuals between the experimental and control groups showed no statistically significant differences before the intervention in any of the measured indicators ($p > .05$). After the intervention, the experimental group demonstrated significantly improved biological indicators compared to the control group, including decreased blood glucose levels ($p < .001$), reduced body weight ($p = .035$), lowered body mass index (BMI) ($p = .007$), and decreased waist circumference ($p < .001$), as shown in Table 6.

Biological Indicator	**Time**	**Experimental Group (Mean ± SD)**	**Control Group (Mean ± SD)**	**t**	**p**
Blood Glucose Level (mg/dL)	Before	115.0 ± 8.33	117.2 ± 6.72	0.161	0.873
	After	99.9 ± 17.50	118.8 ± 6.96	5.312	<.001*
Body Weight (kg)	Before	60.50 ± 11.60	62.09 ± 14.24	1.722	0.100
	After	59.5 ± 5.17	62.18 ± 14.23	2.251	0.035*
Body Mass Index (BMI)	Before	29.58 ± 3.81	30.29 ± 4.32	1.350	0.210
	After	25.46 ± 3.21	31.13 ± 5.08	2.360	0.007*
Waist Circumference (cm)	Before	71.25 ± 1.25	81.23 ± 11.23	1.105	0.288
	After	68.43 ± 2.03	81.60 ± 12.55	5.643	<.001*

Table 6: Comparison of Changes in Biological Indicators Between At-Risk Individuals in the Experimental and Control Groups Before and After the Intervention (n = 30 per group)

*$p < .05$ indicates statistical significance.

Discussion

The discussion of the findings follows the research hypotheses as detailed below: 1) After the intervention, the experimental group demonstrated statistically significant improvements in healthy lifestyle behaviors compared to both their baseline and the control group. These behavioral changes are likely attributable to participation in activities designed according to Bandura's Social Learning Theory (Bandura, 1977), which emphasizes learning through observation, imitation, and the enhancement of self-efficacy. The intervention activities included workshops, "Mor Lam" health performances, planning Isaan-style weight-loss menus, and "Mor Lam" dance as an accessible form of physical exercise. These activities align with Bandura's theory, which posits that observational learning via modeling and motivational reinforcement effectively fosters sustainable behavior change in target populations. This finding corresponds with the work of Dispol Jamjan (2019), who identified that health behavior modification models aimed at reducing diabetes risk produce systemic community changes and effectively lower disease incidence. Similarly, Wannapaporn Chongklang et al. (2020) reported that health knowledge and gender significantly influence health behaviors among populations at risk of diabetes. Furthermore, Rungnapa Chantra et al. (2018) found that enhancing health literacy effectively reduces chronic disease risk. Consistent with these Thai studies, international research by Knowler et al. (2002) and the Diabetes Prevention Program Research Group (2002)

demonstrated that lifestyle modifications, such as increased physical activity and dietary control, significantly reduce the risk of type 2 diabetes. These outcomes also align with the Centers for Disease Control and Prevention's (CDC) National Diabetes Prevention Program (DPP) guidelines, which advocate systematic and sustainable lifestyle interventions focusing on nutrition, physical activity, and stress management at individual and community levels (CDC, 2021). 2) Biometric indicators in the experimental group showed statistically significant improvements after the intervention, including reductions in blood glucose levels, waist circumference, body mass index (BMI), and body weight, compared both to baseline and the control group. These results indicate that the developed lifestyle promotion model effectively improves the health of at-risk individuals. The success of this intervention can be attributed to the participatory approach used in designing and implementing the program, which incorporated local contextual factors and involved community network members in planning, execution, and monitoring. The use of accessible communication channels, such as official LINE groups, further supported sustained behavioral changes. These findings are consistent with those of Knowler et al. (2002) and the Diabetes Prevention Program Research Group (2002), who reported that lifestyle interventions involving increased physical activity, dietary regulation, and weight loss significantly reduce the risk of type 2 diabetes. Pan et al. (2015) also confirmed the efficacy of nutritional and physical activity behavior changes in reducing diabetes risk. Additionally, the CDC (2021) underscores the importance of controlling biometric indicators through the National Diabetes Prevention Program, emphasizing weight reduction, physical activity enhancement, and stress management to sustainably lower diabetes risk at both individual and community levels principles reflected in the intervention model applied in this study.

Recommendations for Future Research

1. Comparative studies should be conducted to examine the effectiveness of lifestyle behavior modification models in urban versus rural at-risk populations. This will help identify differences in outcomes and tailor interventions to the contextual needs of each setting.

2. Longitudinal studies over extended periods are necessary to evaluate the sustainability of health behavior changes and their long-term impact on diabetes risk reduction.

3. Additional research should explore the integration of digital health technologies, such as mobile health applications and online platforms, into community health promotion activities. These tools can enhance access to health information and facilitate ongoing monitoring of health behaviors among at-risk individuals.

Limitations of the Study

This study was limited to a single community sample, and the relatively short follow-up period may restrict the generalizability of the findings. Additionally, external factors and self-report biases could affect data reliability. These limitations should be addressed in future research to strengthen evidence validity.

Acknowledgments

The researcher would like to sincerely thank the thesis advisor and the examination committee members for their invaluable guidance and constructive suggestions in the development of this dissertation. Gratitude is also extended to the experts, directors of Subdistrict Health Promoting Hospitals, public health personnel, and the local community members in Health Region 7 for

their kind cooperation throughout the study. The researcher dedicates the success of this research to their parents and all teachers with deep appreciation and gratitude. This study was approved by the Human Research Ethics Committee of Western University (Approval No. WTU 2567-0141) on January 10, 2025. The research was conducted in accordance with the ethical principles of human research after receiving formal approval.

References

Bandura, A. (1977). Social learning theory. Prentice Hall.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York, NY: W.H. Freeman.

Bandura, A. (2004). Health promotion by social cognitive means. Health Education & Behavior, 31(2), 143–164. https://doi.org/10.1177/1090198104263660.

Centers for Disease Control and Prevention (CDC). (2021). National Diabetes Prevention Program. https://www.cdc.gov/diabetes/prevention/index.html.

Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.). SAGE Publications.

Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.). SAGE Publications.

Diabetes Prevention Program Research Group. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. The New England Journal of Medicine, 346(6), 393–403. https://doi.org/10.1056/NEJMoa012512.

Dispol Jamjan. (2019). Development of health behavior modification models to reduce diabetes risk in communities. Journal of Thai Public Health, 45(3), 112–124. [in Thai]

Kayadee, A., & Suwan, P. (2022). Development of health literacy model for preventing diabetes patients with abdominal obesity through community participation. Social Science and Buddhistic Anthropology, 7(7), 499–517.

Knowler, W. C., Barrett-Connor, E., Fowler, S. E., Hamman, R. F., Lachin, J. M., Walker, E. A., & Nathan, D. M. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. The New England Journal of Medicine, 346(6), 393–403. https://doi.org/10.1056/NEJMoa012512.

Ministry of Public Health. (2023). National primary care screening guidelines for non-communicable diseases. Bureau of Non-Communicable Diseases.

National Health Security Office. (2024). Annual diabetes screening report 2023: Health Region 7. Bangkok, Thailand: Ministry of Public Health.

Nunnally, J. C., & Bernstein, I. H. (1994). Psychometric theory (3rd ed.). McGraw-Hill.

Pan, X. R., Li, G. W., Hu, Y. H., Wang, J. X., Yang, W. Y., An, Z. X., ... & Howard, B. V. (2015). Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance. Diabetes Care, 20(4), 537–544. https://doi.org/10.2337/diacare.20.4.537.

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. Research in Nursing & Health, 29(5), 489–497. https://doi.org/10.1002/nur.20147.

Polit, D. F., & Beck, C. T. (2017). Nursing research: Generating and assessing evidence for nursing practice (10th ed.). Wolters Kluwer.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. Health Education Quarterly, 15(2), 175–183. https://doi.org/10.1177/109019818801500203.

Rungnapa Chantra, P., Thamrongchareon, S., & Boonrungk, P. (2018). Health literacy and chronic disease risk reduction in rural Thailand. Southeast Asian Journal of Tropical Medicine and Public Health, 49(5), 865–872. [in Thai]

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical

Education, 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd.
The Nation Thailand. (2024, November 14). Thais urged to change habits as diabetes cases cross 6.5 million. https://www.nationthailand.com/health-wellness/40043269.
Thipsasajtham, S., & Suwan, P. (2024). Development of a lifestyle promotion model applying anti-aging medicine for pre-hypertension people, Ubol Ratchathani province. Journal of Social Science and Culture, 8(3), 293–315.
Wannapaporn Chongklang, S., Lertprasert, P., & Somsuk, P. (2020). Factors influencing health behaviors in diabetes risk populations. Thai Journal of Nursing Research, 24(2), 139–147. [in Thai]
World Health Organization. (2022). Noncommunicable diseases. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases.
World Health Organization. (2022). Guidelines on physical activity and sedentary behavior. https://www.who.int/publications/i/item/9789240015128.