Thai Health Sciences Frontiers
วารสารวิทยาศาสตร์สุขภาพไทยก้าวหน้า
THSF

RESEARCH ARTICLE

Development of a Health Promotion Model for Buddhist Monks to Prevent Emerging and Re-emerging Infectious Diseases, Mueang District, Kalasin Province

Sumalee Wichaiyo[1*]

[1] Registered Nurse, Senior Professional Level, Family and Community Medicine Practice and Urban Health Center, Social Medicine Department, Kalasin Hospital, Mueang District, Kalasin Province, Thailand

*Corresponding author

☐ **Received:** 31 March 2026 ✓ **Revised:** 10 April 2026 ☑ **Accepted:** 20 April 2026

Citation: Wichaiyo S. Development of a health promotion model for Buddhist monks to prevent emerging and re-emerging infectious diseases, Mueang District, Kalasin Province: effects on health literacy, mental health, and quality of life. Thai Health Sciences Frontiers. 2026;1(1):44–56.

Abstract

This research and development study aimed to examine the situation, develop, and evaluate a health promotion model for Buddhist monks to prevent emerging and re-emerging infectious diseases in Mueang District, Kalasin Province, Thailand, from January 2024 to March 2026. The evaluation phase used a one-group pretest–posttest design. The sample comprised 356 participants: 86 monks, 26 health personnel, 58 village health volunteers, 46 temple stewards, 38 temple cooks, 74 regular temple visitors, and 28 temple committee members, selected by stratified sampling; outcomes were evaluated in the 86 monks. Instruments included semi-structured interview and focus group guides, questionnaires on health literacy, mental health (TMHI-66), quality of life (WHOQOL-BREF-THAI), and satisfaction. Quantitative data were analyzed using frequency, percentage, mean, standard deviation, and paired t-test; qualitative data were analyzed by content analysis.

The results showed that 34.26% of the monks had contracted COVID-19, 22.65% had a body mass index above the cut-off, and 25.62% had a waist circumference above the cut-off. The developed model comprised three main components and 10 key measures. After implementation, mean scores of the monks increased significantly in all four domains (all $p < .001$): health literacy for COVID-19 prevention (35.42±22.77 to 52.72±28.45, $t = 5.42$), health literacy on diet, emotion, and exercise (32.44±14.76 to 53.44±13.26, $t = 6.27$), mental health (152.23±88.34 to 180.32±92.84, $t = 3.57$), and quality of life (90.22±52.44 to 125.26±56.32, $t = 3.62$). Satisfaction averaged 18.78±8.35 (out of 25). The model may be tested further in areas with similar contexts, integrated with multidisciplinary teams and community networks, using designs with comparison groups.

Keywords: Buddhist monks, health promotion, emerging and re-emerging diseases, health literacy, quality of life

Introduction

Emerging and re-emerging infectious diseases pose a continuing threat to global population health owing to changes in pathogens, population travel and mobility, and environmental change.[1] Coronavirus disease 2019 (COVID-19) is a major example of an emerging disease with worldwide impact; as of March 2026, the World Health Organization reported more than 779 million cumulative confirmed cases and more than 7.1 million deaths.[2] Thailand has recorded more than 4.7 million cumulative cases and more than 34,000 deaths.[2] In addition, re-emerging diseases such as influenza, dengue fever, and measles remain public health problems requiring continuous surveillance, with older adults and people with underlying diseases at risk of severe illness.

Buddhist monks are at risk of respiratory infections because they travel to perform religious ceremonies on invitation and have close contact with laypeople and fellow monks. During the COVID-19 epidemic in Mueang District, Kalasin Province, which has 886 monks, approximately 34% of monks contracted the disease during 2021–2023, according to surveillance data from the Kalasin Provincial Public Health Office. The most common underlying diseases were diabetes and hypertension, and risks from excess body mass index and waist circumference were also found. These may be partly related to the sweet, fatty, and salty food offered by laypeople, as well as to monks' limited health literacy and undesirable health behaviors. A study of monks aged 35 years and over in Chanthaburi Province found a diabetes prevalence of 10.83%,[3] and such chronic diseases are risk factors for severe infectious disease.

Health promotion under the Ottawa Charter emphasizes building healthy public policy, creating supportive environments, strengthening community action, and developing personal skills.[4] Health literacy refers to the cognitive and social skills that enable individuals to access, understand, and use information to take care of their own health.[5,6] Previous health care models for monks include a health education model for monks[7] and the National Health Charter for Buddhist Monks.[8] However, most studies have focused on chronic non-communicable diseases or care for sick monks, and no model yet integrates the prevention of emerging and re-emerging diseases into health promotion for monks through network partner participation in an urban context. Participatory

research and development is an appropriate approach for developing such a model.[9] The researcher previously developed a health promotion model for monks in the post-COVID-19 situation in the same area.[10] The present study builds on that work by extending its scope from COVID-19 prevention to other emerging and re-emerging diseases, involving additional network partners, and systematically evaluating outcomes in health literacy, mental health, and quality of life.

Because monks' health problems are an urgent issue, the researcher developed a health promotion model for monks that respects the monastic disciplinary rules (Dhamma-Vinaya) and builds laypeople's health literacy regarding food offerings, so that monks can be healthy, adopt desirable behaviors, serve as a spiritual refuge for the public, and follow their monastic practices. The conceptual framework applied the Ottawa Charter, the concept of health literacy, and Pender's Health Promotion Model.[11] The independent variable was the 10-measure health promotion model for monks, and the dependent variables were monks' health literacy, mental health, quality of life, and satisfaction (Figure 1). The findings are expected to guide health agencies and network partners in applying the model to prevent emerging and re-emerging diseases in areas with similar contexts.

Research Objectives

1. To examine the situation and problems of health care and the prevention of emerging and re-emerging diseases among monks in Mueang District, Kalasin Province
2. To develop a health promotion model for monks to prevent emerging and re-emerging diseases in Mueang District, Kalasin Province
3. To implement and evaluate the health promotion model for monks to prevent emerging and re-emerging diseases in terms of process (coverage of measures) and outcomes (health literacy, mental health, quality of life, and satisfaction)

Methods

This research and development study was conducted in Mueang District, Kalasin Province, from January 2024 to March 2026, a total of 27 months, in three phases according to the objectives: Phase 1, situation analysis (January–June 2024); Phase 2, model development (July–December 2024); and Phase 3, implementation and evaluation of the model (January–December 2025, a 12-month program, with results summarized and disseminated in January–March 2026). Phase 3 used a one-group pretest–posttest design.

Situation data in Phase 1 were obtained from the Health Data Center (HDC) database of the Kalasin Provincial Public Health Office and annual health check-up results of monks. Details are as follows.

Population

The population comprised 886 monks in Mueang District, Kalasin Province; 26 staff of Kalasin Hospital, private hospitals, and sub-district health promoting hospitals (SHPHs); 2,488 village health volunteers (VHVs); 111 temple stewards; 186 temple cooks; 2,026 regular temple visitors who attended at least three days a week; and 628 temple committee members from 110 temples in Mueang District. Thirty temples covering all sub-districts were purposively selected based on the abbots' willingness to participate. All 26 health staff were included (census).

Sample

The sample size was calculated using Yamane's formula, $n = N/(1+Ne^2)$, with N = 6,351 and e = 0.0515, yielding 356 participants: 86 monks, 26 health staff, 58 VHVs, 46 temple stewards, 38 temple cooks, 74 temple visitors, and 28 temple committee members. Stratified sampling by role in monks' health care was used, with monks, the main target group, forming the largest stratum, and participants within each stratum were randomly selected by drawing lots without replacement. The outcome evaluation in Phase 3 included 86 monks; G*Power 3.1 for a two-tailed paired t-test with an effect size (dz) of 0.35, α = .05, and power of .80 indicated at least 67 monks, increased to 84 to allow for 20% attrition, and 86 monks were therefore enrolled.

Inclusion Criteria

1) Monks who had resided in a temple in Mueang District for at least one year; 2) health staff, VHVs, temple stewards, temple cooks, and temple committee members whose duties involved monks' health care; 3) regular temple visitors who attended at least three days a week; 4) aged 18 years or older; and 5) able to communicate in Thai and willing to participate.

Exclusion Criteria

Severe illness preventing participation in activities. Discontinuation criteria were 1) moving out of the area or leaving the monkhood during the study and 2) requesting withdrawal from the study.

Research Instruments

The instruments comprised 1) the intervention: the 10-measure health promotion model for monks (Table 3) and its operational manual, rated by three experts as highly appropriate and feasible; and 2) data collection instruments: a semi-structured interview guide, a focus group guide, and questionnaires administered before and after implementation in four domains: health literacy for COVID-19 prevention and health literacy on diet, emotion, and exercise,

adapted from the assessment forms of the Health Education Division, Department of Health Service Support (13 items each, 5-point scale, 13–65 points); mental health (Thai Mental Health Indicator, TMHI-66; 66 items, 4-point scale, 66–264 points); and quality of life (WHOQOL-BREF-THAI; 26 items, 5-point scale, 26–130 points); plus a satisfaction questionnaire administered after implementation (maximum 25 points). Content validity was examined by three experts, yielding item IOC values of 0.67–1.00 for the researcher-developed instruments, whereas the TMHI-66 and WHOQOL-BREF-THAI were used in their standard versions without modification. Reliability testing in 30 people with similar characteristics yielded Cronbach's alpha coefficients of 0.85, 0.83, 0.89, 0.87, and 0.81, respectively.

Data Collection

Qualitative data were collected through observation, four focus group discussions of 8–10 participants each, and semi-structured in-depth interviews with 15 purposively selected key informants until data saturation. Sessions were audio-recorded and transcribed, and trustworthiness was ensured by triangulation. Quantitative data were collected before (January 2025) and after implementation (December 2025) by the researcher and two research assistants.

Data Analysis

Data were analyzed using R version 4.4.1 in RStudio. Descriptive statistics included frequency, percentage, mean ($\bar{x}$), and standard deviation (S.D.). Paired t-tests compared pre- and post-implementation scores in the 86 monks after the distribution of differences was checked with the Shapiro–Wilk test (the Wilcoxon signed-rank test was used if non-normal). Mean differences ($\bar{d}$), 95% confidence intervals (95% CI), and effect sizes (Cohen's dz) were reported, and p-values were Bonferroni-adjusted (α = .0125). Only participants with complete data at both time points were analyzed (complete case), and statistical significance was set at .05. Qualitative data were analyzed by content analysis through coding, categorization, and theme summarization; the researcher and two co-researchers analyzed the data independently and reached consensus, and the results were used to define the measures in Phase 2.

Research Ethics

This study was approved by the Human Research Ethics Committee of the Kalasin Provincial Public Health Office (No. KLS.REC 101/2566, dated 15 December 2023). The researcher explained the study objectives and procedures, obtained signed informed consent, kept data confidential, and presented results only in aggregate; participants could withdraw at any time without affecting the

services they received. Consent from monks was obtained in a manner consistent with monastic discipline, with information conveyed through temple stewards or representatives and without documents being handed directly from women to monks.

Results

1. Situation of Health Care Problems among Monks

1.1 Demographic characteristics. Of the 356 participants, most were female (214, 60.11%) and 142 were male (39.89%). By group, monks were the largest (86, 24.16%), followed by temple visitors (74, 20.79%) and VHVs (58, 16.29%). Most were aged 31–40 years (29.21%), followed by 18–30 years (24.72%), with a mean age of 41.40±13.60 years. Most were single (including monks; 58.99%). The most common education was a religious (Dhamma) qualification (24.16%), followed by a bachelor's degree (20.50%), as shown in Table 1.

Table 1 Demographic characteristics of the sample (n = 356)

Variable	Number	Percentage
Sex		
Male	142	39.89
Female	214	60.11
Group		
Monks	86	24.16
Hospital staff	26	7.30
VHVs	58	16.29
Temple stewards	46	12.92
Temple cooks	38	10.67
Temple visitors	74	20.79
Temple committee members	28	7.87
Age (years) ($\bar{x}$±S.D. = 41.40±13.60)		
18–30	88	24.72
31–40	104	29.21
41–50	81	22.75
≥ 51	83	23.31
Marital status		
Single	210	58.99

Variable	Number	Percentage
Married	48	13.48
Widowed	98	27.53
Education level		
No formal education	36	10.11
Primary school	57	16.01
Lower secondary school	58	16.29
Upper secondary/vocational certificate	46	12.92
Bachelor's degree	73	20.50
Religious (Dhamma) qualification	86	24.16

1.2 Situation of health care problems and disease prevention among monks. Data from the 2024 annual health check-up of monks and the HDC database (N = 886) showed that 34.26% of monks had contracted COVID-19, of whom 28.72% were hospitalized, with no deaths or disabilities. Overall, 24.72% were older adults, 16.54% had hypertension, 13.25% had diabetes, 22.42% had fallen in the past year, 22.65% had a body mass index above the cut-off (≥ 23 kg/m²), and 25.62% had a waist circumference above 36 inches, as shown in Table 2. Situation analysis with network partners identified the key problems as travel for religious ceremonies, offerings of sweet, fatty, and salty food, limited health literacy, and lack of isolation space within temples. Qualitative findings revealed three main themes: 1) monks' limited choice of food, as one said, “Whatever the laypeople offer, we must eat; we cannot choose”; 2) laypeople's lack of knowledge about food suitable for monks; and 3) temples' lack of guidelines and space for managing infected monks.

Table 2 Health problems and disease prevention situation among monks (n = 886)

Situation	Percentage
Contracted COVID-19	34.26
Hospitalized due to COVID-19	28.72
Death or disability	0.00
Older adults	24.72
Underlying disease: hypertension	16.54
Underlying disease: diabetes	13.25
History of falls in the past year	22.42

Situation	Percentage
Body mass index (BMI) above cut-off (≥ 23 kg/m²)	22.65
Waist circumference > 36 inches (approx. 91 cm)	25.62
Blood pressure ≥ 140/90 mmHg	13.64
Fasting capillary blood glucose ≥ 126 mg/dL	3.65
Myopia	14.03
Hyperopia	5.42

2. Development of the Health Promotion Model for Monks to Prevent Emerging and Re-emerging Diseases

2.1 Key measures of the model. The researcher developed the model through situation analysis, a literature review, and three solution-seeking meetings with 30 network partners, including monk representatives, health staff, VHVs, temple stewards, temple cooks, and temple committee members. Consensus was reached through group discussion and joint resolution, and the model was reviewed for appropriateness by three experts. The resulting model comprised 10 key measures, as shown in Table 3.

Table 3 Key measures of the health promotion model for monks to prevent emerging and re-emerging diseases

No.	Activity/Content	Tools	Duration	Academic Rationale
1	Training on COVID-19 and on surveillance and infection prevention measures for monks and temple visitors	Teaching media (PowerPoint), knowledge manual	2 hours	Enhance functional and interactive health literacy based on Nutbeam's concept[5]
2	Develop surveillance and prevention guidelines based on DMHTTA measures; manage the temple environment; clean equipment and religious areas daily	Practice guidelines, cleaning solutions	Daily	Create supportive environments for health based on the Ottawa Charter[4]
3	Designate suitable isolation areas within temples according to context	Area assessment form, temple layout	1 day per temple	Separate patients from others to reduce transmission within temples
4	Screen temple visitors at risk of COVID-19	Screening form, thermometer, ATK test kits	Every activity day	Proactively detect patients and risk groups at an early stage

No.	Activity/Content	Tools	Duration	Academic Rationale
5	Health behavior modification for monks on 3E (eating, exercise, emotion) and adequate rest	Lesson plans, health record book	3 hours	Promote perceived self-efficacy based on Pender's Health Promotion Model[11]
6	Public communication via community broadcasting, village loudspeakers, leaflets, video clips, and the hospital page on healthy food offerings that avoid sweet, fatty, and salty food	Broadcasting, leaflets, video clips, hospital page	Ongoing throughout the project	Build health literacy among laypeople who offer food[6]
7	Poster boards on healthy food and chronic diseases within temples	Poster boards	Throughout the project	Provide continuous reminders and knowledge in the temple environment
8	Training on healthy menus for monks to prevent chronic diseases	Healthy menu manual, cooking demonstration	3 hours	Develop the skills of temple cooks and stewards in preparing food offerings
9	Proactive, integrated health check-ups of monks by a multidisciplinary team	Weighing scale, measuring tape, blood pressure monitor, glucometer	Twice a year	Screen for chronic diseases, which are risk factors for severe infection
10	Telemedicine via video call for symptom inquiry, with medication delivered by staff and VHVs	Smartphone, video call	By appointment or when symptomatic	Increase access to services and reduce travel and close contact

2.2 Development process and components of the model. Network partners jointly drove the activities and piloted the model in two temples with 30 participants for one month. The model was then evaluated and refined before full implementation by adjusting training schedules to fit monks' daily routines and simplifying the media. The model has three main components: (1) participation of network partners, including Kalasin Hospital, SHPHs, the Provincial Public Health Office, temples, and VHVs; (2) 10 measures covering the prevention of emerging and re-emerging diseases and the promotion of 3E health behaviors (eating, exercise, and emotion); and (3) continuous monitoring and evaluation by a multidisciplinary team, as shown in Figure 1.

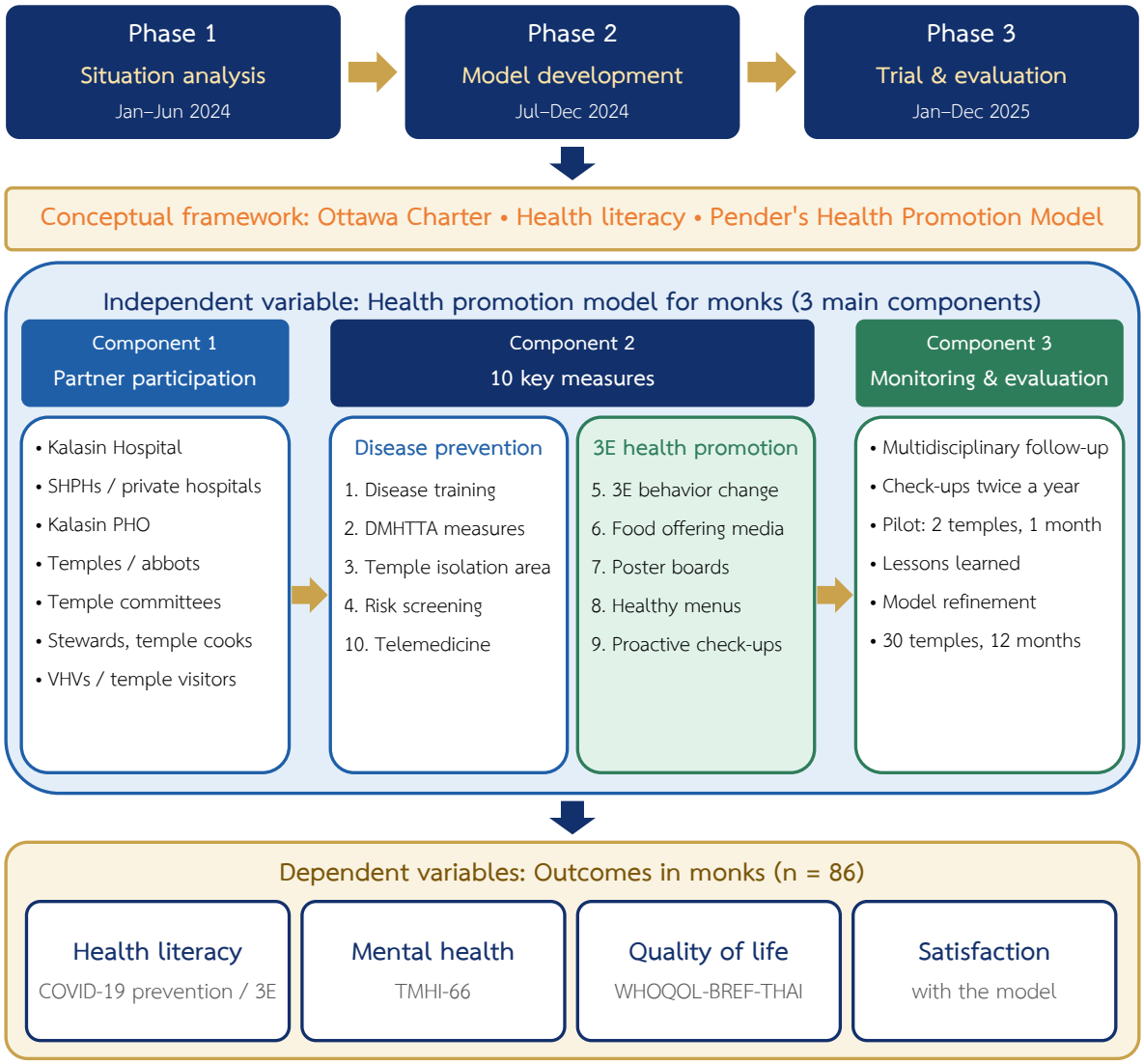


Figure 1 Health promotion model for monks to prevent emerging and re-emerging diseases, Mueang District, Kalasin Province

3. Implementation and Evaluation of the Model

3.1 Implementation results. All 30 participating temples implemented all 10 measures. Of the monks, 93.02% (80 of 86) attended the training; 2,450 risk screenings of temple visitors were conducted; and 124 telemedicine consultations were provided to monks. Post-implementation health check-ups showed that 19.77% had a body mass index above the cut-off, 22.09% had an excess waist circumference, and 11.63% had blood pressure of 140/90 mmHg or higher. Five monks (5.81%) contracted respiratory infections during the implementation period.

3.2 **Comparison of scores before and after implementation.** All 86 monks completed both questionnaires with no attrition. Mean scores after implementation were significantly higher than before in all four domains ($p < .001$), remaining significant after Bonferroni adjustment, with small to

moderate effect sizes (Cohen's dz = 0.38–0.68), as shown in Table 4. Satisfaction with the model, measured after implementation, averaged 18.78±8.35 points (out of 25).

Table 4 Comparison of mean scores before and after implementation of the health promotion model for monks (n = 86)

Variable	Max score	Before		After		$\bar{d}$	95% CI	t	Cohen's dz	p-value
		$\bar{x}$	S.D.	$\bar{x}$	S.D.					
Health literacy for COVID-19 prevention	65	35.42	22.77	52.72	28.45	17.30	10.95–23.65	5.42	0.58	<.001*
Health literacy on diet, emotion, and exercise	65	32.44	14.76	53.44	13.26	21.00	14.34–27.66	6.27	0.68	<.001*
Mental health (TMHI-66)	264	152.23	88.34	180.32	92.84	28.09	12.45–43.73	3.57	0.38	<.001*
Quality of life (WHOQOL-BREF-THAI)	130	90.22	52.44	125.26	56.32	35.04	15.79–54.29	3.62	0.39	<.001*

*Statistically significant at $p < .05$

Discussion

The situation analysis found that 34.26% of monks had contracted COVID-19, which may be related to their practice of traveling for religious ceremonies and close interaction with laypeople and fellow monks. Hypertension (16.54%), diabetes (13.25%), excess body mass index (22.65%), and excess waist circumference (25.62%) were also found, which may be related to offerings of sweet, fatty, and salty food and limited health literacy. The prevalence of diabetes was similar to that reported among monks aged 35 years and over in Chanthaburi Province (10.83%),[3] although definitions and measurement methods may differ. Evidence from other studies indicates that chronic diseases are risk factors for severe infectious disease;[12] therefore, infectious disease prevention should be implemented alongside health promotion.

The health promotion model for monks was derived from problem review, literature review, and joint solution-seeking meetings, resulting in 10 key measures. This is consistent with the Ottawa Charter's emphasis on creating supportive environments and community participation[4] and with the concept of health literacy, which emphasizes accessing, understanding, and using information for self-care.[5,6] It is also in line with the study by Leeyutthanont et al.,[7] in which network partner participation was a key component, and with the direction of the National Health Charter for Buddhist Monks.[8]

After implementation, mean scores for health literacy, mental health, and quality of life were significantly higher than before ($p < .001$), with small to moderate effect sizes (Cohen's dz = 0.38–0.68). This may be related to collaboration among Kalasin Hospital, the community, and the Kalasin Provincial Public Health Office, as well as network partnerships sustained since the COVID-19 epidemic. These results are consistent with the study by Leeyutthanont et al.[7] and the researcher's previous study in the same area.[10] The model may be adapted to prevent other emerging and re-emerging diseases, such as influenza, dengue fever, and measles.

Limitations of this study include 1) the one-group pretest–posttest design without a comparison group, which precludes causal inference and control of external factors, natural change, and testing effects; 2) the evaluation period occurring after the major COVID-19 pandemic; 3) no measurement of disease incidence or preventive behaviors; 4) self-reported scores; 5) clustering of monks within temples; and 6) implementation only in Mueang District, Kalasin Province.

Conclusion

This research and development study produced a health promotion model for monks to prevent emerging and re-emerging diseases in Mueang District, Kalasin Province, comprising three main components and 10 key measures. The situation analysis showed that 34.26% of monks had contracted COVID-19 and had chronic disease risks. After implementation, monks' health literacy, mental health, and quality of life scores increased significantly ($p < .001$); these are preliminary results from a one-group pretest–posttest design.

Recommendations

1. Recommendations for applying the findings: 1) Health service units applying the model in areas with similar contexts should adapt the measures to community lifestyles and staff workloads and implement them for at least 12 months. 2) Activities should be extended to laypeople who offer food and to patients with chronic diseases, with continuous integration with multidisciplinary teams and network partners. 3) Provincial public health offices and related agencies may use the findings to plan monks' health care in accordance with the National Health Charter for Buddhist Monks.

2. Recommendations for future research: Future studies should use quasi-experimental designs with comparison groups, such as a cluster quasi-experimental design at the temple level, in areas with similar contexts, with long-term follow-up, disease incidence or preventive behavior outcomes, and testing of the model for other emerging and re-emerging diseases.

Acknowledgments

The author thanks the monks, temple stewards, temple cooks, temple committee

members, VHVs, and all participants, as well as the Director of Kalasin Hospital, the Kalasin Provincial Public Health Office, the Mueang DHCC network, the SHPHs, and the multidisciplinary team for supporting this research.

References

1. Morens DM, Folkers GK, Fauci AS. The challenge of emerging and re-emerging infectious diseases. Nature. 2004;430(6996):242-9.
2. World Health Organization. WHO COVID-19 dashboard [Internet]. Geneva: World Health Organization; 2026 [cited 2026 Mar 15]. Available from: https://data.who.int/dashboards/covid19
3. Kuramasuwan B, Howteerakul N, Suwannapong N, Rawdaree P. Diabetes, impaired fasting glucose, daily life activities, food and beverage consumption among Buddhist monks in Chanthaburi Province, Thailand. Int J Diabetes Dev Ctries. 2013;33(1):23-8.
4. World Health Organization. Ottawa charter for health promotion. Geneva: World Health Organization; 1986.
5. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. Health Promot Int. 2000;15(3):259-67.
6. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, et al. Health literacy and public health: a systematic review and integration of definitions and models. BMC Public Health. 2012;12:80.
7. Leeyutthanont M, Uraiwan P, Kaewsakulthong J, Saetew P. Development of health education model for monks. The Journal of Boromarajonani College of Nursing, Nakhonratchasima. 2019;25(2):104-17. (in Thai)
8. National Health Commission Office. The National Health Charter for Buddhist Monks, first edition, B.E. 2560. Nonthaburi: National Health Commission Office; 2017. (in Thai)
9. Kemmis S, McTaggart R, Nixon R. The action research planner: doing critical participatory action research. Singapore: Springer; 2014.
10. Wichaiyo S, Chaisongkram S, Noenchat A. Development of a health promotion model for Buddhist monks in the post-COVID-19 situation, Mueang District, Kalasin Province. J Environ Educ Med Health. 2023;8(4):624-9. (in Thai)
11. Pender NJ, Murdaugh CL, Parsons MA. Health promotion in nursing practice. 7th ed. Boston: Pearson; 2015.
12. Guan WJ, Liang WH, Zhao Y, Liang HR, Chen ZS, Li YM, et al. Comorbidity and its impact on 1590 patients with COVID-19 in China: a nationwide analysis. Eur Respir J. 2020;55(5):2000547.