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Comprehensive Cancer Care Scenario

RESEARCH ARTICLE

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A Scenario for a Model of Excellence in Comprehensive Cancer Care

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Abstract

Background: Cancer is the leading cause of death in Thailand, and the incidence of cancer is increasing substantially. The aim of the research was to develop a scenario for a model of excellence in comprehensive cancer care. **Method:** Using Ethnographic Delphi Futures Research (EDFR), 30 expert informants in the field of cancer care were selected using the snowball sampling technique. The research tools were an interview guide and questionnaires. Data were transcribed, analyzed, and synthesized to yield a proposed scenario of the model, which was validated by seven qualified persons. **Results:** The generated scenario for a model of excellence in comprehensive cancer care consisted of seven dimensions. The first five dimensions described excellence in service systems and comprised proactive prevention, early detection, rapid and accurate diagnosis, effective treatment from multidisciplinary teams, and palliative care to improve quality of life. The last two dimensions described supporting systems and comprised informatics technology and continuous research and innovation. **Conclusion:** The scenario for a model of excellence in comprehensive cancer care can be summarized according to the "3 Ts": transformation of cancer care, team and capacity building, and total quality management.

Keywords: Cancer- Health service- Multidisciplinary team- Quality management

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Introduction

Cancer is a major public health problem. In Thailand, it has been the leading cause of death for more than two decades, and the number of cancer deaths is increasing very year. In 2020, there were 84,697 deaths from cancer, of which 48,239 occurred in men and 36,458 in women. The most common cancers in Thailand are liver and bile duct, trachea and lungs, colorectal, breast, and cervix uteri cancer [1]. Cancer incidence is high; there are 336 new cases daily and 122,757 annually [2]. Cancer incidence among Thai men is as high as 169.3 per 100,000 population, and among women, it is 151 per 100,000 population [3]. More than 40% of patients are diagnosed with late-stage cancer. Patients at this stage are five times more likely to die and twice as likely to experience financial burdens, which lead to household, societal, and national economic problems [4].

The risk factors for cancer are genetics, lifestyle habits, physical diseases, and environmental factors. Research showed that 30% to 50% of cancers can be prevented by avoiding cancer risk factors. Early detection and timely treatment of cancer improve the 5-year survival rate. Palliative care reduces physical symptoms and improves the quality of life for terminally ill cancer patients [5]. Therefore, it is important to implement a range of cancer prevention and control strategies, such as taking preventive measures, reducing cancer risk factors, cancer screening and early detection, developing therapeutic interventions, and providing care for terminally ill patients to maintain quality of life [6].

To address these issues, the Thai Department of Medical Services, Ministry of Public Health, was tasked to being the main body responsible for brainstorming ideas from business executives and academics in both the public and private sectors related to all fields of cancer. This resulted in the implementation of the National Cancer Prevention and Control Plan 2013-2017. This plan was translated into a cancer service plan at all levels nationwide [6]. Health service systems for cancer were developed and comprised seven strategic operations to reduce mortality rates, morbidity rates, and treatment waiting times [7]. The strategic operation plan includes cancer prevention, screening, diagnosis, treatment, palliative care, informatics, and research. The 2018-2022 health service development plan provides a referral hospital cascade for 12 health districts under the "seamless heath service network" principle. This referral system connects

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primary, secondary, tertiary, and super-tertiary centers to provide self-contained comprehensive care for people within the network. The system enables people to gain access to universal services, reduces hospital congestion, shortens treatment waiting time, reduces disparities in healthcare services, and uses limited healthcare resources effectively [6].

Although there have been efforts to reduce the burden of cancer in Thailand for over a decade, cancer incidence continues to rise. Some individuals still do not access standard screening tests [8], and most new cancer patients admitted to hospitals have late-stage cancer [9]. Both patients and public health service failures delayed treatment [10, 11]. The public health services do not currently meet the needs of patients and their families [12, 13].

The Ministry of Public Health and ministry-level agencies have developed a strategy to establish a network of nationwide medical centers of excellence, medical institutions, and educational institutions according to a long-term (5-10 year) plan. Five medical centers of excellence (for cardiovascular, cancer, trauma and emergency medicine, neonatal, and transplantation care) have been established in six Ministry of Interior regions. These excellence centers comprise an efficient health service system and reduce disparity in access to services. They provide convenient and comprehensive access to public health services. Similarly, the provision of medical personnel in under-resourced areas has improved. In the private sector, comprehensive cancer centers of excellence have been established to provide effective and specialized cancer diagnosis and treatment using advanced technology. Several measures have been implemented to ensure that treatment results meet international standards; these include service model research and development, personnel development, and knowledge transfer to establish a cancer registry that can assess the quality of medical care at the hospital level and raise the standard of care through multidisciplinary teams. Most public and private cancer care centers of excellence are in central Thailand. Service costs are relatively high, which restricts access to medical services for some individuals. The government supports three different types of funding that provide health care benefits, but disparities remain in hospital costs and accepted payment methods. The uneven allocation of medical personnel, expensive medical equipment, and advanced technology across local healthcare systems creates considerable regional disparities in provision [14].

The problems discussed above affect the model of cancer care in Thailand. Therefore, a scenario for a model of excellence in comprehensive cancer care is needed. This research aimed to propose a scenario for a model of excellence in comprehensive cancer care. Such a model was feasibility and suitability for developing the prototype and implementing it in healthcare services for cancer prevention and control.

Materials and Methods

The Ethnographic Delphi Futures Research (EDFR) [15] technique was used to develop a scenario for a model of excellence in comprehensive cancer care. Theoretical frameworks were identified from document research and analysis and from examining the following health service system measures for cancer initiated and implemented in the National Cancer Prevention and Control Plan 2018-2022 prevention, screening, diagnosis, treatment, palliative care, informatics, and research. Strategies for establishing a national network of medical centers of excellence in various medical and educational institutions (according to a 5- to 10-year plan), the development of medical centers of excellence, and the evaluation criteria for such centers were integrated using the McKinsey 7S Framework model [16] to guide the conceptual framework, as shown in Figure 1.

EDFR was used to guide the research process, which was divided into three phases:

Phase 1: Conceptual framework development using document analysis to collect documents and related research.

Phase 2: Data collection consisted of 1) in-depth interviews with 30 experts, hospital executives, cancer care specialists, academics and researchers in the field of cancer, and individuals who supported cancer care services, purposefully selected using the snowball sampling technique. Interview data were transcribed, content analyzed, and transformed to produce a draft of a questionnaire on prospective components for a comprehensive cancer care model; 2) validation and testing of a reliability questionnaire completed by the same expert panel in the second round; 3) questionnaire results obtained from the second round were sent out to the same panel in the third round to confirm their previous responses.

Phase 3: Visualization of the scenario for a model of excellence in comprehensive cancer care by developing an outline of a future cancer care model. Feedback on the scenario was provided by seven qualified individuals. A comprehensive scenario of excellence in the cancer care model was produced.

Research instruments

An in-depth interview guide and questionnaires were used to collect the data.

1) The interview guide asked interviewees to describe the following aspects of excellence in comprehensive cancer care: the optimistic-realistic scenario, the pessimistic-realistic scenario, and the most desirable, appropriate, and feasible scenario.

2) The questionnaire items were developed after content analysis of interview data. For the first set of questionnaires, a five-level response scale was used to rate each item. The percentage, mode, median, and interquartile ranges were used to analyze the responses. The calculations were as follows:

(1) if the difference between the mode and the median did not exceed 1.00, and the interquartile range (Q3-Q1) did not exceed 1.5, this indicated agreement between the experts on a particular question.

(2) if the median ranged from 3.50 to 5.00, it indicated

a likelihood or a tendency to occur as per the statement of a particular question.

The analysis of the response to the first questionnaire was recorded on the new questionnaire (the second set). The calculated median, mode, and interquartile range were specified, along with the position of each expert's original answer on the previous questionnaire items. The second set of questionnaires was returned to the experts for them to review their answers. Experts were asked to change or confirm their previous answers and to state the reasons for their opinions. Experts returned the questionnaires via registered mail or e-mail.

Data collection

Cancer care experts were invited to participate in the study and were given information about the research objectives and methods in person, by e-mail, or by post. Experts were informed that there would be three rounds of data collection, comprising interviews and questionnaires. Thirty experts were interviewed face-to-face, online, or on-site, according to the availability of each expert in the first round. The researcher conducted in-depth interview with the experts for 1-2 hours. The interview was audiotaped with field notes. The questionnaire items were developed after content analysis of interview data. The questionnaires in rounds 2 and 3 were sent out by registered mail or e-mail and followed up by phone until all questionnaires were returned.

The statistical analyses used in the data analysis comprised percentage, mode, median, interquartile range, and likelihood value.

Results

The results of the analysis of the expert data obtained using EDFR were as follows: Experts' opinions on the model of excellence in comprehensive cancer care according to the cancer health service system development plan yielded promising options and consensus on seven dimensions with 40 components. These were clustered as follows: (1) seven components on the prevention and reduction of cancer risk; (2) five components on early cancer screening and detection; (3) six components on cancer diagnosis; (4) eight components on cancer treatment; (5) four components on palliative care; (6) five components on cancer informatics; and (7) five components on cancer research (Figure 2).

The results of the synthesis of key components and cancer care according to the seven strategies of the health service system development plan for cancer provided an outline of the desirable, appropriate, and feasible scenario of excellence in comprehensive cancer care. The relationships among the components were analyzed. These relationships are summarized in Figure 3.

The main factors can be summarized as the "3 Ts" of a model of excellence in comprehensive cancer care. These concepts are defined as follows:

T1: The transformation of cancer care uses technologies and innovative tools to process and analyze big data, as well as continuing research to generate accurate

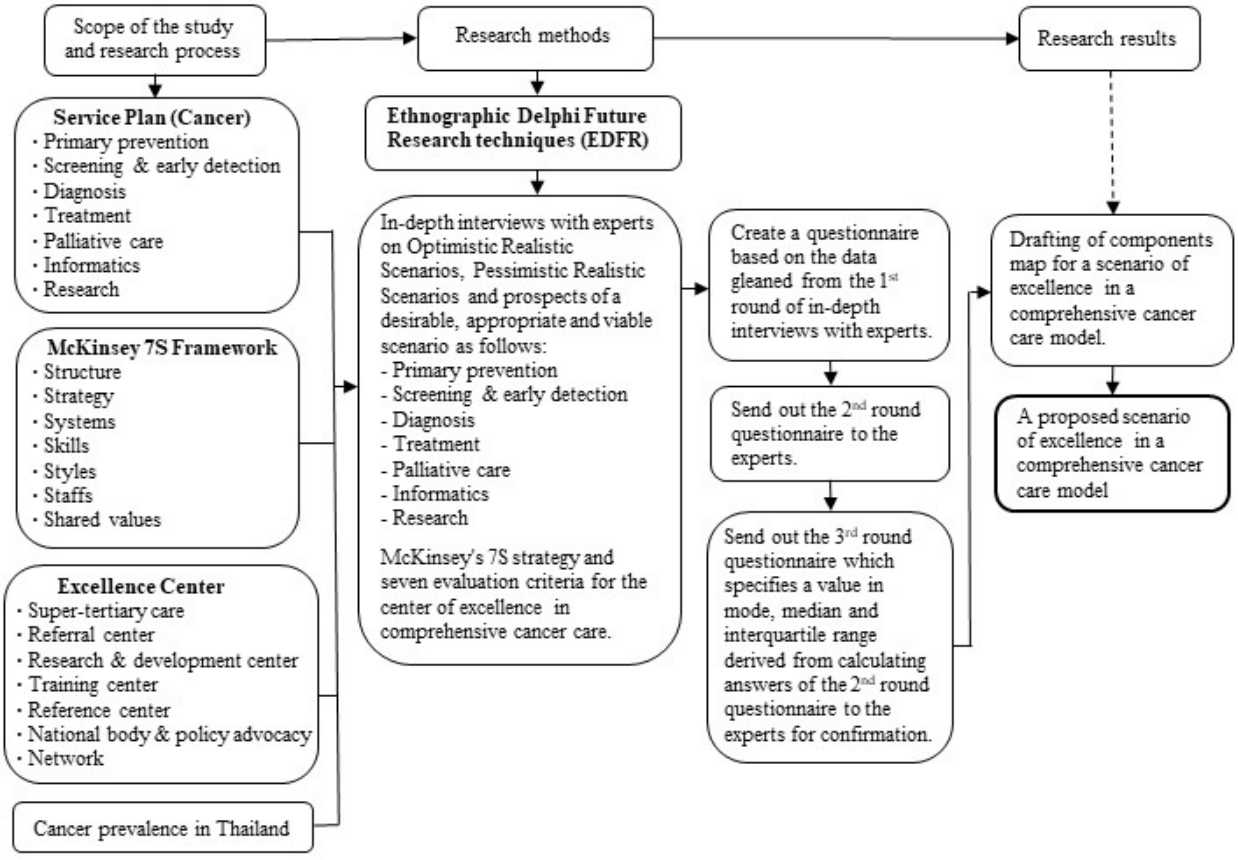

Figure 1. Research Conceptual Framework

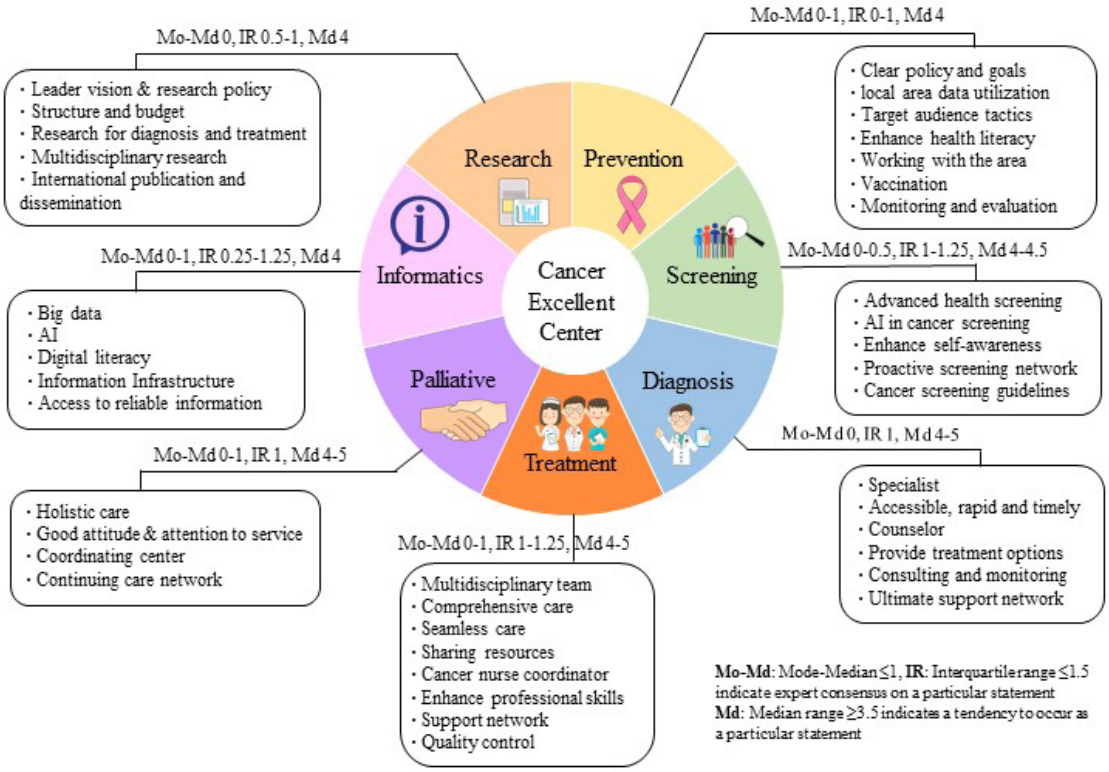

Figure 2. Key Components of Cancer Care According to the Seven Strategies of the Health Service System Development Plan for Cancer

information and empirical evidence. It covers cancer prevention, screening, diagnosis, treatment, and palliative care.

T2: Team and capacity building includes building a multidisciplinary team with specific expertise and a service approach, creating a service support network, and enhancing people's health literacy.

T3: Total quality management relies on setting concise goals, effective communication, sharing resources, and continuous quality improvement that involves all relevant personnel.

Discussion

In the context of substantial and rapid changes in population structure, lifestyle, and socioeconomics, scientific, technological, and environmental solutions to cancer care problems are required. Cancer care needs to change from the use of modular services to the provision of comprehensive care at all stages of illness, from pre-disease to the final stage. The present findings yield a scenario for a model of excellence in comprehensive cancer care. A successful cancer care service model could help to reduce cancer incidence, disparities in access to services, waiting times, and mortality, and improve the patient's quality of life in the late stage of the disease.

The present model of excellence in comprehensive cancer care consists of seven dimensions: five that describe excellence in service systems and two that describe supporting factors. These dimensions constitute the basis for the future development and improvement of all cancer services.

Five service support systems

System for the prevention and reduction of cancer risk.

This system's excellence in effectively detecting and controlling cancer prevalence relies on several factors including creating clear policies and goals that are widely disseminated so that they can be developed and implemented. Local area data utilization is essential for cancer prevention, from planning to effective resolution. Enhancing health literacy promotes people's knowledge and willingness to attend screenings, evaluate health

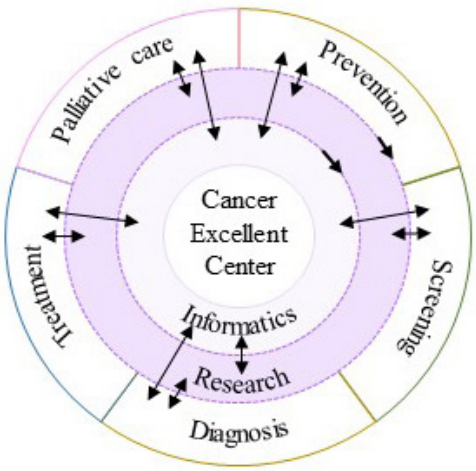

Figure 3. Relationships in a Scenario for a Model of Excellence in Comprehensive Cancer Care

information, and make decisions to modify their health behaviors appropriately. Ongoing communication with the target audience to access reliable information and protect people from inaccurate information, as well as monitoring and evaluating the results and improving the plan, are important. A previous study showed that working with the local community on the process of problem analysis, finding solutions together, and collaborative planning could help people increase their knowledge and prevention behavior of liver fluke and cholangiocarcinoma [17]. Additionally, cancer vaccination can reduce the risk of cancer-causing infections, such as liver and cervical cancers [5].

Cancer screening and early detection system

Cancer screening can reduce morbidity and mortality in the population through early detection and early treatment of cancer or by reducing the incidence of cancer by identifying and treating its precursors. Regular cancer screening exams, based on gender and age, are recommended for breast cancer by mammography, cervical cancer by human papillomavirus testing (HPVs), and colonoscopy for colorectal cancer [18]. Modern screening systems that use evidence-based cancer screening programs, advanced technology, innovation, and artificial intelligence have great potential to improve cancer screening practices and increase the effectiveness of screening systems. This is consistent with previous studies finding that artificial intelligence enables rapid processing, high-volume concurrent usage, and high accuracy in disease screening [19]. Raising public awareness on the importance of cancer screening, the availability of mobile screening networks, and guidelines for health care personnel are essential components to facilitate more convenient and effective screening, especially in primary health care units [20].

Fast and accurate diagnosis by a specialist physician

This system is essential for the selection of the most appropriate and effective treatment [5]. A referral system network for cancer diagnosis allows patients rapid and timely access to services and reduces treatment queues. Information about alternative treatment, consultation options, and counseling by competent health personnel can increase treatment effectiveness. A monitoring and counseling system and an after-discharge care network offer an effective follow-up system for the excellent service model.

Providing effective treatment from a multidisciplinary team with advanced, comprehensive, and seamless medical therapies

This excellence component involves cooperation between multidisciplinary teams in discussing options and making joint decisions to develop personalized treatment plans for cancer patients. Sharing health professionals, medical equipment, and patient information between professionals can help standardize, continue care, and improve patient outcomes. Cancer liaison nurses are being established to help coordinate cancer care and referral system benefits. Improving specialists' practical skills in providing quality care, establishing support networks to help patients and families, and developing a comprehensive care quality control system would help to improve excellence centers for comprehensive cancer care. There is evidence that sharing care between oncology providers and primary care providers increases patient satisfaction and reduces care costs [21, 22].

Palliative care improves the quality of life of terminally ill patients

The provision of palliative and holistic patient care by qualified health personnel with a positive attitude, attention to service, and good communication skills improve the quality of life of terminally ill patients. These talented staff coordinate with patients and families seeking a referral and provide home care support. Palliative care for cancer patients can help to reduce physical symptoms and depression, lower treatment costs, shorten hospital stays, improve quality of life, and help patients die in peace. This type of system increases the likelihood that a patient can die at home and supports the family after the patient's death. It also increases the social well-being of caregivers [23].

Two supporting components

Advanced information technology and big data analytics systems

The big data, which involves the collection of data from various relevant agencies on macro- and micro-level national cancer care prevalence, should be organized to form a foundation for comprehensive cancer care. Big data analytics has five processes: data acquisition, data storage, data management, data analytics, and data visualization and reporting. This system uses advanced technology, innovation, and artificial intelligence to support big data analytics and cancer informatics to maximize cancer-related information. Studies indicate that big data analytics have shown moderate to high accuracy in the diagnosis, treatment, and prediction of important clinical outcomes of several chronic diseases [24]. Qualified personnel with digital competency and who have access to reliable health information are necessary for this system to work.

Continuous research and innovation development

These supporting factors include leadership and clear policies; organization structure and sufficient budget; the promotion of diagnostic-focused cancer treatment research that informs practice; the development of a multidisciplinary research network together with the use of empirical evidence and clinical practice guidelines; the dissemination of research and innovation at national and international levels; and the development of critical success indicators in organizing the service to facilitate continuing research monitoring and evaluation to improve comprehensive care system quality.

Service delivery changes are inevitable in the development of comprehensive one-stop cancer care centers of excellence. Comprehensive massive data sets (from various relevant agencies) of micro- and macro-level national cancer care prevalence should be organized to form a foundation for comprehensive cancer care. This

should include disease prevention, screening, diagnosis, treatment, and palliative care. Such data sets could reflect the cancer situation in each area and identify which aspects of cancer care need to be changed, improved, developed, or strengthened. They could also provide an indicator of the quality of different aspects of cancer care and form the basis of research and innovation development in various relevant fields. Multidisciplinary team research could help to identify appropriate solutions and deliver innovative health services and medical innovations. A massive cancer database could store new research results. As cancer care becomes more sophisticated and technologically advanced, multidisciplinary teams with specific expertise are needed. These should be characterized by a positive attitude and service approach and should contain a support network to help provide services seamlessly, including health literacy promotion to increase the efficiency of the service. Effective management of cancer treatment services should be comprehensive and of high quality, with concise goals, effective communication, service quality orientation, continuous quality improvement, and sharing of resources. Involvement and support from stakeholders and networks in the government, private, and public sectors are also essential for the success of such systems.

The scenario for a successful and exceptional comprehensive cancer care system can be summarized according to the model of the "3 Ts" of excellent comprehensive cancer care, which includes transformation of cancer care, team and capacity building, and total quality management.

Suggestions

Suggestions for the practical implementation of the model

*There should be a clear policy and goal to develop comprehensive cancer care and substantially accelerate the development of information systems (big data) to obtain a complete overview of cancer. Such systems should be accurate and current, and could be used in care services and research, for example, by linking different parts of the health service system (from primary care to highly specialized centers in the public and private sectors). The system should cover cancer prevention, screening, diagnosis, treatment, and palliative care.

*Budgets and research facilities should be increased to facilitate innovation and artificial intelligence development by a multidisciplinary team in all aspects of cancer care. Additionally, research should be disseminated nationally and internationally to benefit the development of the health care service system.

*The provision of cancer specialists in various fields should be improved to help achieve the goals of cancer prevention and control.

Suggestions for further research

*This study presented a possible scenario for a comprehensive cancer care model. These findings should be used as a foundation for further research. For example, they could be applied to the development of a model of a comprehensive cancer care center of excellence.

*Other useful research studies that could be conducted include the application of design thinking, a thought process that facilitates a detailed understanding of the needs of a target group. This would help to develop ideas and innovations for practical problem solving and could produce tangible results.

Author Contribution Statement

All authors contributed to the study design and final approval. SP, SR, NK, and TJ collected data. SP and VT performed data interpretation, analysis, and visualization. SP drafted the manuscript and its final version.

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Ethical considerations

This study was approved by the Human Research Ethics Committee, Chulabhorn Research Institute (Project Code 108/2563).

Conflict of interest

The authors declare no conflict of interest.

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