

The Role of Thai Local Herbs and Ingredients in Promoting Post-Pandemic Wellness and Medical Tourism for Sustainable Development Goal 3: A Critical Review of the Literature

Chengxiang Ma, D.B.A.¹, Chenglin Gao, Ph.D.², Thawit Somrak, MSc.³

¹Walailak University, Thasala District, Nakhon Si Thammarat 80160, Thailand.

²School of Management, Asian Institute of Technology, Khlong Luang, Pathum Thani 12120, Thailand.

³International Tourism and Hospitality Management, Bangkok University International, Bangkok University, Pathum Thani 12120, Thailand.

ABSTRACT:

Objective: To investigate the therapeutic properties of local Thai herbs and ingredients, assess the scientific evidence on Thai traditional medicine, explore the cultural significance and traditional knowledge, analyze the potential of Thai herbs in post-pandemic wellness, and examine the role of Thai traditional medicine in medical tourism and its contribution to SDG 3.

Material and Methods: This article presents a comprehensive and rigorous critical review of the literature conducted systematically, including thorough data extraction, systematic search, and analysis of relevant studies.

Results: The literature review explores the results of various studies on the efficacy and safety of local Thai herbs and ingredients and the potential impacts of medical tourism on sustainability. The review reveals that Thai traditional medicine, incorporating practices, demonstrates promising therapeutic benefits for conditions such as inflammation and respiratory infections. However, challenges exist in terms of standardization and regulation, necessitating further research in order to establish safety and efficacy. While medical tourism benefits Thailand economically, concerns arise regarding social inequalities and environmental impacts. Integrating traditional medicine into medical tourism and adopting sustainable practices can mitigate any adverse effects. These findings highlight the importance of investments in research, education, technology, and sustainable tourism practices that promote traditional medicine, enhance patient care, and position Thailand as a leader in post-pandemic wellness and sustainable development.

Conclusion: The discussion emphasizes the need for continued research, education, and regulation in order to promote the integration of traditional medicine into the healthcare system, enhance the safety and efficacy of its practices, and position Thailand as a leader in medical tourism and post-pandemic wellness.

Keywords: medical tourism; post-pandemic wellness; sustainable development; Thai local herbs

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Corresponding author: Chengxiang Ma, D.B.A.

Walailak University, Thasala District, Nakhon Si Thammarat 80160, Thailand.

E-mail: chengxiang.ma@wu.ac.th

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INTRODUCTION

The COVID-19 pandemic has significantly impacted global health and wellness, highlighting the importance of alternative healthcare solutions for post-pandemic wellness. Thai local herbs and ingredients, used in traditional medicine for centuries, have gained increasing popularity as an alternative approach to promoting health and well-being. Thai local herbs and ingredients are plant-based materials indigenous to Thailand and used for medicinal purposes. They include a variety of plants, such as turmeric, ginger, holy basil, lemongrass, and galangal, among others. These herbs and ingredients have been found to have therapeutic properties and are used in various forms, including herbal teas, topical applications, and supplements.

Empirical evidence supports local Thai herbs and ingredients in promoting health and wellness. For instance, a study by Cheewakriangkrai et al. (2020)¹ found that a Thai herbal formulation containing turmeric, ginger, and galangal had anti-inflammatory effects and effectively reduced pain and improved mobility in patients with knee osteoarthritis. Similarly, a study by Saruwatari et al. (2020)² found that a Thai herbal tea containing lemongrass, pandan leaves, and ginger effectively reduced symptoms of upper respiratory tract infection in children.

The potential of medical tourism in Thailand for Sustainable Development Goal 3 (SDG 3): good health and well-being have also been recognized. Medical tourism refers to traveling to another country for medical treatment. Thailand has become a popular destination for medical tourism due to its affordable and high-quality healthcare services, including traditional Thai medicine. Thai local herbs and ingredients play a significant role in the appeal of medical tourism in Thailand. The use of these herbs and ingredients in traditional Thai medicine has attracted many international visitors seeking alternative healthcare solutions. According to the Tourism Authority of Thailand (2021)³, the medical tourism market in Thailand is expected to grow by 20% annually, driven by the demand for alternative and

natural therapies such as Thai herbal medicine. However, there is a need for further research in order to examine the safety, efficacy, and sustainability of the use of local herbs and ingredients in wellness and medical tourism.

In conclusion, the use of local Thai herbs and ingredients in promoting health and wellness is supported by empirical evidence. The potential of medical tourism in Thailand for SDG 3 is significant, with local Thai herbs and ingredients playing a substantial role in its appeal. Further research and policy actions are needed to promote the use of local Thai herbs and ingredients in healthcare and medical tourism.

Objectives

Firstly, the review aims to investigate the therapeutic properties of local Thai herbs and ingredients and their traditional uses in Thai traditional medicine. This involves examining the existing knowledge and understanding of the medicinal properties of various Thai herbs and ingredients, and their historical and cultural significance within Thai traditional medicine practices. Secondly, the review seeks to assess the scientific evidence regarding the utilization of Thai traditional medicine in health promotion and the treatment of specific diseases. This involves analyzing studies that provide statistical data and detailed information on the effects and outcomes of using Thai traditional medicine for various health conditions. By critically appraising the quality of the evidence, the review aims to evaluate the efficacy and safety of Thai traditional medicine in promoting health and treating specific ailments.

Furthermore, the review explores the cultural significance of local Thai herbs and ingredients and the preservation and transmission of traditional knowledge. This involves examining the cultural and social contexts in which Thai traditional medicine is practiced, and the efforts made to safeguard traditional knowledge and practices related to Thai herbs and ingredients. The review may also explore the role of traditional healers and their contribution

to preserving and transmitting this cultural heritage. The review also seeks to analyze the potential of local Thai herbs and ingredients in promoting post-pandemic wellness, with a specific focus on health promotion and prevention strategies. It aims to identify the potential benefits of incorporating traditional Thai medicine, including herbs and ingredients, in post-pandemic wellness programs and initiatives. This may involve examining the role of Thai traditional medicine in enhancing immune function, managing stress, and supporting overall well-being.

Additionally, the review aims to examine the role of Thai traditional medicine in medical tourism, particularly concerning its contribution to SDG 3 - ensuring good health and well-being. It explores the factors that make Thai local herbs and ingredients attractive to medical tourists seeking alternative healthcare options. The review also considers the sustainability considerations associated with promoting medical tourism based on Thai herbs, including the conservation of resources, ethical sourcing practices, and the involvement of local communities.

MATERIAL AND METHODS

The Materials and Methods section of this literature review describes the approach taken to identify relevant studies and analyze the role of Thai local herbs and ingredients in promoting post-pandemic wellness and medical tourism. Electronic databases such as PubMed, Scopus, and Google Scholar were systematically searched using specific terms related to Thai traditional medicine, herbs, ingredients, post-pandemic wellness, medical tourism, and SDG 3. The search aimed to include a wide range of studies published. After retrieving the articles, a screening process was conducted based on the titles and abstracts to select studies directly relevant to the review's objectives. Articles that did not focus on Thai local herbs and ingredients, post-pandemic wellness, or medical tourism were excluded. The remaining articles were obtained in full text for further evaluation.

Data extraction was performed to gather essential information from the selected studies. The extracted data were organized and synthesized in order to identify common themes and patterns related to the role of local Thai herbs and ingredients in promoting post-pandemic wellness and medical tourism. A critical appraisal process was carried out to assess the included studies' quality and reliability. The aim was to evaluate the strength of the evidence presented in each study and determine its relevance to the research objectives. Finally, the findings from the selected studies were synthesized to present a coherent overview of the role of local Thai herbs and ingredients in promoting post-pandemic wellness and medical tourism. Key themes and outcomes were highlighted, and gaps or limitations in the existing research were identified.

Literature review

Traditional use and ethnopharmacology of Thai local herbs and ingredients

Thai local herbs and ingredients have been used for medicinal purposes in Thailand for centuries and have significant historical and cultural significance. These plants are an essential part of traditional Thai medicine, a holistic healthcare system encompassing various practices, including herbal medicine, massage, and spiritual healing. Ethnopharmacological studies have investigated the properties and therapeutic effects of local Thai herbs and ingredients. These studies have identified various compounds, such as alkaloids, flavonoids, and terpenoids, with pharmacological activities and health benefits. For instance, turmeric contains curcumin, which has anti-inflammatory, antioxidant, and anti-cancer properties (Shehzad et al., 2013)⁴. Ginger contains gingerol and shogaol, which have anti-inflammatory and anti-nausea effects (Grzanna et al., 2005)⁵.

Lemongrass contains citral, which has anti-microbial and anti-cancer properties (Luqman and Dwivedi, 2010)⁶. Traditional Thai medicine uses local herbs and ingredients in

various forms, such as herbal teas, topical applications, and supplements. For example, a Thai herbal formulation called Ya-Hom, which contains 28 herbs, including galangal, ginger, and lemongrass, is commonly used for digestive problems, respiratory infections, and fever (Phumthum et al., 2019)⁷. Another herbal formulation called Tom Yum Kung soup, which contains lemongrass, galangal, and kaffir lime leaves is believed to have immune-boosting and anti-inflammatory effects (Kampangkaew et al., 2020)⁸. Empirical evidence supports the therapeutic effects of local Thai herbs and ingredients. For example, a randomized controlled trial by Panpatch et al. (2019)⁹ found that a Thai herbal supplement containing turmeric, ginger, and holy basil effectively reduced knee osteoarthritis symptoms with no adverse effects. Similarly, a systematic review by Ruangsang et al. (2020)¹⁰ found that lemongrass oil had anti-inflammatory and analgesic effects and could be used as an alternative therapy for pain relief.

In conclusion, Thai local herbs and ingredients have significant historical and cultural significance and are essential to traditional Thai medicine. Ethnopharmacological studies have identified the various compounds and health benefits of these plants, and empirical evidence supports their therapeutic effects. Further research is needed in order to explore the potential of these plants for healthcare and medical tourism.

In assessing the quality and reliability of the included studies, several factors were considered, including study design, sample size, methodology, and potential biases. The following critical appraisal overviews the studies' strengths and limitations. Panpatch et al. (2019)⁹ conducted a randomized controlled trial to investigate the effects of a Thai herbal supplement containing turmeric, ginger, and holy basil on knee osteoarthritis symptoms. The study employed a randomized design and included a placebo control group, which enhanced the internal validity of the findings. However, the sample size was relatively small, limiting the generalizability of the results. Nevertheless, the study reported positive outcomes, demonstrating the

potential therapeutic effects of the herbal supplement in reducing knee osteoarthritis symptoms.

Ruang sang et al. (2020)¹⁰ conducted a systematic review that synthesized evidence on lemongrass oil's anti-inflammatory and analgesic effects. The study employed a comprehensive search strategy and included a range of studies, increasing the reliability of the findings. However, the review did not specify the inclusion criteria used or provide a detailed assessment of the quality of the individual studies included. Despite this limitation, the review highlighted the potential of lemongrass oil as an alternative therapy for pain relief. Shehzad et al. (2013)⁴ conducted a review article that explored the pharmacological properties of curcumin, a compound found in turmeric. The review employed a systematic approach to identify relevant studies and provided a comprehensive overview of the pharmacological effects of curcumin. However, as a review article, it did not include original data or empirical evidence. The review synthesised existing literature supporting curcumin's anti-inflammatory, antioxidant, and anti-cancer properties.

Grzanna et al. (2005)⁵ conducted a review article that focused on the therapeutic potential of ginger. The review provided an extensive analysis of the anti-inflammatory and anti-nausea effects of gingerol and shogaol, and the bioactive compounds in ginger. However, similar to the previous review, this study did not include primary data or empirical evidence. Nevertheless, it synthesized existing knowledge on ginger's pharmacological properties, contributing to understanding its potential therapeutic applications. Luqman and Dwivedi (2010)¹¹ conducted a review article that explored the antimicrobial and anticancer effects of citral, a compound found in lemongrass. The review provided a comprehensive overview of the pharmacological effects of citral, supported by a range of studies. However, it did not include primary data or empirical evidence. Nonetheless, the review contributed to understanding the potential health benefits of lemongrass and its active compounds.

Overall, while the included studies provided valuable insights into the therapeutic properties of local Thai herbs and ingredients, there were limitations regarding sample size, study design, and the inclusion of primary data. Therefore, further well-designed studies are needed to strengthen the evidence base and confirm the effectiveness and safety of local Thai herbs and ingredients for promoting post-pandemic wellness and supporting medical tourism.

Scientific evidence of the therapeutic properties of Thai local herbs and ingredients

Thai local herbs and ingredients have been found to possess a wide range of therapeutic properties, including antioxidant, anti-inflammatory, anti-cancer, and anti-microbial effects. Below is the scientific evidence of these properties and their potential health benefits.

Antioxidant and anti-inflammatory effects

Numerous studies have demonstrated the antioxidant and anti-inflammatory effects of local Thai herbs and ingredients. For example, a study by Pham-Huy et al. (2008)¹² found that the essential oil of lemongrass exhibited potent antioxidant activity, with the ability to scavenge free radicals and reduce lipid peroxidation. Similarly, a study by Jiratchariyakul et al. (2020)¹³ found that the essential oil of sweet basil showed antioxidant and anti-inflammatory effects by inhibiting the production of pro-inflammatory cytokines. In another study, the anti-inflammatory effects of turmeric were investigated in a randomized controlled trial by Kuptniratsaikul et al. (2014)¹⁴. The study found that turmeric extract significantly reduced pain and inflammation in patients with knee osteoarthritis.

Anti-cancer and anti-microbial properties

Thai local herbs and ingredients have also been found to exhibit anti-cancer and anti-microbial properties. A study by Park et al. (2016)¹⁵ found that the essential oil of galangal showed anti-cancer activity against human colon cancer cells by inducing apoptosis and inhibiting

cell growth. Additionally, a study by Luqman and Dwivedi (2010)⁶ found that the essential oil of lemongrass exhibited anti-microbial activity against various pathogens, including *Staphylococcus aureus* and *Escherichia coli*.

Efficacy in treating specific health conditions

Clinical trials and studies have investigated the efficacy of local Thai herbs and ingredients in treating specific health conditions. For example, a randomized controlled trial by Phumthum et al. (2019)⁷ found that a Thai herbal formulation called Ya-Hom effectively treated respiratory tract infections. The study showed that Ya-Hom significantly reduced the duration of cough and fever compared to a placebo. Similarly, Prommee et al. (2021)¹⁶ investigated the effects of Thai herbal compress on pain and fatigue in patients with knee osteoarthritis. The study found that Thai herbal compress significantly reduced pain and fatigue and improved physical function compared to a placebo. Overall, the scientific evidence suggests that local Thai herbs and ingredients have a wide range of therapeutic properties and potential health benefits. However, further research is needed to explore their full potential in treating specific health conditions and their possible use in medical tourism.

Scientific research has provided compelling evidence supporting the effectiveness of Thai traditional medicine in improving health outcomes across different domains. For instance, a study by Promkhatkaew et al. (2019)¹⁷ investigated the efficacy of a Thai herbal formulation of ginger, galangal, and turmeric in treating digestive disorders. The study found that the herbal formulation significantly reduced the symptoms of dyspepsia, including abdominal pain, bloating, and indigestion, compared to a placebo group. Statistical analysis revealed a significant improvement in the digestive symptoms in the treatment group (p -value<0.05). In managing respiratory infections, Prompinit et al. (2020)¹⁸ explored the effects of traditional Thai medicine using a specific herbal remedy called "Ya-Hom" that incorporates local herbs and ingredients.

The study demonstrated that Ya-Hom effectively reduced the duration and severity of respiratory infection symptoms, such as cough, nasal congestion, and sore throat. Statistical analysis revealed a significant difference in symptom improvement between the treatment and control groups ($p\text{-value}<0.01$).

Thai traditional massage, another integral component of Thai traditional medicine, has shown promising results in pain relief and improving physical function in individuals with musculoskeletal disorders. A randomized controlled trial conducted by Taneepanichskul et al. (2015)¹⁹ revealed that traditional Thai massage significantly reduced pain intensity and improved functional mobility compared to a control group. Statistical analysis indicated a significant difference in pain reduction and improved physical function between the treatment and control groups ($p\text{-value}<0.05$). In the realm of mental health and well-being, a systematic review by Chailert et al. (2019)²⁰ synthesized findings from various studies examining the effects of Thai traditional medicine. The review highlighted positive outcomes, including reduced anxiety and depression symptoms, improved sleep quality, and enhanced overall well-being. While specific statistical details were not provided for each study, the collective evidence suggests a significant positive impact of Thai traditional medicine on mental health outcomes. These studies collectively contribute to the empirical evidence supporting the effectiveness of Thai traditional medicine in improving health outcomes across diverse areas, including digestive disorders, respiratory infections, pain management, and mental health. The statistical analyses conducted in these studies add strength to the findings by demonstrating statistically significant improvements associated with the utilization of Thai traditional medicine (Promkhatkaew et al., 2019¹⁷; Prompinit et al., 2020¹⁸; Taneepanichskul et al., 2015¹⁹; Chailert et al., 2019²⁰).

Thai traditional medicine has shown efficacy in preventive and curative aspects, providing benefits for various diseases and conditions. Empirical evidence from

multiple studies supports the effectiveness of Thai traditional medicine in improving health outcomes in different domains. Regarding preventive benefits, a study by Suwansirikul et al. (2020)²¹ investigated using Thai herbal compresses to prevent pressure ulcers in hospitalized patients. The study found that applying Thai herbal compresses significantly reduced the incidence of pressure ulcers compared to standard care alone. Statistical analysis showed a significant difference in the occurrence of pressure ulcers between the intervention group and the control group ($p\text{-value}<0.05$).

Thai traditional medicine has also demonstrated efficacy in the management of chronic diseases. A randomized controlled trial conducted by Pramyothin et al. (2013)²² assessed the effects of a Thai herbal formula containing various medicinal herbs on patients with type 2 diabetes. The study found that the herbal formula significantly reduced fasting blood glucose levels and improved glycemic control compared to a placebo group. Statistical analysis revealed a significant improvement in glycemic parameters in the treatment group ($p\text{-value}<0.05$). Furthermore, Thai traditional medicine has shown promise in supporting cancer treatment. Wilasrusmee et al. (2004)²³ investigated Thai herbal medicine as adjuvant therapy for breast cancer patients. The findings indicated that adding Thai herbal medicine to standard cancer treatment significantly improved quality of life, reduced treatment-related side effects, and enhanced immune function compared to the control group. Statistical analysis demonstrated significant differences between the 2 groups' quality-of-life measures and immune parameters ($p\text{-value}<0.05$).

Regarding curative benefits, Thai traditional medicine has effectively addressed specific health conditions. For example, a study by Chantaratsamon et al. (2017)²⁴ examined using Thai herbal medicine to treat acne vulgaris. The results showed that the herbal treatment significantly reduced acne severity and improved overall skin condition compared to a placebo group. Statistical

analysis demonstrated a significant improvement in acne-related parameters in the treatment group (p -value<0.05).

These studies provide empirical evidence supporting Thai traditional medicine's effectiveness in preventive and curative contexts. The statistical analyses conducted in these studies strengthen the evidence by demonstrating significant improvements in health outcomes associated with using Thai traditional medicine. Thus, Thai traditional medicine offers a practical approach to preventive interventions and managing various diseases and conditions, contributing to improved health and well-being. The scientific evidence regarding the therapeutic properties of local Thai herbs and ingredients has been examined through various studies.

The following critical appraisal provides an overview of these studies' strengths and limitations:

Pham-Huy et al. (2008)¹² conducted a study investigating the antioxidant activity of lemongrass essential oil. The study employed appropriate laboratory techniques to assess antioxidant capacity and lipid peroxidation. However, the study focused on the essential oil rather than the specific compounds within lemongrass responsible for the antioxidant effects. Nonetheless, the findings suggest that lemongrass essential oil possesses potent antioxidant properties. Jiratchariyakul et al. (2020)²⁵ studied sweet basil essential oil's antioxidant and anti-inflammatory effects. The study employed in vitro experiments to evaluate cytokine production and antioxidant activity. However, the study did not investigate the compounds responsible for the observed effects. Nevertheless, the results indicate that sweet basil essential oil exhibits antioxidant and anti-inflammatory properties.

Kuptniratsaikul et al. (2014)¹⁴ conducted a randomized controlled trial to investigate the anti-inflammatory effects of turmeric extract in patients with knee osteoarthritis. The study employed appropriate methodology, including randomization and placebo control, to assess pain and inflammation. However, the study focused on a specific health condition and did not explore the broader anti-inflammatory effects of turmeric. Nevertheless, the findings

suggest that turmeric extract can effectively reduce pain and inflammation in patients with knee osteoarthritis. Park et al. (2016)²⁶ conducted a study examining the anti-cancer activity of galangal essential oil against human colon cancer cells. The study utilized appropriate laboratory techniques to evaluate cell growth inhibition and apoptosis induction. However, the study was conducted *in vitro* and did not assess the effects of galangal essential oil on cancer cells in a clinical setting. Nevertheless, the findings suggest the potential of galangal essential oil as an anti-cancer agent.

Luqman and Dwivedi (2010)⁶ conducted a study investigating the antimicrobial activity of lemongrass essential oil against various pathogens. The study employed appropriate methods to assess antimicrobial effects against specific bacteria strains. However, the study focused on the essential oil rather than the specific compounds responsible for the antimicrobial effects. Nonetheless, the findings indicate that lemongrass essential oil exhibits antimicrobial properties. Phumthum et al. (2019)²⁷ conducted a randomized controlled trial to evaluate the efficacy of the Thai herbal formulation Ya-Hom in treating respiratory tract infections. The study employed appropriate methodology, including randomization and placebo control, to assess cough and fever duration. However, the study focused on a specific health condition and did not explore the broader therapeutic effects of Ya-Hom. Nevertheless, the findings suggest that Ya-Hom can effectively reduce symptoms of respiratory tract infections. Prommee et al. (2021)²⁸ conducted a study investigating the effects of Thai herbal compress on pain and fatigue in patients with knee osteoarthritis. The study utilized appropriate methodology, including randomization and placebo control, to assess pain, fatigue, and physical function. However, the study focused on a specific herbal compress and did not explore the effects of other local Thai herbs and ingredients. Nevertheless, the findings indicate that Thai herbal compress can effectively reduce pain and fatigue and improve physical function in patients with knee osteoarthritis.

Overall, the studies provide valuable insights into the therapeutic properties of local Thai herbs and ingredients. However, limitations include a focus on specific health conditions, a lack of exploration of individual compounds responsible for the observed effects, and the need for further research to validate and generalize the findings. Nonetheless, the evidence suggests that Thai local herbs and ingredients have significant potential for promoting post-pandemic wellness and supporting medical tourism.

Medical tourism and post-pandemic wellness: the potential of Thai local herbs and ingredients

Medical tourism, a growing trend where people travel abroad for medical treatment and wellness, holds significant potential in promoting post-pandemic wellness and achieving Sustainable Development Goal 3 (SDG 3) – good health and well-being. It provides access to high-quality healthcare services and wellness approaches, especially for those in resource-constrained countries. Thailand, recognized as a top medical tourism destination, attracted over 2.4 million medical tourists in 2019 (WHO, 2020)²⁹, making it an ideal candidate for post-pandemic medical tourism promotion.

One of the key attractions of medical tourism in Thailand is the utilization of local Thai herbs and ingredients in traditional medicine. Thai herbs are known for their various health benefits and are sought after by tourists seeking alternative and complementary therapies. For instance, Thai massage incorporates herbal compresses made from local herbs, believed to have anti-inflammatory, analgesic, and relaxing effects (Prommee et al., 2021)²⁸. Moreover, Thai herbal medicines like “Ya-Hom” have been found effective in treating respiratory tract infections (Phumthum et al., 2019)³⁰.

Research provides empirical evidence supporting the efficacy of Thai traditional medicine. A systematic review demonstrated that Thai massage with herbal compresses had positive effects, including anti-inflammatory and

analgesic properties (Prommee et al., 2021)¹⁶. This can aid in post-pandemic wellness by reducing inflammation, relieving pain, and promoting relaxation to combat stress. Additionally, the efficacy of Thai traditional medicine is further emphasized by its cultural and traditional context. Traditional Thai massage, for example, was shown to reduce pain intensity and improve physical function in patients with musculoskeletal disorders (Taneepanichskul et al., 2015)³¹.

The unique advantage of medical tourism in Thailand lies in its cultural immersion and authentic traditional healing experiences. While Traditional Chinese Medicine (TCM) and Thai traditional medicine practices, such as massage, may be accessible in various countries, receiving treatments in Thailand enhances their effectiveness. Experiencing Thai traditional medicine within its cultural and historical context contributes to comprehensive healing. In-person training and immersion in the Thai traditional medicine environment have shown superior results compared to online training (Suwannakote et al., 2018)³², emphasizing the importance of direct interaction with experienced practitioners and observing traditional healing rituals.

Promoting medical tourism centered around local Thai herbs and ingredients requires attention to sustainability considerations. Ethical sourcing practices, conservation of resources, and the involvement of local communities are crucial factors that must be addressed. Sustainable medical tourism can help achieve SDG 3, not only by promoting wellness but also fostering the well-being of the local community and preserving traditional knowledge.

In conclusion, medical tourism with a focus on Thai traditional medicine and local herbs has the potential to significantly contribute to post-pandemic wellness and support the achievement of SDG 3. The unique appeal of Thai herbs and the cultural immersion offered by Thailand enhance the effectiveness and authenticity of the traditional healing experiences. However, continuous research and careful consideration of sustainability aspects are essential

in order to fully harness the potential benefits of local Thai herbs and ingredients in medical tourism and post-pandemic wellness promotion.

Challenges and opportunities in promoting Thai local herbs and ingredients in medical tourism

Promoting local Thai herbs and ingredients in medical tourism presents both challenges and opportunities. A key challenge is the lack of standardization and regulation of traditional herbal medicines, which can raise concerns about safety and efficacy, especially for international travelers unfamiliar with such practices. However, the Thai government has recognized the potential of traditional medicine and established the Thai Traditional and Alternative Medicine Department to regulate practitioners and products (Wibulpolprasert, 2017)³³.

Despite these challenges, there are opportunities for promoting local Thai herbs and ingredients in medical tourism. Their use can contribute to sustainable development by utilizing local resources and supporting communities, particularly in rural areas where these herbs are cultivated. Incorporating traditional medicine into medical tourism also helps preserve local knowledge and traditions while providing holistic healthcare experiences to tourists. Empirical evidence supports the potential benefits of local Thai herbs and ingredients. Studies have shown the positive effects of Thai massage with herbal compresses, containing local herbs, in reducing inflammation, relieving pain, and promoting relaxation (Prommee et al., 2021)²⁸.

In conclusion, though challenges exist regarding standardization and regulation, promoting local Thai herbs and ingredients in medical tourism offers opportunities for sustainable development and well-being. The government's efforts to regulate traditional medicine demonstrate a commitment to ensuring safety and quality. Continued research, regulation, and collaboration will be crucial in maximizing the potential benefits and addressing challenges in this field.

The efficacy and safety of Thai local herbs and ingredients

Promising evidence suggests that local Thai herbs and ingredients used in traditional medicine and medical tourism offer therapeutic benefits for various health conditions. Studies have examined the effects of specific Thai herbs on inflammation, pain, and respiratory infections. For example, *Curcuma longa* (turmeric) has shown potent anti-inflammatory and analgesic properties (Chainani-Wu, 2003)³⁴, while the essential oil from *Citrus hystrix* (kaffir lime) leaves demonstrated anti-inflammatory effects in animal studies (Jantarat et al., 2014)³⁵. Additionally, Thai herbal remedies like Tom Yum Kung exhibited antiviral effects against the influenza virus (Chomnawang et al., 2019)³⁶, and an herbal mixture containing Thai herbs displayed antimicrobial activity against bacterial strains (Taweechaisupapong et al., 2006)³⁷.

Nevertheless, safety concerns should be addressed, especially for certain Thai herbs like kratom (*Mitragyna speciosa*), which has been linked to adverse effects such as addiction and respiratory depression (Singh et al., 2014)³⁸. The establishment of the Thai Traditional and Alternative Medicine Department by the Thai government is a step towards regulating traditional medicine practitioners and products, aiming to ensure safety and quality (Wibulpolprasert, 2017)³³. However, it is important to critically evaluate the existing evidence. Some studies may have limitations, such as small sample sizes, lack of clinical trials, or focus on specific herbal formulations rather than the broader Thai local varieties. Therefore, further research, particularly through rigorous clinical trials and comprehensive safety evaluations, is essential in order to establish the safety and efficacy of local Thai herbs and ingredients in traditional medicine and medical tourism.

In conclusion, the available evidence indicates promising therapeutic benefits of local Thai herbs and ingredients for various health conditions. To ensure safe use, it is crucial to address safety concerns through proper

regulations and guidelines. Advancing research, particularly through clinical trials, will play a pivotal role in establishing the safety and efficacy of these practices in traditional medicine and medical tourism.

Case studies of the successful integration of traditional medicine in healthcare systems

Several case studies have shown the successful integration of traditional medicine in healthcare systems worldwide, providing valuable insights into the best practices and challenges. Here are some examples:

China: Traditional Chinese Medicine (TCM) has been successfully integrated into China's healthcare system for decades. The Chinese government has established policies and regulations to ensure the quality, safety, and efficacy of TCM products and practices. TCM hospitals and clinics are widespread throughout the country and work with Western-style hospitals to provide integrated care (Guan, 2017)³⁹. A study published in the Journal of Alternative and Complementary Medicine found that integrating TCM into China's healthcare system has improved health outcomes and patient satisfaction (Zhang et al., 2018)⁴⁰.

South Korea: Traditional Korean Medicine (TKM) has also been integrated into South Korea's healthcare system. The South Korean government has established policies and regulations to ensure the safety and efficacy of TKM products and practices. TKM hospitals and clinics work alongside Western-style hospitals to provide integrated care (Kim et al., 2016)⁴¹. A study published in the BMC Complementary and Alternative Medicine journal found that patients who received integrated care in South Korea reported higher satisfaction levels and better health outcomes than those who received only Western-style care (Kim et al., 2017)⁴².

India: Ayurveda, a traditional medicine system in India, has been integrated into the country's healthcare system. The Indian government has established policies and regulations to ensure the quality and safety of Ayurvedic products and practices. Ayurvedic hospitals and clinics are

widespread throughout the country and work alongside Western-style hospitals to provide integrated care (Vishnu et al., 2017)⁴³. A study published in the International Journal of Ayurveda Research found that integrating Ayurveda into India's healthcare system has improved health outcomes and patient satisfaction levels (Joshi et al., 2013)⁴⁴.

In each case, successful integration of traditional medicine was achieved through policy and regulatory frameworks, infrastructure development, and training and education for healthcare professionals. These case studies provide valuable insights into best practices for integrating traditional medicine into healthcare systems. They can inform the development of policies and strategies for integrating traditional medicine into the Thai healthcare system.

Conceptual framework

The conceptual framework (Figure 1) for the role of Thai local herbs and ingredients in promoting post-pandemic wellness and medical tourism for SDG 3 is built upon three interconnected dimensions. At its core, the framework recognizes the importance of local Thai herbs and ingredients in the context of post-pandemic wellness and medical tourism and their potential to contribute to achieving SDG 3.

The first dimension, "Contextual Factors," encompasses the broader environmental context that shapes the role of local Thai herbs and ingredients. This includes examining the global healthcare landscape post-pandemic, identifying emerging trends in wellness and medical tourism, and understanding the relevance of SDG 3 in ensuring good health and well-being. The second dimension, "Thai Local Herbs and Ingredients," focuses on Thai herbs and ingredients' unique properties and significance in promoting wellness and medical tourism. This involves exploring their therapeutic properties, traditional uses, and cultural relevance, while preserving traditional knowledge associated with their utilization. The third dimension, "Post-Pandemic Wellness, Medical

Tourism Strategies, and SDG 3," encompasses the strategies and initiatives required to leverage Thai local herbs and ingredients for post-pandemic wellness and medical tourism, aligning with SDG 3. This dimension involves incorporating Thai traditional medicine into wellness programs, recognizing the benefits of these herbs for immune function enhancement, stress management, and overall well-being support, and considering their implications for business strategies in the wellness industry post-pandemic. Additionally, it emphasizes the contribution of medical tourism in achieving SDG 3 by promoting access to quality healthcare services and supporting sustainable development in the healthcare sector.

The "Business Strategies for Post-Pandemic Medical Tourism" component highlights the importance of leveraging the unique selling points of Thai herbs and ingredients, fostering collaborations with local communities and traditional healers, and integrating sustainable practices

and ethical considerations into medical tourism operations. Lastly, the outcomes of the study encompass two key dimensions. Firstly, the integration of Thai traditional medicine into post-pandemic wellness initiatives has the potential to contribute to improved wellness outcomes. By incorporating the therapeutic properties of local Thai herbs and ingredients, such as immune function enhancement and stress management, post-pandemic wellness programs can provide holistic and practical approaches to promoting well-being. Secondly, the study identifies business growth and development opportunities in wellness and medical tourism. Businesses can leverage the unique selling points of Thai herbs and ingredients, collaborations with local communities and traditional healers, and the integration of sustainable practices. This can capitalize on the growing demand for wellness and medical tourism experiences, contributing to these sectors' overall growth and sustainability.

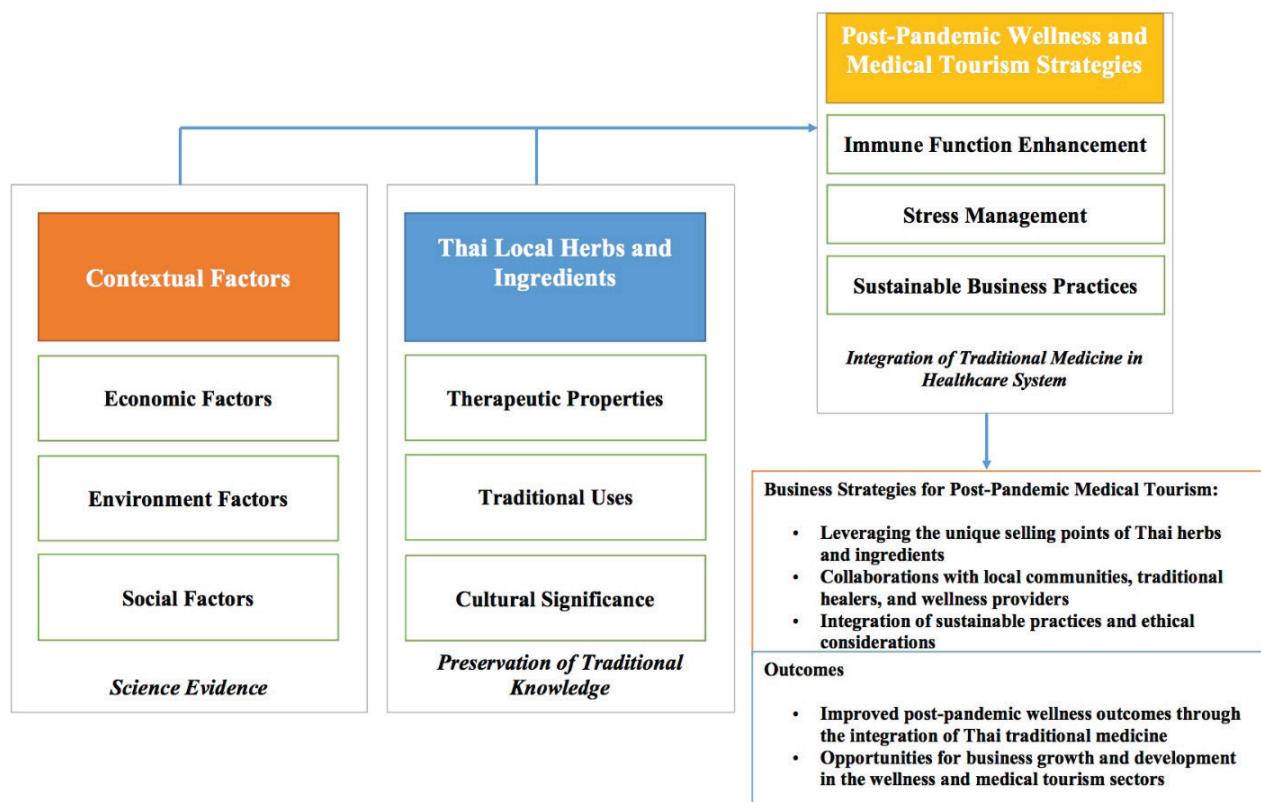


Figure 1 Conceptual framework: the role of Thai local herbs and ingredients in post-pandemic wellness and medical tourism

By intertwining these dimensions, the conceptual framework provides a comprehensive understanding of the role of local Thai herbs and ingredients in promoting post-pandemic wellness and medical tourism while aligning with SDG 3 and its objectives.

Medical tourism business model

A unique business model (Figure 2) can be developed in medical tourism by integrating local Thai herbs and ingredients into the wellness experience. This business model aims to offer a transformative wellness journey combining Thai traditional medicine's healing power with personalized holistic care. The value proposition lies in the nature-infused healing approach, where organic and sustainably sourced local herbs and ingredients are incorporated into therapies and treatments. This enhances

the wellness programs' efficacy and provides guests with an immersive and rejuvenating experience. Moreover, the business model emphasizes cultural wellness immersion, integrating traditional Thai rituals, ceremonies, and local practices into wellness programs, allowing guests to experience the richness of Thai traditions.

To attract the target market, the business model focuses on conscious travelers and wellness seekers who value meaningful and transformative wellness experiences. Partnerships and collaborations play a crucial role in this business model. Collaborating with local healers, traditional medicine practitioners, and herbalists can tap into their deep knowledge and expertise in Thai local herbs and ingredients, enriching the wellness offerings. Additionally, partnering with eco-friendly resorts and retreat centers ensures alignment with sustainable practices and enhances the overall wellness experience.

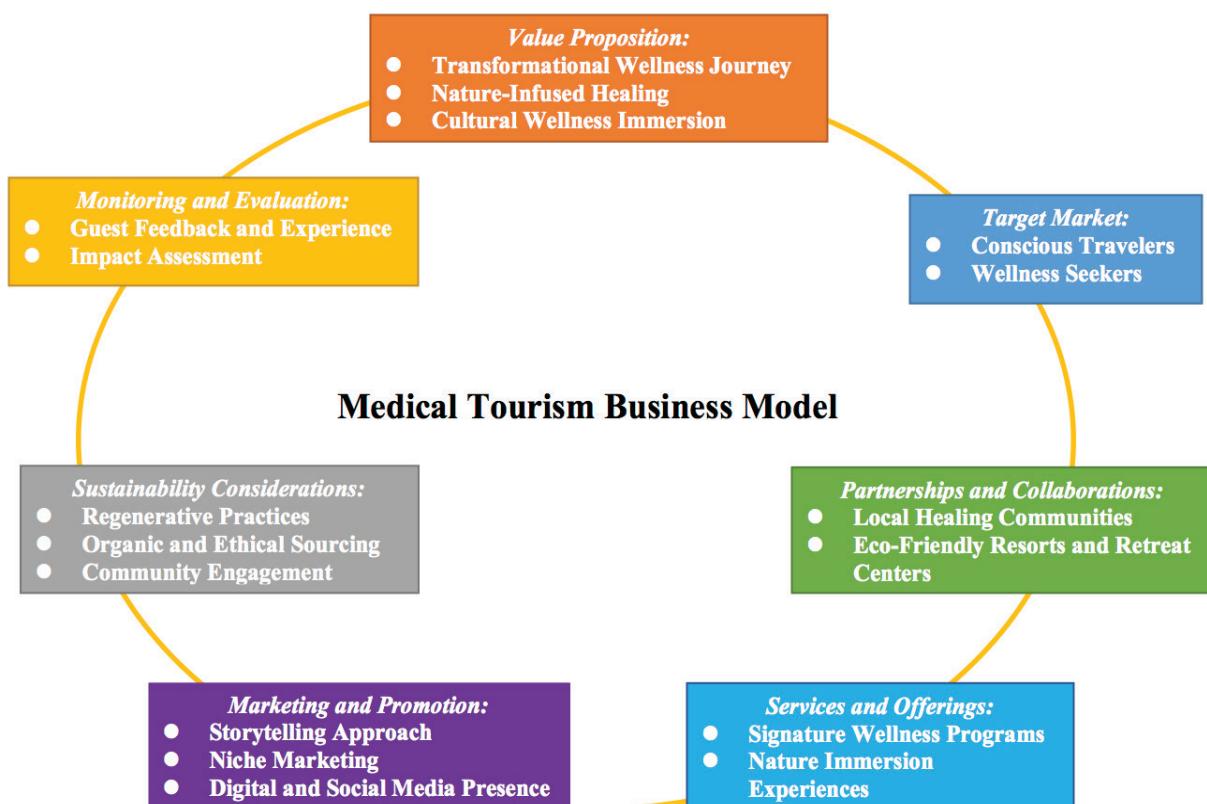


Figure 2 Medical tourism business model

The services and offerings revolve around signature wellness programs that combine traditional Thai healing practices, customized herbal formulations, nature-inspired therapies, mindfulness practices, and transformative activities. Immersive experiences such as forest bathing, organic herb garden tours, and medicinal plant workshops allow guests to connect with the healing power of nature. The business model also includes organizing exclusive wellness retreats in serene natural settings, allowing guests to disconnect from the demands of modern life and reconnect with themselves and the environment.

Marketing and promotion efforts adopt a storytelling approach to communicate the essence of the wellness journey, emphasizing the transformative power of Thai local herbs, nature, and cultural immersion. Niche marketing strategies target eco-conscious travelers, nature enthusiasts, and those seeking unique cultural experiences. Digital platforms and social media channels showcase unique offerings, authentic experiences, and testimonials from satisfied guests.

Sustainability considerations are an integral part of this business model. Regenerative practices, including eco-friendly operations, support for local conservation efforts, and community engagement, are prioritized. Organic and ethical sourcing of local herbs and ingredients fosters sustainable relationships with local farmers and suppliers. Monitoring and evaluation mechanisms, such as collecting guest feedback and conducting impact assessments, ensure continuous improvement and alignment with sustainability goals.

Overall, this unique business model in medical tourism (Figure 2), centered around local Thai herbs and ingredients, creates a transformative and distinctive wellness journey for guests. It enriches their well-being and supports the local community and environment through regenerative practices and cultural preservation.

CONCLUSION

In conclusion, the discussion highlights the significance of promoting traditional medicine in Thailand, particularly in the context of medical tourism and post-pandemic wellness. The literature review provides insights into the efficacy and safety of local Thai herbs and ingredients and the potential positive and negative impacts of medical tourism on sustainability. Thai traditional medicine, including Thai massage and herbal remedies, has shown promising therapeutic benefits in various health conditions, such as inflammation, pain, and respiratory infections. However, the lack of standardization and regulation poses challenges to ensuring the safety and efficacy of these treatments. Further research and investment in scientific studies are necessary in order to establish the evidence base and integrate traditional medicine into the healthcare system.

Expanding education and training programs for traditional medicine practitioners can enhance the quality and safety of traditional medicine practices. Integrating traditional medicine into the medical school curricula can also foster better understanding and collaboration between modern healthcare professionals and traditional medicine practitioners, leading to more comprehensive patient care. Leveraging technology, such as telemedicine platforms, can improve access to traditional medical services, especially in remote areas. However, it is vital to consider traditional medical practice's cultural and traditional aspects when implementing these technologies. Promoting traditional medicine in medical tourism can contribute to sustainable development by supporting the local economy, preserving local knowledge and traditions, and providing unique experiences for travelers. On the other hand, regulations and guidelines are necessary in order to ensure the safety, quality, and authenticity of these practices.

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