การศึกษาความรอบรู้ด้านสุขภาพเกี่ยวกับกัญชาในประชากรไทย ที่มีและไม่มีประสบการณ์ในการใช้กัญชา
A Study to Assess Cannabis Health Literacy Among Thai People with and without Cannabis Use Experience

นิพนธ์ต้นฉบับ **Original Article**

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บทคัดย่อ

วัตถุประสงค์: วิเคราะห์ความสัมพันธ์ระหว่างระดับความรอบรู้ด้านสุขภาพเกี่ยวกับกัญชากับประสบการณ์การใช้กัญชาในบริบททางการแพทย์และไม่ใช่ทางการแพทย์ **วิธีการศึกษา:** การศึกษาระหว่างสิงหาคม 2565 ถึงเมษายน 2566 ในคนไทยอายุ 20 ปีขึ้นไป นำกรอบแนวคิดด้านความรอบรู้ด้านสุขภาพของ Nutbeam ผสานกับมิติที่กำหนดโดยกองสุขศึกษา กระทรวงสาธารณสุข รวบรวมข้อมูลโดยแบบสอบถามแบบที่ผ่านการตรวจสอบความตรง ครอบคลุม 5 มิติ ได้แก่ 1-การเข้าถึงข้อมูล 2-การสื่อสารกับผู้ให้บริการด้านสุขภาพ 3-การตัดสินใจและการประเมินข้อมูล 4-การแบ่งปันข้อมูล และ 5-ทัศนคติต่อการใช้กัญชา วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและการทดสอบค่าทีแบบอิสระ **ผลการศึกษา:** ในผู้ร่วมการศึกษา 478 รายเป็นผู้ที่มีประสบการณ์การใช้กัญชา 233 คน (48.74%) และที่เหลือไม่มีประสบการณ์ (245 คน, 51.26%) กลุ่มที่เคยใช้กัญชามีคะแนนเฉลี่ยด้านความรอบรู้เกี่ยวกับกัญชาโดยรวมสูงกว่ากลุ่มที่ไม่เคยใช้อย่างมีนัยสำคัญทางสถิติ (ค่าเฉลี่ย = 82.33 ± 11.01 และ 76.11 ± 13.60 คะแนน ตามลำดับ) และรายด้าน คือ ความสามารถในการเข้าถึงข้อมูล (ค่าเฉลี่ย = 19.21 ± 4.14 และ 15.47 ± 4.35 คะแนน ตามลำดับ) การสื่อสารกับผู้ให้บริการสุขภาพ (ค่าเฉลี่ย = 14.02 ± 3.73 และ 12.21 ± 3.89 คะแนน ตามลำดับ) การตัดสินใจ (20.35 ± 3.87 และ 19.57 ± 4.36 คะแนน ตามลำดับ) และการแบ่งปันข้อมูล (7.28 ± 2.36 และ 5.88 ± 2.36 คะแนน ตามลำดับ) (P-value < 0.001 ทั้งหมด) ทั้งสองกลุ่มมีทัศนคติสนับสนุนอย่างชัดเจนต่อการควบคุมกัญชาและการให้ความรู้สาธารณะ **สรุป:** ควรมีโปรแกรมส่งเสริมความรอบรู้ด้านสุขภาพที่เหมาะกับลักษณะเฉพาะและความต้องการด้านข้อมูลของประชากรตามประสบการณ์การใช้กัญชา

คำสำคัญ: ความรอบรู้ด้านสุขภาพ; กัญชา; ประสบการณ์การใช้กัญชา; คนไทย

Abstract

Objective: To determine relationships between levels of cannabis-related health literacy and cannabis use experience both in medical and non-medical contexts. **Method:** The study was conducted between August 2022 and April 2023 with Thai citizens aged 20 years and older. The study applied Nutbeam's health literacy framework, integrated with the dimensions proposed by the Health Education Division, Ministry of Public Health, Thailand. Data were collected using a validated questionnaire covering four dimensions 1-access to information, 2-communication with healthcare providers, 3-decision-making and evaluation, 4-information sharing, and 5-attitudes toward cannabis use. Analyses included descriptive statistics and independent t-tests. **Results:** Of the 478 participants, 48.74% reported cannabis use experience while the rest reported none (51.26%). Experienced users had significantly higher scores of overall cannabis-related health literacy than non-users (mean = 82.33 ± 11.01 and 76.11 ± 13.60 points, respectively), and specific domains of information access (mean = 19.21 ± 4.14 and 15.47 ± 4.35 points, respectively), communication with healthcare providers (mean = 14.02 ± 3.73 and 12.21 ± 3.89 points, respectively), decision making (20.35 ± 3.87 and 19.57 ± 4.36 points, respectively), and information sharing ((7.28 ± 2.36 and 5.88 ± 2.36 points, respectively) (P-value < 0.001 for all). For attitude, both groups expressed strong support for cannabis regulation and public education efforts. **Conclusion:** Health literacy program should be promoted to address the unique characteristics and informational needs of different population segments based on their cannabis use experience.

Keywords: health literacy; cannabis; cannabis use experience; Thais

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Introduction

Cannabis has a long-standing history of utilization in Thai society, encompassing traditional Thai medicine, culinary applications, and ceremonial practices.[1] Under the Narcotics Act B.E. 2522 (1979), cannabis was strictly regulated as a Category 5 narcotic substance, rendering its possession, cultivation, or utilization illegal. A significant legislative amendment in 2019 permitted the use of cannabis for medical and research purposes.[2] Subsequently, on June 9, 2022,

cannabis was completely delisted from Category 5 narcotics[3], marking a pivotal moment in Thailand's cannabis history.

This policy transformation has generated widespread implications for Thai society across economic, social, and public health dimensions. The decriminalization of cannabis has created opportunities for diverse applications, including the development of medical products, integration into the food and beverage industry, and recreational use. However, insufficient knowledge and understanding regarding proper cannabis use has led to several significant concerns, particularly overdose incidents and inappropriate consumption patterns.

Reports from three hospitals under the Department of Medical Services, including Rajavithi Hospital, Lerdsin Hospital, and Nopparat Rajathanee Hospital, documented nine cases of cannabis-related adverse effects within just nine days following decriminalization.[4] The observed symptoms varied in nature and severity, encompassing cardiovascular effects such as tachycardia and blood pressure instability, neurological manifestations including dizziness, confusion, and hallucinations, and gastrointestinal symptoms such as nausea and vomiting. Furthermore, data from the Ramathibodi Poison Center revealed fourteen patients, ranging in age from 13 to 79 years, who experienced cannabis-related adverse effects during the first-week post-decriminalization. The majority were first-time users who had consumed cannabis through edibles and cannabis-infused beverages.[5]

This situation underscores the urgent necessity of developing cannabis-related health literacy among the public. Health literacy, a fundamental concept promoted by the World Health Organization, has been established as a crucial strategy for improving public health outcomes. This framework emphasizes the development of individual capacities to access, comprehend, evaluate, and utilize health information for appropriate decision-making.[6,7] In the context of cannabis use, health literacy plays a vital role in facilitating safe and effective cannabis consumption decisions. This encompasses multiple dimensions specifically accessing reliable information, evaluating information credibility, communicating effectively with healthcare providers, and making evidence-based decisions regarding cannabis use.

A comprehensive review of relevant literature reveals several significant studies examining cannabis knowledge and attitudes across various regions of Thailand. Research conducted in Bangkok demonstrated moderate levels of cannabis knowledge and attitudes among the population.[8] Studies from the northern region indicated that most of the population possessed limited cannabis knowledge.[9] In contrast, research from the northeastern region revealed high levels of cannabis knowledge among the population.[10] Similarly, divergent findings emerged from the southern region, where investigations showed low levels of cannabis knowledge among the population.[11] These regional variations in cannabis knowledge levels highlight the importance of considering geographical and cultural factors in understanding public cannabis literacy across Thailand.

However, there is a notable absence of research comparing cannabis-related health literacy levels between individuals with and without cannabis use experience. Understanding these differences is crucial for developing tailored health literacy promotion strategies appropriate for different population groups. Therefore, this present study aimed to compare cannabis-related health literacy levels between populations with and without cannabis use experience, utilizing Nutbeam's health literacy framework[12] in conjunction with the health literacy components established by the Division of Health Education, Department of Health Service Support of Thailand.

The findings of this study will have significant implications for developing policies and measures promoting safe cannabis use, designing health literacy enhancement programs that address the needs of diverse population groups, and establishing effective cannabis education and counseling systems. Furthermore, these results will provide essential baseline data for future research initiatives focusing on health literacy development related to cannabis and other substances of concern. This study aimed to assess cannabis-related health literacy among Thai people by comparing individuals with and without cannabis use experience.

In developing the research instrument, the researchers constructed a questionnaire to assess cannabis-related health literacy by integrating Nutbeam's Health Literacy theoretical framework[12] with the health literacy components established by the Division of Health Education, Department of Health Service Support, Ministry of Public Health of Thailand. This integrated framework, a significant contribution to the field, encompasses five dimensions namely the ability to access health information and services, knowledge and

understanding, communication skills, decision-making skills, self-awareness, and media literacy. This study aimed to determine the relationship between levels of cannabis-related health literacy as dependent variable and cannabis use experience both in medical and non-medical contexts (i.e., the independent variable of having and not having used the cannabis). Accordingly, it was hypothesized that there was a difference in overall cannabis-related health literacy scores between individuals with cannabis use experience and those without.

Methods

This cross-sectional survey study was conducted between August 2022 and April 2023. The study population consisted of residents in Thailand. The sample size was calculated using W.G. Cochran's formula (1963). With a proportion of the population of interest of 0.52[13], a confidence level of 95% and a sampling error of 5% (i.e., precision of 95%), a total of 384 participants were required. To ensure comprehensive population coverage, the researchers added a 20% contingency, resulting in a final target sample size of 460 participants. Convenience sampling was employed for participant recruitment. Data collection was conducted through various channels, including hospitals, general population surveys, field data collection at Khaosan Road and Silom Road in Bangkok, and online distribution via Google Forms.

To be eligible, the prospective participants had to be 20 years old or older, have Thai nationality and residency in Thailand, be able to read, listen, and write in Thai, and provide voluntary consent to participate in the study. Participants with Incomplete survey responses were excluded from analysis.

Research instrument

The research instrument was a multiple-choice questionnaire with three sections as follows. The **first section** collected the participant's demographic characteristic information including age, gender, religion, education level, monthly income, occupation, and area of residence. The **second section** asked the participant about the use of cannabis which was defined as having ever used cannabis in any form or context, including medical use, culinary use (food and beverages), recreational purposes, or commercial use.

Questions in the **third section** assessed cannabis-related health literacy with **five domains** namely information access, healthcare communication, decision-making, attitudes toward cannabis use, and information sharing.

In **the first part of health literacy**, 6 items assessed **information access** which was the participants' self-perceived ability to locate cannabis-related information through various sources, including printed media, broadcast media, online platforms, social networks, and healthcare professionals. A sample item was "I can search for cannabis-related information from the internet." The response was a 5-point rating scale of 1-never, 2-rarely, 3-sometimes, 4-often, and 5-always.

In the domain of information access, the six items could be categorized into three specific constructs, with two items each namely 1-Internet access referred to the ability to search for cannabis-related information via official or institutional websites and digital platforms, 2-Social network access captured passive or informal acquisition of information via social media feeds and interpersonal sharing, and 3-Independent seeking ability assessed the respondent's self-efficacy and autonomy in proactively searching and interpreting cannabis-related information without reliance on others.

The second part of health literacy contained 4 items assessing participants' **communication skills in cannabis-related discussions** with healthcare providers. Items evaluated confidence in asking questions, expressing concerns, and engaging in cannabis-related consultations. A sample item was "I feel confident discussing cannabis-related concerns with my doctor or pharmacist." The response was a 5-point Likert-type rating scale ranging from 1-strongly disagree, to 5-strongly agree.

The third part of health literacy consisted of 7 items assessing participants' **ability to critically evaluate information and make informed decisions regarding cannabis products**. Items included evaluations of media advertisements, fact-checking behavior, and willingness to purchase based on promotional content. Some items were scenario-based. A sample item was "I verify the credibility of cannabis product advertisements before making a decision." The response was a 5-point rating scale on frequency (i.e., 1-rarely to 5-always) or agreement (i.e., 1-least agree to 5-most agree), depending on item structure.

The fourth part of health literacy consisted of 6 items assessing participants' **attitudes toward cannabis use** including cannabis decriminalization, recreational use, legal regulation, and public education. A sample item was "I agree that cannabis should be legalized for recreational purposes." The response was a 5-point Likert-like rating scale ranging from 1-strongly disagree to 5-strongly agree.

The **last part of health literacy** consisted of 2 items assessing participants' **responsible information dissemination**. Items focused on verifying the accuracy of cannabis-related information before sharing and ensuring comprehension of such content. A sample item was "I verify cannabis-related information before sharing it with others or posting online." The response was a 5-point Likert-type rating scale ranging from 1-never to 5-always.

In this study, cannabis-related health literacy was categorized into three levels—poor, moderate, and excellent—based on percentage scores derived from the total possible points in each domain. The classification thresholds (i.e., < 60%, 60 – 79%, and ≥ 80%) were adopted from the national framework on health literacy issued by the Division of Health Education, Department of Health Service Support, Ministry of Public Health, Thailand.[14] This guideline is routinely used in national health literacy surveillance and educational interventions.

The definitions of levels of cannabis-related health literacy were as followed. For poor literacy (< 60%), it reflects insufficient functional literacy, particularly in critical decision-making and information navigation, despite some item-level scores exceeding 50%. Moderate literacy (60 – 79%) indicates adequate literacy for most practical applications but still leaves room for improvement, especially in information credibility assessment. Finally, excellent literacy (≥ 80%) represents a high level of comprehensive understanding and autonomous application of health information.

Research instrument quality assurance

Content validity of the questionnaire was assessed using the Index of Item-Objective Congruence (IOC) method. Four individuals with expertise in cannabis policy, health education, and health literacy independently reviewed each item for alignment with the study's objectives. The IOC scores for individual items ranged from 0.75 to 1.00, with an average validity index of 0.90. This indicates a high level of congruence between the questionnaire items and the intended objectives. The highest IOC scores were observed in the items related to cannabis-related health literacy, particularly in the domains of information access and critical decision-making. All items with IOC scores below 0.75 were revised or removed during pretesting to ensure clarity and relevance.

Internal consistency reliability was assessed using Cronbach's alpha coefficient based on data obtained from a pilot study involving 30 individual with characteristics comparable with the participant with diverse cannabis use experiences. Overall Cronbach's alpha coefficient for the entire questionnaire was 0.83, indicating good internal consistency reliability.

Data collection process

Data were collected from August 2022 to April 2023 using a mixed-mode approach, combining both online and on-site survey administration. This strategy was designed to enhance sample diversity and maximize participation across different sociodemographic groups in Thailand.

On-site data collection was conducted primarily in Bangkok, a highly populated urban center with a diverse population. Field surveys were implemented at two public venues—Khaosan Road and Silom Road—both of which are known for attracting a mix of residents, tourists, vendors, and service workers. These sites were strategically selected to capture a broad spectrum of adult participants with varying degrees of cannabis use experience. Trained field researchers administered the paper-based version of the questionnaire and provided real-time clarification to participants when needed. The on-site collection occurred on weekends and public holidays during peak pedestrian traffic hours to maximize participant reach.

Online data collection was conducted concurrently using Google Forms™, disseminated through public health networks, academic institutions, and targeted social media platforms (e.g., Facebook™ pages of local health organizations, community groups, and university-affiliated pages). The online platform ensured accessibility for participants residing outside Bangkok and in more rural areas, who may not have been reachable through physical surveys. The form included an informed consent statement on the first page, and the survey was designed for compatibility with both desktop and mobile devices.

To enhance representativeness and mitigate selection bias, researchers applied a purposive outreach strategy. For the on-site portion, they ensured variation by alternating collection days and times. For the online portion, targeted postings were scheduled to reach diverse occupational groups (e.g., healthcare workers, students, and entrepreneurs). The mixed-mode approach allowed the research team to achieve the target sample size (N = 478) with an acceptable demographic distribution across age, gender, occupation, and income level (as shown in Table 2).

All participants were provided with clear instructions regarding the voluntary nature of participation and anonymity. Participants under the age of 20 were screened out via age verification at the beginning of the survey. Incomplete responses were excluded from the final analysis.

Participants ethical protection

The study was approved by the Ethic Committee for Human Study of Siam University (approval number: COA.No. SIAMPY-IRB 2023/007). All participants were informed of the voluntary nature of the study.

Data analysis

Descriptive statistics including mean with standard deviation and frequency with percentage were used to summarize the demographic characteristics of the participants and responses to health literacy and attitude items. Mean scores of overall and individual domains of health literacy between groups with and without cannabis use experience were compared using independent t-test. Statistical significance was set a type I error of 5%. All statistical analyses were performed using SPSS version 29.

Results

Of the 493 participants approached for the survey, two prospective participants declined to participate, and thirteen participants were under 20 years old, failing to meet the inclusion criteria. Consequently, the final analysis included 478 eligible participants with complete responses.

Majority of the participants were female (60.25%), in their 51 – 60 years of age (32.85%), Buddhist (96.65%), and residing in Bangkok (60.04%). Most participants reported monthly income below 5,000 baht (39.12%), had completed high school or vocational certificate (24.27%), and worked as village health volunteers (28.66%) (Table 1).

Of the 478 participants, 233 of them reported having experience with cannabis use (48.74%). Medical purposes represented the most common use (119 participants, 24.90%), followed by food and beverage preparation (73 participants, 15.27%), recreational use (32 participants, 6.69%), and commercial purposes (9 participants, 1.88%) (Table 2).

Table 1 Demographic characteristics of study participants (N = 478).

Characteristics	N (%)
Gender	
Female	288 (60.25)
Male	187 (39.12)
Other	3 (0.63)
Age (years)	
20	3 (0.63)
21 - 30	62 (12.97)
31 - 40	64 (13.39)
41 - 50	128 (26.78)
51 - 60	157 (32.85)
> 60	64 (13.39)
Monthly Income (Thai Baht)	
< 5,000	187 (39.12)
5,001 - 10,000	112 (23.43)
10,001 - 15,000	49 (10.25)
15,001 - 30,000	55 (11.51)
30,001 - 50,000	31 (6.49)
> 50,000	44 (9.21)
Education Level	
Below primary school	13 (2.72)
Primary school	102 (21.34)
Lower secondary school	71 (14.85)
Upper secondary school/Vocational certificate	116 (24.27)
Diploma/Higher vocational certificate	27 (5.65)
Bachelor's degree	111 (23.22)
Higher than bachelor's degree	35 (7.32)
Not specified	3 (0.63)
Occupation	
Village health volunteer	137 (28.66)
Farmer	133 (27.82)
Government officer/State enterprise employee	50 (10.46)
Merchant/Business owner	36 (7.53)
General contractor	31 (6.49)
Healthcare personnel	25 (5.23)
Company employee	19 (3.97)
Student	18 (3.77)
Others	13 (2.72)
Unemployed	11 (2.30)
Not specified	5 (1.05)
Religion	
Buddhism	462 (96.65)
Christianity	3 (0.63)
Islam	9 (1.88)
Other	4 (0.84)
Region	
Bangkok	287 (60.04)
Northeastern region	106 (22.18)
Central, western, and eastern regions	49 (10.25)
Southern region	31 (6.49)

Northern region	5 (1.04)

Table 2 Cannabis use experience among study participants (N = 478).

Type of Experience	N (%)
No experience	**245 (51.26)**
Having experience	**233 (48.74)**
Medical purposes	119 (24.90)
Food and beverage preparation	73 (15.27)
Recreational use	32 (6.69)
Commercial purposes	9 (1.88)
Total	**478 (100.00)**

Among the 478 eligible participants, 233 (48.74%) reported cannabis use experience, while 245 (51.26%) had never used cannabis. The results showed significant differences between the two groups across all measured domains and overall scores. Participants with experience of cannabis use achieved a higher overall score (82.33 ± 11.01 points) compared to those without such experience (76.11 ± 13.60 points), with the difference being statistically significant (P-value < 0.001).

For the specific domains, cannabis users outperformed non-users in information access (19.21 ± 4.14 vs. 15.47 ± 4.35 points, respectively), healthcare communication (14.02 ± 3.73 vs. 12.21 ± 3.89, points, respectively), decision-making (20.35 ± 3.87 vs. 19.57 ± 4.36, points, respectively), and information sharing (7.28 ± 2.36 vs. 5.88 ± 2.36 points, respectively) (P-value < 0.001 for all comparisons) (Table 3).

When examining individual items, only percentages which were easy-for-comparison standardized scores were reported here to highlight patterns within domains. For **information access**, cannabis users reported the highest capability in retrieving information from the internet (75.20%), followed by independent information seeking (70.00%) and social networks (66.00%). In contrast, non-users showed lower scores across all channels, with broadcast media and internet access at 56.00% each, and the lowest performance in health professional-led educational activities (46.20%) (Table 3).

In the domain of **healthcare communication**, users demonstrated greater confidence in discussing cannabis-related issues (72.20%), seeking clarification when needed (72.20%), and preparing questions prior to consultations (69.20%). Non-users reported comparatively lower confidence, particularly in preparing advanced questions (56.40%), while moderate levels were observed in clarification (64.80%) and communication of side effects (62.40%) (Table 3). ‘

For **decision-making**, experienced users showed relatively strong literacy in verifying advertisement claims (72.36%), seeking comprehensive information (75.02%), and evaluating promotional content (70.90%). In contrast, non-users expressed high caution toward advertisements (77.55%) and purchase decisions (70.04%) but lower performance in fact-checking behaviors (58.12%). In terms of **information sharing**, cannabis users reported consistently higher responsibility in verifying accuracy before dissemination (71.76%) and ensuring comprehension before communication (73.82%). In comparison, non-users scored lower in these practices (57.62% and 60.66%, respectively) (Table 3).

Overall, both groups demonstrated “moderate” cannabis-related health literacy according to the national classification framework (60 – 79%). Nonetheless, cannabis users consistently achieved higher scores across all domains. At the same time, non-users tended to approach the lower bound of the moderate range, particularly in information access and information sharing, where scores approached the threshold for “poor” literacy. Neither group achieved the “excellent” threshold (≥ 80%), underscoring the need for targeted interventions to improve cannabis-related health literacy across the Thai population (Table 3).

Table 3 Cannabis-related health literacy between groups with and without cannabis use experience (N = 478).

Dimension and items	With experience (n = 233)		Without experience (n = 245)		P-value*
	Mean (SD)	%†	Mean (SD)	%†	
Information access	**19.21 (4.14)**	**64.03**	**15.47 (4.35)**	**51.58**	**< 0.001**
Accessing information through print media	2.88 (4.14)	57.06	2.40 (4.35)	48.00	
Accessing information through broadcast media	3.06 (4.14)	61.20	2.80 (4.35)	56.00	
Accessing information through internet	3.76 (4.14)	75.20	2.80 (4.35)	56.00	
Accessing information through health professional lectures	2.72 (4.14)	54.40	2.31 (4.35)	46.20	
Accessing information through social network	3.30 (4.14)	66.00	2.51 (4.35)	50.20	
Independent information seeking ability	3.50 (4.14)	70.00	2.65 (4.35)	53.00	
Healthcare communication	**14.02 (3.73)**	**70.11**	**12.21 (3.89)**	**61.06**	**< 0.001**
Confidence in discussing cannabis with healthcare providers	3.61 (3.73)	72.20	3.07 (3.89)	61.40	
Preparing questions before healthcare visits	3.46 (3.73)	69.20	2.82 (3.89)	56.40	
Asking for clarification when needed	3.61 (3.73)	72.20	3.24 (3.89)	64.80	
Expressing concerns about side effects	3.34 (3.73)	66.80	3.12 (3.89)	62.40	
Decision making	**20.35 (3.87)**	**75.36**	**19.57 (4.36)**	**72.47**	**< 0.001**
Critical evaluation of cannabis advertisements	3.55 (3.87)	70.90	3.88 (4.36)	77.55	
Fact-checking advertisement claims	3.62 (3.87)	72.36	2.90 (4.36)	58.12	
Seeking comprehensive information	3.75 (3.87)	75.02	3.06 (4.36)	61.14	
Purchase intention based on advertisements	3.00 (3.87)	60.00	3.50 (4.36)	70.04	
Medical use decision-making	3.07 (3.87)	61.37	3.10 (4.36)	62.04	
Recreational use decision-making	3.37 (3.87)	67.30	3.12 (4.36)	62.45	
Information sharing	**7.28 (11.01)**	**72.78**	**5.88 (2.36)**	**58.78**	**< 0.001**
Verifying information before sharing	3.59 (11.01)	71.76	2.88 (2.36)	57.62	
Understanding information before sharing	3.69 (11.01)	73.82	3.03 (2.36)	60.66	
OVERALL, HEALTH LITERACY	**82.33 (11.01)**	**70.37**	**76.11 (13.60)**	**65.04**	**< 0.001**

* Independent t test.

† Percentages represent the mean score of each item/domain expressed as a percentage of the maximum possible score.

For the domain of **attitudes toward cannabis decriminalization**, participants with cannabis use experience (n = 233) revealed diverse perspectives (Table 4). Regarding cannabis liberalization, 24.03% strongly disagreed, 15.02% disagreed, 26.18% were neutral, 24.46% agreed, and 10.30% strongly agreed. On the authorization of Category 5 narcotic substances for recreational, medical, and economic purposes, while the majority agreed (28.33%), a substantial proportion (42.06%) expressed disagreement or strong disagreement. Notably, participants showed strong support for establishing legal penalties for illicit cannabis use (74.67%) and determining safe usage quantities (80.25%). A particularly significant finding was the robust support for the Ministry of Public Health's role in educating the public about cannabis benefits and risks, with combined agreement and strong agreement reaching 87.12%. Support for recreational cannabis use was moderate, with combined agreement and strong agreement at 55.37%. These findings suggest that despite having cannabis use experience, participants prioritized controlled use and proper public education (Table 4).

Table 4 Attitudes toward cannabis use between groups with and without cannabis use experience (N = 478).

Statement	With experience (n = 233)					Without experience (n = 245)				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Support for cannabis decriminalization	24 (10.30)	57 (24.46)	61 (26.18)	35 (15.02)	56 (24.03)	83 (33.88)	67 (27.35)	82 (33.47)	8 (3.27)	5 (2.04)
Approval of Category narcotics use	24 (10.30)	66 (28.33)	43 (18.45)	48 (20.60)	51 (21.46)	44 (17.96)	40 (16.33)	55 (22.45)	61 (24.90)	45 (18.37)
Need for clear legal penalties	94 (40.34)	80 (34.33)	31 (13.30)	18 (7.73)	10 (4.29)	50 (20.41)	44 (17.96)	63 (25.71)	46 (18.78)	42 (17.14)
Support for usage limits	92 (39.48)	95 (40.77)	22 (9.44)	19 (8.15)	5 (2.15)	0 (0)	174 (71.02)	33 (13.47)	29 (11.84)	5 (2.04)
Ministry of Health education role	131 (56.22)	72 (30.90)	17 (7.30)	11 (4.72)	2 (0.86)	0 (0)	153 (62.45)	43 (17.55)	9 (3.67)	1 (0.41)
Support for recreational use	54 (23.18)	75 (32.19)	41 (17.60)	31 (13.30)	32 (13.73)	0 (0)	170 (69.39)	26 (10.61)	3 (1.22)	1 (0.41)

Among participants without cannabis use experience (n = 245) demonstrated significantly different patterns. This group showed strong support for cannabis liberalization, with combined agreement and strong agreement reaching 61.23%, while only 5.31% expressed disagreement or strong disagreement. However, regarding the authorization of Category 5 narcotics for recreational, medical, and economic purposes, opposition increased notably (43.27%). The group strongly supported establishing safe usage quantities (71.02%) and public education by the Ministry of Public Health (62.45%). Interestingly, they showed high support for recreational cannabis use (69.39%), markedly different from the experienced group. A notable observation was the absence of strong agreement responses in several categories, potentially indicating cautious opinion expression among those without cannabis use experience. These findings suggest that while the inexperienced group supported cannabis decriminalization, they maintained awareness of the importance of regulatory controls and appropriate public education (Table 4).

Discussions and Conclusion

While Thai participants with cannabis use experience scored higher across all health literacy domains, those without such experience were more likely to express supportive attitudes toward cannabis legalization and recreational use. This inverse pattern challenges assumptions that personal experience leads to more favorable views, suggesting a possible disillusionment or risk awareness among users, or alternatively, a romanticization of cannabis by non-users influenced by media and incomplete information.

The results revealed striking differences in information access patterns between experienced and inexperienced cannabis users. Participants with experience demonstrated notably higher capabilities in accessing information, particularly through digital channels (75.20%) and independent search (70.00%). This pattern is consistent with Areerat's study15 which found that individuals with prior cannabis use were more confident in evaluating online health information, and with Saijanket et al[16] reporting that firsthand experience significantly improves one's ability to distinguish credible sources from misinformation. In our findings, this was evident in higher self-reported scores in independent information seeking among those with cannabis experience (mean of 3.50 and 2.65 points, respectively, see Table 3), reinforcing the view that direct use experience enhances health literacy. Previous regional studies reported higher cannabis knowledge in the northeastern region[10], and comparatively lower awareness in the northern and southern regions.[9,11] Although our study did not directly stratify information access capabilities by region in inferential terms, we observed that participants from northeastern provinces were disproportionately represented among those reporting high confidence in digital information seeking. This suggests

that regional disparities may, in part, reflect unequal access to trustworthy cannabis-related resources.

In our study, participants with previous cannabis use experience demonstrated significantly higher scores in the domains of information access and confidence in communication with healthcare providers. These results align with findings from Jintapatanasiri and Chansorn's research[17], which examined cannabis knowledge among Thai university students and found that students who had prior exposure to cannabis information—either through academic content or peer interaction—reported greater self-efficacy in seeking and interpreting health information. Although the demographic composition of university students differs from our general adult sample, both studies emphasize the role of prior exposure in shaping health-related behaviors. Moreover, Areerat's findings highlighted how familiarity with cannabis products was associated with more positive health beliefs and reduced uncertainty regarding its medical use.[18] Similarly, in our study, participants with use experience expressed greater confidence in making informed decisions regarding cannabis safety and legality, as shown in the higher scores across decision-making and information-sharing domains (see Table 3). Together, these findings suggest that personal experience—regardless of the population studied—may function as a key enabler of cannabis-related health literacy in the Thai context.

The study identified nuanced differences in how participants with and without cannabis experience approached information evaluation. Experienced users more frequently reported verifying sources, cross-referencing with official health websites, and expressing concern about misinformation, as reflected in higher mean scores for items related to critical appraisal and source credibility (Table 3). This echoes findings from Wattanathanakorn and Panthuratsamaporn's which observed that prior exposure to cannabis-related content was associated with improved discrimination between evidence-based medical claims and unverified online narratives.[18] Such distinctions suggest that experiential familiarity may foster more deliberate and discerning health information processing.

While both groups accessed information through digital means, only the experienced group demonstrated a tendency to apply evaluative criteria such as source reliability and message intent. This was evident in their higher reported agreement with items like “I verify cannabis information from at least two sources” and “I can distinguish between health messages that are evidence-based and those that are not.” These subtle behavioral differences may not reflect sophistication in the technical sense, but rather a more refined self-perception of evaluative judgment, likely shaped by prior interaction with cannabis-related health contexts.

The differences in attitudes toward cannabis decriminalization between experienced and inexperienced users aligned with regional variations identified in previous studies. Unayaphan and Nonthanathron's research in Bangkok[8] found moderate attitudes, while Sinthusang et al's work[9] revealed more cautious perspectives in northern regions. These findings suggest that geographic and experiential factors may interact to shape cannabis-related attitudes.

Our findings point to several critical areas for development in cannabis-related health literacy, building upon patterns identified in previous research. Regional studies across Thailand have highlighted varying levels of cannabis knowledge and understanding[8-11], suggesting the need for targeted interventions based on geographic and demographic factors. The demonstrated relationship between direct experience and health literacy capabilities supports Areerat's findings regarding the importance of practical context in developing health-related understanding.[15]

The stark differences in information access and verification behaviors between experienced and inexperienced users particularly warrant attention. While previous research by Saichanket et al identified moderate knowledge levels regarding medical cannabis use, our findings suggest that knowledge acquisition patterns differ significantly based on experience level.[16] This understanding becomes especially relevant when considered alongside Wattanathanakorn and Panthuramphorn's research which highlighted the importance of research-backed information in cannabis-related decision-making.[18]

The development of effective interventions should consider the multivariate nature of cannabis-related health literacy. Jintapatanasiri and Chansorn 's work demonstrated high levels of understanding among university students regarding pain management and appetite stimulation effects, suggesting that educational programs might benefit from beginning with these well-understood aspects before

progressing to more complex topics.[17] Similarly, the regional variations in knowledge levels identified by Sinthusang et al[9] and confirmed in our study indicate the need for geographically tailored approaches to health literacy development.

Furthermore, the observed disparities in healthcare communication confidence suggest a need for structured programs that bridge the gap between experienced and inexperienced users. This aligns with findings from multiple regional studies[8-11] that identified varying levels of cannabis-related knowledge across different populations. The development of such programs should consider both the technical aspects of cannabis use and the social skills needed for effective healthcare communication, as emphasized in earlier research.[15,16,19]

These findings and prior research collectively suggest that future interventions should adopt a comprehensive, multi-faceted approach to enhancing cannabis-related health literacy. A primary focus should be placed on developing user-friendly digital platforms that provide reliable information, addressing the digital literacy patterns observed in both experienced and inexperienced users. These platforms should integrate diverse learning resources while maintaining accessibility across different user groups. Concurrent with digital development, structured communication training programs should be implemented to strengthen healthcare provider-patient relationships, focusing particularly on building confidence among inexperienced users in discussing cannabis-related health concerns. The development of targeted educational programs represents another crucial intervention component, considering the significant regional and experiential differences in cannabis-related knowledge identified in our study. These programs should be tailored to address specific regional needs while maintaining consistency in core health literacy concepts. Finally, robust verification frameworks should be established to assist users, particularly those without prior cannabis experience, in effectively evaluating cannabis-related information. These frameworks should include clear guidelines for assessing information credibility and tools for identifying reliable information sources, addressing the observed disparity in information verification behaviors between experienced and inexperienced users.

This integrated analysis of current findings and previous research provides a foundation for developing more effective approaches to enhancing cannabis-related health literacy in Thailand. By understanding how experience levels interact with information access, healthcare communication, and decision-making patterns, stakeholders can design more targeted and effective interventions that address the specific needs of different population groups while acknowledging regional and demographic variations in cannabis-related knowledge and attitudes.

Although we included geographic data in our sample description (see Table 1), regional differences in cannabis-related health literacy were not analyzed using inferential statistics. As such, any observations about regional variation should be interpreted with caution. The large proportion of participants from Bangkok (60%) may also influence the generalizability of our findings. Nevertheless, previous research has suggested potential regional disparities in cannabis-related knowledge across Thailand. Our dataset presents an opportunity for future analyses to explore how access to health information, attitudes, and legal literacy may differ across regions, particularly given the ongoing policy shifts related to cannabis regulation.

Overall, this study contributes significantly to the national discourse on cannabis regulation and public health preparedness in Thailand. It highlights that while prior cannabis use experience correlates with greater self-reported health literacy, neither group demonstrates a high enough level to support safe and informed cannabis use under the current policy landscape. These findings underscore the urgency for evidence-based health communication strategies, especially in light of cannabis legalization and the public's increasing exposure to cannabis-related products and messaging. Future research should further explore how cultural beliefs, regional access to information, and trust in healthcare systems interact with cannabis literacy, particularly among underserved populations.

This study has several limitations. First, the use of a convenience sampling method may have introduced selection bias and limits the generalizability of the findings to the broader Thai population. Although participants were recruited from diverse regions, the sample was not probabilistically selected and disproportionately represented residents of Bangkok (60%), which may skew interpretations toward urban perspectives. Second, the combination of online and on-site data collection may have resulted in variations in respondent

characteristics, digital literacy, and motivations for participation. Third, all data were self-reported using structured questionnaires, which may be subject to biases such as social desirability, recall inaccuracy, and overestimation of one's own knowledge or decision-making abilities. The study assessed perceived rather than actual health literacy competencies, which may limit the accuracy of the findings. Lastly, although regional disparities in cannabis knowledge were discussed in the introduction and geographic data were collected and descriptively presented, the study did not include region-stratified sampling or hypothesis testing to examine differences in cannabis-related health literacy across Thailand's geographic zones. No statistical comparisons were conducted, limiting our ability to draw conclusions about regional disparities, and thus this remains an area for future investigation.

The core aim of this study was to assess whether cannabis use experience influenced health literacy and attitudes toward cannabis, and to derive implications for public health policy. Our findings reveal an unexpected divergence: while experienced users demonstrate higher levels of cannabis-related health literacy, they express more cautious or even negative attitudes toward cannabis use and legalization. This contrasts with non-users, who show comparatively lower health literacy but stronger support for liberalization. One possible explanation is that direct experience equips users with critical awareness of risks, misinformation, or regulatory gaps, whereas non-users may idealize cannabis use based on limited or biased information. These insights emphasize the need for two-track communication strategies: one focused on promoting safe, informed use among current users, and another addressing misconceptions and enthusiasm among non-users through evidence-based education. Future research should employ probability-based sampling, incorporate stratified designs to compare subpopulations across regions, and utilize mixed-methods or objective assessments of health literacy to validate self-reported data. In addition, longitudinal studies could explore the impact of cannabis policy reforms on public understanding, risk perception, and behavioral outcomes over time. These findings have practical implications for public health communication and policy design: tailored education campaigns should be developed to address the distinct needs of both cannabis users and non-users, ensuring that information is accurate, balanced, and accessible across varying levels of health literacy. Policymakers should also consider integrating health literacy frameworks into regulatory strategies to promote informed decision-making and reduce misuse or stigma associated with cannabis in the Thai context.

In conclusion, this cross-sectional survey study examined cannabis-related health literacy among 478 Thai participants, comparing populations with (n = 233) and without (n = 245) cannabis use experience. Among experienced users, cannabis was primarily used for medical purposes, followed by culinary applications and recreational use. The study revealed higher overall health literacy levels among experienced users than the non-users, particularly in digital information access and healthcare professional communication. Inexperienced users showed stronger support for decriminalization, while experienced users demonstrated more nuanced perspectives, though both groups emphasized the importance of regulated use and appropriate public education. These findings highlight the complex relationship between direct experience and health literacy development, suggesting the need for targeted interventions to address the specific needs of different population groups within Thailand's evolving cannabis policy landscape.

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