



# An intervention to promote health literacy in Bangkok schools: Preventing the risks of legalized cannabis on vulnerable youth

D Chatchawan Jongkam<sup>1</sup>, D Tharisara Chirasatienpon<sup>2\*</sup>, D Phubate Napatpittayatorn<sup>2</sup>

<sup>1</sup>Kasetsart University Laboratory School Center for Education Research and Development, Faculty of Education, Kasetsart University, Bangkok, Thailand.

<sup>2,3</sup>Major of Health education, Department of Physical Education, Faculty of Education, Kasetsart University, Bangkok, Thailand.

Corresponding author: Tharisara Chirasatienpon (Email: tharisara.c@ku.th)

#### Abstract

Following the legalization of cannabis in Thailand, there has been a rise in usage, especially among adolescents, due to inadequate health literacy and a perceived low risk, highlighting the need for school-based health education programs to reduce harm. These initiatives can alleviate cannabis abuse and promote responsible decision-making, benefiting both individuals and society. This study administered pre- and post-assessments to two groups. Study participants were categorized into experimental and control groups. Health literacy was provided to the experimental group to deter cannabis intake. The control group was provided with informational brochures regarding cannabis. This study focused on lower secondary pupils from ten demonstration schools in Bangkok. The researchers selected schools and then utilized multi-stage sampling to randomly select 7th, 8th, and 9th grades. The G\*Power software determined a sample size of 76 individuals (38 in each group) using effect size estimations, a 95% confidence level, and 0.8 testing power, while factoring in a 10% dropout rate. Demographics, health literacy, cannabis knowledge, communication, self-management, media literacy, and decision-making were assessed by questionnaires. The control group received cannabis leaflets, whereas the experimental group attended an intervention program. The results demonstrated that in all health literacy categories related to cannabis prevention, the experimental group showed improvements in communication, self-management, media literacy, decision-making, and information accessibility. The control group showed negligible improvement in these domains. Notwithstanding the legalization of cannabis in 2022, Thai students remain inadequately informed about the substance. The findings demonstrate that health education programs improve health literacy and prevent cannabis use.

Keywords: Adolescents, Secondary school, Behavior, Cannabis, Health education program, Health literacy.

DOI: 10.53894/ijirss.v8i1.4825

Funding: This research is funded by Kasetsart University through the Graduate School Fellowship Program

History: Received: 7 January 2025/Revised: 10 February 2025/Accepted: 14 February 2025/Published: 20 February 2025

**Copyright:** © 2025 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<u>https://creativecommons.org/licenses/by/4.0/</u>).

**Competing Interests:** The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

**Publisher:** Innovative Research Publishing

#### **1. Introduction**

Cannabis is still illegal in many countries, but more are legalizing its medical and recreational usage [1]. Thailand passed the Cannabis Act in 1934 to control possession and ban consumption. Cannabis became a Category 5 narcotic under the 1979 Narcotics Act. This statute now allows medical cannabis usage until February 18, 2019. As of July 5, 2021, the Department of Thai Traditional and Alternative Medicine [2] declared the removal of cannabis from Category 5 narcotics, effective June 9, 2022. The government further emphasized that "all parts of cannabis" are no longer drugs except extracts with more than 0.2% THC or CBD. This allows people to grow cannabis and make health items. However, cannabis flower buds and seeds remain Category 5 narcotics. Cannabis is frequently used in Thailand, especially in legal health items including cosmetics, herbs, and food. Thailand was the first Asian country to legalize cannabis use and purchase in February 2021, and the entire plant in June 2022, after the 2019 medicinal cannabis permission [3].

Cannabis has characteristics that lower stress, promote sleep, stimulate appetite, and reduce inflammation and pain<sup>[2]</sup>. In Europe, the UK, and Canada, whole cannabis plant extracts with a 1:1 ratio of THC to CBD are approved for treating pain and spasticity in multiple sclerosis patients [4]. Cannabis' ability to release soothing brain signals contributes to its relaxation benefits. Cannabis reduces tension when combined with physically strengthening exercises like yoga. Yoga might boost mood and relaxation by releasing muscle tension through stretching exercises [5]. After liberalization in 2022, recreational cannabis use has surged, notably among children and adolescents. Out of 11 million individuals, 300,000 minors aged 18-19 have used cannabis, perhaps increasing the chance of trying other narcotics [6]. Since 2012, cannabis has become the most extensively used substance worldwide, with 192 million users in 2018 and 209 million in 2020. The 15-64 age group had a 3.9% prevalence rate, greater than the global average. With 14.6%, North America led, followed by Australia and New Zealand at 10.6% and West and Central Africa at 9.3%. Canadian adolescents use cannabis at the greatest rate, with 19.2% of 15-17-year-olds reporting use [7].

Cannabis use has increased in Thailand, especially among teens. According to a study by Lamy et al. [1], Thai cannabis users believe their usage has few health risks, emphasizing the need for better prevention and health literacy. Cannabis production and retail for medical and recreational use are now legal. Surveys indicate that cannabis abuse, especially among 15-19-year-olds, is on the rise [8]. Cannabis usage can harm brain development, emotions, and behavior, especially in children and teenagers. Delays in development, behavioral difficulties, and mental health illnesses like schizophrenia and depression are hazards. Cannabis usage is illegal for those under 20 in Thailand, but inadvertent consumption, such as through cannabis-infused foods, is increasing [9]. According to a study by The Royal College of Paediatricians of Thailand [10], adolescents' ignorance of cannabis is a primary cause of its overuse. Higher health literacy in adolescents leads to healthier cannabis use decisions and resistance to peer pressure [11].

The literature promotes health literacy for adolescents to prevent cannabis use. Since most cannabis usage starts in adolescence, schoolchildren need reliable cannabis information. Research and programs on cannabis health literacy for students are needed. The development of cannabis programs can minimize misuse and encourage better decision-making, benefiting individuals and society [11, 12]. Moreover, proclaiming schools "cannabis-free" zones under the Bangkok Metropolitan Administration helps address this issue and protect the nation's future workers.

#### 2. Materials and Methods

#### 2.1. Study Design and Setting

This experimental study utilized a two-group pre-test-post-test design. The study sample was divided into two groups: an experimental group and a control group. Health literacy programs aimed at preventing cannabis consumption were provided to students in the experimental group. The control group reviewed a health literacy brochure designed to prevent cannabis use.

#### 2.2. Study Participant and Sampling

The study population comprised lower secondary students enrolled in ten demonstration schools affiliated with higher education institutions in Bangkok during the 2024 academic year. These schools, overseen by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research, and Innovation, Thailand, were selected for the study. A multi-stage sampling approach was employed. First, ten demonstration schools were selected. Second, two schools were randomly assigned to the experimental (Kasetsart University Laboratory School) and control (Srinakharinwirot University

Demonstration School, Pathumwan) groups. Third, grade 9 was randomly selected from grades 7-9. The sample size was determined using G\* Power software based on effect size estimations from relevant literature [13], resulting in a sample of 38 participants per group (n = 76 total). A 95% confidence level, 0.05 significance level, 0.8 power, and an effect size of 0.69 were used in the G\* Power analysis.

#### 2.3. Instrument

Both groups' surveys had two sections: demographics (age, sex, grade, parental marital status, areas of residence, parental education, number of people living together, parental cannabis exposure experience, and source) and a health literacy test and questionnaire for cannabis prevention derived from the Health Literacy and Health Behavior Scale, which includes a cannabis information access questionnaire. The assessment included: 1) Cannabis Knowledge and Understanding Test, 2) Cannabis Prevention Communication Skills Questionnaire, 3) Cannabis-Prevention Self-Management Skills Quiz, 4) Cannabis-Related Media Literacy Quiz, and 5) Cannabis Prevention Decision-Making Questionnaire. The questionnaire took 20–25 minutes. However, the control group received a cannabis prevention health literacy booklet, while the experimental group participated in a four-week, 50-minute health literacy program at a Bangkok demonstration school to prevent early adolescents from using cannabis.

#### 2.4. Ethical Consideration

The researcher used inclusion and exclusion criteria to determine sample rights in this study. Before starting the study, each sample group member gave consent. The Kasetsart University Human Research Ethics Committee accepted this study with the number KURDI code COA67/073 on October 17, 2024.

#### 3. Data Analysis

The data analysis in this study employed a pre-existing computer program to determine the mean (X), frequency, and standard deviation (SD), and to compare the mean of health literacy in preventing cannabis use and cannabis use prevention behavior. A t-test was used to analyze data with a confidence level of 0.05 for the test set.

	Interventio	on group (n=38)	Control g	Control group (n=38)						
Demographic data	Frequency	Percentage	Frequency	Percentage						
1. Grade point average										
2.00 - 2.49	7	18.4	2	5.3						
2.50 - 2.99	4	10.5	4	10.5						
3.00 - 3.49	8	21.1	10	26.3						
≥3.50	19	50.0	22	57.9						
2. Residing with										
Father and mother	29	76.3	35	92.1						
Father	3	7.9	2	5.3						
Mom	6	15.8	1	2.6						
3. Current place of residence										
House	35	92.1	34	89.5						
Condominium	3	7.9	4	10.5						
4. Resources for students to obtain knowledge regarding cannabis										
Television	9	20.7	25	65.8						
Magazine/ Journal	-	-	1	2.6						
Billboard	1	2.6	-	-						
Internet	18	47.4	8	21.1						
Social media	-	-	1	2.6						
Father/ Mother/ Parent	-	-	1	2.6						
Teacher	10	26.3	2	5.3						

### Table 1. Demographic characteristics data

#### 4. Results

Table 1 demonstrated that the experimental group had the highest academic accomplishment, with 50.0 percent achieving a GPA of 3.50 and above, followed by 21.1 percent with a GPA of 3.00 to 3.49. Most students (76.30%) lived with their parents, while 15.80% lived with their mother. A significant number of students (92.10%) resided in their own homes, while 7.90% lived in condominiums. Students (47.30%) learned about cannabis online, and 26.30% learned from teachers or professors.

A majority of students in the control group (57.9%) had a GPA of 3.50 or higher. The second most common GPA range was 3.00 to 3.49, at 26.3 percent. Additionally, 92.1 percent of students lived with their parents, while 5.3 percent lived with their father. The majority of students lived at home. Television provided cannabis information to 65.8% of students, followed by the Internet at 21.1%.

## 4.1. The Effect of a Health Literacy Program for Preventing Cannabis Use in Early Adolescents in a Demonstration School in Bangkok.

Section 1, "Let's Get to Know Cannabis," was an activity designed to develop students' ability to access cannabis information by verifying the credibility of the information. This allowed students to search for information about cannabis from reputable sources.

The experimental group initially exhibited high cannabis knowledge literacy (34.2%) with moderate levels (31.7%). After the experiment, they achieved perfect health literacy scores to deter cannabis use. The control group also began with high cannabis use prevention literacy (39.5% proficient, 36.8% moderate). Post-experiment, their literacy shifted to a majority at a moderate level (55.3%).



#### Figure 1.

Let's get to know cannabis.

Section 2 "Cannabis-savvy" activity is an instructional instrument that aims to improve media literacy skills by utilizing the principles of analyzing, interpreting, and evaluating media to develop an understanding of the purpose of the content the media is presenting and to encourage students to follow credible content. Subsequently, activities that foster decision-making and thought processes will be implemented to enable students to determine whether or not to abstain from cannabis consumption.

The experimental group initially had very low cannabis use health literacy (97.3%). After the trial, they achieved perfect scores. The control group also started with low literacy (94.8%), and post-trial, the majority still had inadequate knowledge (89.5%).

#### **"KEEP CURRENT ON MEDIA LITERACY ABOUT** Part 2: Please indicate 🖉 appropriate or inappropriate behavior depending on the CANNABIS; THERE ARE NO ISSUES ABOUT CANNABIS" sed on your thought process and explain why de an answer to the foll ion no. 1 Topic Content Make decision luct a search for recent media on that or regarding cannabis in a positive way. 1. 0. De not Content sons for your decis Topic 2. Provide rea สวิตติ มีกัญจา มีสุข 2.1 Please use 5 media lit antions to brai ideas for analyzing the Make decision 1.1 Please use 5 media lite for analyzing the media interes L Do Do not L Do Do not Ahat does the medi And what is not pre > Make decisio Information no. 3 1. Do Donst ns for your 1. 00 Do no 2 Provide Make decisio . Do Donot 1. Do Do no

#### International Journal of Innovative Research and Scientific Studies, 8(1) 2025, pages: 1890-1901

**Figure 2.** Cannabis-savvy activity.

1. Do Do not 2. Provide reasons for your d

Section 3 "Say No to Cannabis" activity is a systematic exercise aimed at enhancing students' communication abilities, particularly their capacity to proficiently refuse or avoid cannabis use. This activity provides students with realistic hypothetical circumstances in which they may face peer pressure to consume cannabis. In these instances, students are prompted to practice communicating and presenting clear, strong refusals. The objective is to provide students with the linguistic skills and assurance to manage social contexts related to cannabis consumption in a healthy and responsible way.

Grade level ......Student ID

Name and sum

The experimental group initially showed mostly poor and fair health literacy about cannabis use prevention. After the experiment, a dramatic improvement occurred, with 97.4% achieving "Very Good" literacy. The control group, which started with high levels of "Very Good" and "Good" literacy, saw a slight shift towards a "High" level of cannabis use prevention after the experiment.





Section 4 "I don't use cannabis" activity is designed to cultivate self-management skills in the prevention of cannabis use. This activity involves the use of brainstorming strategies and role-playing, as well as the requirement that students compose a promise that reflects their intention to refrain from engaging in cannabis-related activities.

The experimental group initially demonstrated high health literacy about cannabis use prevention, with 44.7% scoring very well. After the experiment, they achieved perfect scores. The control group also began with high literacy, with 47.4% showing proficient self-management skills. Following the trial, the control group maintained a high level of literacy, with 44.7% exhibiting commendable knowledge.

"SAFELY MANAGE ONESELF NO ISSUE WITH CANNABIS" Instruction: Please provide an answer to the following questions Part 1. Generating ideas for a role-playing scenario including the following: 1) Describing events that result in marijuana consumption following invitation 2) Demonstrating how to say no and stay away from events that encourage cannabis consumption (time limit-first roughly ten minutes-for considering a role-playing scenario)	Commitment Card My name is : I'll commit:

**Figure 4.** I do not use cannabis.



#### Figure 5.

Objectives, process and outcome of health literacy program for preventing cannabis use in early adolescents in a demonstration school in Bangkok.

#### Table 2.

The distribution of students by group and the method of health education, along with a comparison of the mean differences in health literacy regarding the prevention of cannabis use between the experimental group and the control group, both pre-test and post-test (N=76).

յսի	Prior intervention		After intervention		t	df	<i>P</i> -value
	$\overline{x}$	SD	$\overline{x}$	SD			
periment	17.73	3.91	23.34	1.41	-7.838	37	0.000*
ntrol	18.65	2.97	17.92	2.89	1.716	37	.095
periment	4.55	1.84	11.65	.66	-21.360	37	0.000*
ntrol	3.97	2.29	4.76	2.24	-2.113	37	0.041*
periment	21.89	3.58	28	1.87	-9.365	37	0.000*
ntrol	22.86	3.05	22.15	3.23	1.713	37	0.095
periment	14.76	2.98	19.21	1.09	-8.22	37	0.000*
ntrol	14.86	3.09	15.13	3.23	919	37	0.364
periment	16.68	2.18	23.60	1.24	-15.379	37	0.000*
ntrol	16.78	4.28	16.78	3.93	.000	37	1.000
periment	10.10	2.19	13.92	1.14	-9.054	37	0.000*
ntrol	10.36	2.92	10.60	2.86	692	37	0.493
	periment htrol periment htrol periment htrol periment htrol periment htrol	$\bar{x}$ periment         17.73           ntrol         18.65           periment         4.55           ntrol         3.97           periment         21.89           ntrol         22.86           periment         14.76           ntrol         14.86           periment         16.68           ntrol         16.78           periment         10.10           ntrol         10.36	$\bar{x}$ SD           periment         17.73         3.91           ntrol         18.65         2.97           periment         4.55         1.84           ntrol         3.97         2.29           periment         21.89         3.58           ntrol         22.86         3.05           periment         14.76         2.98           ntrol         14.86         3.09           periment         16.68         2.18           ntrol         16.78         4.28           periment         10.10         2.19           ntrol         10.36         2.92	$\bar{x}$ SD $\bar{x}$ periment         17.73         3.91         23.34           ntrol         18.65         2.97         17.92           periment         4.55         1.84         11.65           ntrol         3.97         2.29         4.76           periment         21.89         3.58         28           ntrol         22.86         3.05         22.15           periment         14.76         2.98         19.21           ntrol         14.86         3.09         15.13           periment         16.68         2.18         23.60           ntrol         16.78         4.28         16.78           ntrol         10.36         2.92         10.60	$\bar{x}$ SD $\bar{x}$ SD           periment         17.73         3.91         23.34         1.41           ntrol         18.65         2.97         17.92         2.89           periment         4.55         1.84         11.65         .66           ntrol         3.97         2.29         4.76         2.24           periment         21.89         3.58         28         1.87           ntrol         22.86         3.05         22.15         3.23           periment         14.76         2.98         19.21         1.09           ntrol         14.86         3.09         15.13         3.23           periment         16.68         2.18         23.60         1.24           ntrol         16.78         4.28         16.78         3.93           periment         10.10         2.19         13.92         1.14           ntrol         10.36         2.92         10.60         2.86	$\bar{x}$ SD $\bar{x}$ SD           periment         17.73         3.91         23.34         1.41         -7.838           ntrol         18.65         2.97         17.92         2.89         1.716           periment         4.55         1.84         11.65         .66         -21.360           ntrol         3.97         2.29         4.76         2.24         -2.113           periment         21.89         3.58         28         1.87         -9.365           ntrol         22.86         3.05         22.15         3.23         1.713           periment         14.76         2.98         19.21         1.09         -8.22           ntrol         14.86         3.09         15.13         3.23        919           periment         16.68         2.18         23.60         1.24         -15.379           ntrol         16.78         4.28         16.78         3.93         .000           periment         10.36         2.92         10.60         2.86        692	$\bar{x}$ SD $\bar{x}$ SD $\bar{x}$ SD           periment         17.73         3.91         23.34         1.41         -7.838         37           ntrol         18.65         2.97         17.92         2.89         1.716         37           periment         4.55         1.84         11.65         .66         -21.360         37           ntrol         3.97         2.29         4.76         2.24         -2.113         37           periment         21.89         3.58         28         1.87         -9.365         37           ntrol         22.86         3.05         22.15         3.23         1.713         37           periment         14.76         2.98         19.21         1.09         -8.22         37           ntrol         14.86         3.09         15.13         3.23        919         37           periment         16.68         2.18         23.60         1.24         -15.379         37           ntrol         16.78         4.28         16.78         3.93         .000         37           periment         10.10         2.19         13.92         1.14

Note: \* P-value is significant at 0.05 or less.

From Table 2: The experimental group's cannabis information access skill had a mean score that was significantly higher than before the experiment at the 0.05 level (P = 0.000) when health literacy scores in preventing cannabis use in each area were compared. Cannabis knowledge and comprehension scores increased significantly after the experiment at the 0.05 level (P = 0.000). At 0.05 (P = 0.000), cannabis prevention communication ability had a significantly higher mean score than before the experiment. The self-management competence to prevent cannabis usage increased significantly at the 0.05 level (P = 0.000). The cannabis media literacy skill mean score increased significantly after the experiment at the 0.05 level (P = 0.000). At P = 0.000, the mean score for cannabis prevention decision-making skill increased significantly from before the experiment.

On average, the control group's cannabis information access score dropped somewhat following the experiment. Comparing cannabis information access scores showed no difference (P = 0.095). The average cannabis knowledge and comprehension score differed significantly at the 0.05 level (P = 0.041). The average score for cannabis prevention communication abilities was slightly lower after the experiment. Average communication abilities to discourage cannabis use were similar (P = 0.095). The average cannabis self-management score increased slightly after the experiment. Self-management skills to prevent cannabis usage were similar (P = 0.364). The average cannabis media literacy score was the same as before the experiment. Average cannabis media literacy scores were identical (P = 1.000). The average score for cannabis prevention decision-making skills increased marginally after the inquiry. Average cannabis prevention decision-making skills were similar (P = 0.493).

#### 5. Discussion

The rapid expansion of Thailand's cannabis policy, which commenced with the prohibition of cannabis in 1979 and ultimately resulted in the decriminalization of cannabis for medical purposes in 2019 and recreational use in 2022, is impeded by inadequate regulation and enforcement. More stringent regulations are necessary to achieve a balance between recreational, medical, and commercial interests [14]. In Asian countries including Thailand, Malaysia, India, Iran, and Nepal, despite the ongoing global process of cannabis regulation, the burden of cannabis use disorders can be disproportionately and unpredictably increased by the existing heterogeneities across countries in terms of policies and epidemiology. A global strategy is required to address these cross-country barriers and enhance the early detection, prevention, and intervention of cannabis use and related disorders [15]. This is an urgent matter.

The study examined whether a health literacy promotion program at a Bangkok demonstration school prevented early adolescents from using cannabis. The two-group pretest-posttest study utilized a health literacy promotion program to prevent early adolescent cannabis use. This systematic educational strategy improved health literacy to prevent cannabis use in experimental students through health education strategies and various learner-appropriate activities. The 4-week activity routine lasted 50 minutes per week. The control group read a cannabis-prevention health literacy leaflet. The main subjects were:

#### 5.1. Medical cannabis in Thailand

Thailand has legalized three categories of cannabis-based medicinal products: medicinal-grade products from two official producers, Thai traditional medicine (TTM) formulas for various conditions, and folk medicine prepared by registered healers. However, stricter quality control is needed, and many still rely on underground markets due to the limited availability of authorized products [16]. BNH Hospital in Thailand has established a medical cannabis clinic, which is an alternative

medicine that employs cannabis to treat a variety of ailments and diseases. A team of doctors from Bloom Up, a BNH certified training program in the use of medical cannabis by the Department of Medicine, Ministry of Public Health, is responsible for enforcing safety standards [17]. The participants of this study were provided with a comprehension of medical cannabis; however, it did not provide a more detailed indication of cannabis for medical purposes.

#### 5.2. Recreational cannabis in Thailand

At the time of this presentation, the countries that have legalized recreational cannabis usage include Canada, Georgia, Malta, Mexico, South Africa, Thailand, and Uruguay. Twenty-four states, two territories, and the District of Columbia in the United States, along with the Australian Capital Territory in Australia, have enacted legislation permitting recreational use. The commercial sale of recreational cannabis is permitted nationwide in three countries: Canada, Thailand, and Uruguay, as well as in all subnational U.S. counties that allow possession, excluding Washington D.C [18].

Many countries, including the Netherlands, have implemented a policy of limited enforcement, which permits the sale of cannabis at licensed coffee shops [19]. There is a growing market in Thailand for legal cannabis, primarily for alternative medical purposes, with shops offering a wide range of cannabis products, strains, and equipment, aiming to provide education and foster a positive image of cannabis as a healthy alternative while supporting the local industry [20]. For this study, the impact of cannabis for recreation is considered; in the event that cannabis is used for recreational purposes, the body will receive toxins that are no different from those found in cigarettes. This will have a mixed effect on mental health, as the THC in cannabis has varied effects: stimulant, depressive, and hallucinogenic [21].

#### 5.3. Cannabis and cuisine in Thailand

Presently, Thailand has authorized the use of cannabis and hemp in food and beverages, subject to stringent regulations imposed by the Ministry of Public Health. This regulation mandates that cannabis products must contain no more than 0.2% THC (Tetrahydrocannabinol), a concentration that does not induce intoxication or vertigo [22].

Following the legalization of cannabis in Thailand on June 9, 2022, a search of cannabis shops and cafes in Bangkok showed substantial growth in the market, especially in Bangkok. Since new cannabis stores open weekly in Bangkok, it may be tough to find them all. Highland Café sells cannabis flowers, hemp items, craft beer, and food. Queen Seed Thailand is a famous European cannabis seed bank [23, 24]. Over 90 of the company's cannabis cultivars are sold in 17 countries. A huge cannabis company, Mementos, and cannabis flowers are also sold. Thai restaurants and cafes have added cannabis to their menus since this breakthrough. They sell cannabis-infused chrysanthemum tea, basil rice, and vermicelli. However, cannabis in food and beverages must be labeled as drowsy and is prohibited for children and pregnant women. The use of cannabis and hemp in health items, food, and beverages is now legal, but severe consumer safety rules require assessment and approval by appropriate agencies [25, 26].

This study examined the knowledge of food labels that contain cannabis and cannabis legislation, in accordance with the Food and Drug Administration's regulation in Thailand that supports the legalization of cannabis and hemp for health products, cosmetics, food, and herb products [27]. Restaurants that integrate cannabis into their menus must prioritize consumer safety by adhering to legal and health regulations, as well as by comprehending the applications, dosages, and strains of cannabis. Menu designers are required to undergo specialized training and must provide specific warnings regarding cannabis usage, such as the potential dangers to pregnant or breastfeeding women, individuals with cannabis sensitivities, and those under the age of 20. Consumers must be advised to stop use in the event of adverse reactions and to seek medical attention for severe symptoms. If lethargy occurs, cannabis-related menus should advise against operating machinery or vehicles. Fines of up to 50,000 baht may be assessed for violations of the Ministry of Public Health Regulations on Food Hygiene, underscoring the significance of compliance monitoring and inspections conducted by local government departments [28, 29].

#### 5.4. Health Literacy Program for Preventing Cannabis Use in Early Adolescents in A Demonstration School in Bangkok

Cannabis use among adolescents has been a growing concern due to its potential impact on health and development. Adolescence is a critical period for brain development, and cannabis can interfere with this process, particularly in areas related to memory, learning, and emotional regulation [30]. Recent research suggests that early and frequent cannabis use is linked to cognitive impairments, decreased academic performance, and an increased risk of mental health issues such as anxiety, depression, and psychosis. Furthermore, cannabis use in adolescence has been associated with changes in brain structure, particularly in the prefrontal cortex, which governs decision-making and self-control [31].

CBD calms seizures, improves sleep, and reduces inflammation. High CBD dosages may cause tiredness and inflammation. Delta-9-tetrahydrocannabinol (THC) affects the nervous system and slows brain growth, especially in children and teens. We use only pure CBD extracts and CBD-enriched cannabis extracts for severe epilepsy. However, children and adolescents who use cannabis and high-THC products suffer from restlessness, lethargy, stomach pain, severe nausea, and vomiting. Depression, anxiety, suicidal thoughts and behaviors, violent behavior, and learning and intellectual deficits like low IQ, poor memory, and executive functioning abilities are mental health difficulties that may hurt academics and careers. Medical personnel should only present factual cannabis information to parents, children, and adolescents to prepare for the adverse effects of cannabis use in children and adolescents when the "Free Cannabis" law is implemented [32].

Cannabis items are freely available on social media. In 2022 and 2023, Lamy and Meemon [33] conducted a questionnaire survey on 2024 with 963 cannabis users to understand their attitudes, knowledge, and behaviors and to explore the types of cannabis products available and used in Thailand. The study found that 30.9 percent of tweets that fulfilled study criteria were product ads, and 34.5 percent of cannabis consumers had bought cannabis online. This shows that online outlets

make cannabis easier to access and offer extra products.

This study investigates the effectiveness of a health literacy program for preventing cannabis use in early adolescents in a demonstration school in Bangkok. The results indicate that the program was effective for school students. This was due to the experimental group receiving activities that aimed to promote health literacy and drug prevention behavior. The activities included the following:

1) "Let's Get to Know Cannabis" activity, which was designed to develop students' ability to access cannabis information by verifying the credibility of the information. This allowed students to search for information about cannabis from reputable sources. This is consistent with the research conducted by Chuenruetai [34], which determined that it is crucial to communicate about cannabis on social media in Thailand in the era of borderless information. In order to establish communication that is both appropriate and beneficial to Thai society in the future, it is necessary to evaluate both the current situation and the reliability of the information. This is consistent with Yaochuang and Jandusitkhajorn [35], who found that the mean knowledge of facts regarding cannabis and hemp before and after participating in the knowledge enhancement program was shown to be significantly greater among students who participated in the program. Consequently, students will possess reliable and applicable information if they are able to access precise cannabis information.

2) "Cannabis-savvy" activity is an instructional instrument that aims to improve media literacy skills by utilizing the principles of analyzing, interpreting, and evaluating media to develop an understanding of the purpose of the content the media is presenting and to encourage students to follow credible content. Consistent with Buapradit, et al. [36], initiatives can improve the public's understanding of cannabis's medical applications through the implementation of health literacy programs. Consequently, in order to empower students with the knowledge of whether or not to refrain from consuming cannabis, activities that encourage decision-making and critical thinking will be implemented. In accordance with Halpern [37], who conducted literature review research, the distribution of media has been significantly influenced by rapid digitization and globalization, which has raised significant concerns regarding information accuracy and social impact. Consequently, it is necessary to provide support to individuals in the critical analysis of media, the identification of biases, the differentiation between reliable and unreliable sources, and the development of a comprehensive understanding of the general social and political implications of media messages.

3) "Say No to Cannabis" activity is a systematic exercise aimed at enhancing students' communication abilities, particularly their capacity to proficiently refuse or avoid cannabis use. This activity provides students with realistic hypothetical circumstances in which they may face peer pressure to consume cannabis. In these instances, students are prompted to practice communicating and presenting clear, strong refusals. The objective is to provide students with the linguistic skills and assurance to manage social contexts related to cannabis consumption in a healthy and responsible way. This study aligns with the 2023 research by Barnett, et al. [38], which indicated that those who regularly consume cannabis may be drawn to social groups where cannabis usage is prevalent. Therefore, practicing social refusal skills is essential for preventing cannabis use in adolescents. An individual's ability to strongly and rationally refuse an invitation to consume cannabis will reduce the probability of commencing cannabis usage and subsequently advancing to other drug use.

4) "I don't use cannabis" initiative aims to develop self-management skills for the prevention of cannabis consumption. This activity includes using brainstorming techniques and role-playing, alongside a requirement that students formulate a commitment that signifies their determination to stay away from cannabis-related behaviors. This study aligns with Karatay and Gürarslan Baş [39], asserting that role-playing situations effectively enhance students' self-efficacy in avoiding substance use. This aligns with the research conducted by Moffat, et al. [40], which established that the extensive adoption of this new drug education strategy highlights the significance of young involvement in preventive programs that ought to be adopted. It is possible to provide young individuals with support in their decision-making by implementing prevention measures that emphasize inclusive and fair dialogues regarding cannabis use. This study aligns with King, et al. [41] regarding the establishment of the REACH (Real Education About Cannabis and Health) Program for Canadian youth. The findings indicated that a toolkit and curriculum resource comprising lesson plans for educators addressing the science of cannabis, social science ramifications, peer pressure, decision-making, and harm reduction, along with videos showcasing youth endorsements and supplementary materials, can be both engaging and informative.

The implementation of health education programs can enhance the knowledge and abilities necessary for effectively obtaining information about cannabis, a finding supported by studies examining the perceptions and understanding of cannabis among youth. Gardiner, et al. [42] emphasized the significance of cannabis education for health care practitioners, highlighting the necessity for knowledge about its medical applications and health consequences. This research aligns with Thepa [43], who examined the impact of a health literacy and smoking prevention initiative on Thai lower secondary school students. These studies have shown that suitable educational programs can significantly enhance awareness of the hazards and consequences related to cannabis use among adolescents. A four-week health literacy and smoking cessation ratings. This study, in accordance with Mendoza and McPherson [44], indicated that both self-perception of abilities and direct knowledge were significantly enhanced following the administration of the educational program.

In general, these kinds of programs are extremely important for adolescents because they contribute to the establishment of a supportive atmosphere in which young people can make decisions based on accurate information. It has been demonstrated by the findings of the current study, which are in agreement with the findings of Botvin, et al. [45] that the overall implementation fidelity and the utilization of appropriate teaching techniques of school-based prevention are both important.

#### 6. Recommendations

This program should be provided to school administrators or school nurses as a guideline to prevent inappropriate cannabis use and promote cannabis health literacy among middle school students. The objectives are to equip students with the necessary skills and knowledge to effectively protect themselves from inappropriate cannabis use.

#### 7. Limitation

The data were obtained from middle schools in a city in Thailand that are part of the Kasetsart University Demonstration School. These schools exhibit demographic and other characteristics that distinguish them from other schools in Thailand due to their distinct cultural cognition. Consequently, the findings of this investigation cannot be applied to the general population of school adolescents in Thailand. Nevertheless, this investigation considered individual, social, and policy factors to suggest suitable strategies for the dissemination of knowledge. These strategies may have theoretical and practical implications for health education professionals, society, and policymakers.

#### 8. Conclusion

Despite the decriminalization of cannabis in Thailand in 2022, students continue to have inadequate knowledge regarding cannabis consumption. Additional advancements and refinements are required for cannabis-related risk awareness campaigns and certain school-based educational programs. This study establishes a basis for developing educational programs designed to deliver extensive knowledge about cannabis and mitigate cannabis abuse behaviors. This study demonstrated that health educational programs can enhance health literacy to reduce cannabis misuse.

#### References

- F. R. Lamy, S. C. Paek, and N. Meemon, "Risk perception of cannabis use among a sample of Thai cannabis users," *Journal of Population and Social Studies*, vol. 32, pp. 575–590, 2024.
- [2] T. M. o. P. H. Department of Thai Traditional and Alternative Medicine, "Health knowledge handbook," Retrieved: https://ockt.dtam.moph.go.th/images/Document/สุขภาพกัญชาA5total.pdf. 2024.
- R. Kalayasiri and S. Boonthae, "Trends of cannabis use and related harms before and after legalization for recreational purpose in a developing country in Asia," *BMC Public Health*, vol. 23, no. 1, p. 911, 2023. https://doi.org/10.1186/s12889-023-15883-6
- [4] R. G. Pertwee, "Targeting the endocannabinoid system with cannabinoid receptor agonists: Pharmacological strategies and therapeutic possibilities," *Philosophical Transactions of the Royal Society B: Biological Sciences*, vol. 367, no. 1607, pp. 3353– 3363, 2012. https://doi.org/10.1098/rstb.2011.0381
- [5] K. Polsorn, "The possibility of using cannabis for recreation in Thailand," *Journal of Kasetsart Education Review*, vol. 35, no. 1, pp. 101–112, 2020.
- [6] M. Rotermann, "Looking back from 2020, how cannabis use and related behaviours changed in Canada," *Health Reports*, vol. 32, no. 4, pp. 3–14, 2021. https://doi.org/10.25318/82-003-x202100400001-eng
- [7] United Nations Office on Drugs and Crime, "Booklet 3 Drug market trends: Opioids, cannabis," Retrieved: https://www.unodc.org/unodc/en/data-and-analysis/wdr-2021\_booklet-3.html. 2024.
- [8] S. Boontae, "Survey project on attitudes and behaviors towards drug use: A case study of people aged 15–65 years in 20 provinces in all regions of the country," Retrieved: https://cads.in.th/cads/content?id=130. 2024.
- [9] BBC News Thai, "Cannabis: Food and snacks with cannabis. How to eat them safely," Retrieved: https://www.bbc.com/thai/thailand-61797479. 2024.
- [10] The Royal College of Paediatricians of Thailand, "The impact of legal cannabis laws on the health of children and adolescents," Retrieved: https://tmc.or.th/pdf/Ped-cannabis-06072565.pdf. 2024.
- [11] L. Sakulpacharoen, "Health literacy and behaviors to prevent inappropriate use of cannabis among school age group in Udon Thani province," *Research and Development Health System Journal*, vol. 16, no. 2, pp. 230–243, 2023.
- [12] L. D. Bishop, D. H. Drakes, J. R. Donnan, E. C. Rowe, and M. Najafizada, "Exploring youths' cannabis health literacy post legalization: A qualitative wtudy," *Journal of Adolescent Research*, vol. 40, no. 1, pp. 130–160, 2022. https://doi.org/10.1177/07435584221118380
- [13] A. Thipnet, "Effectiveness of health education program to develop drug health intelligence of Grade 6 students at Kasetsart University Demonstration School, Educational Research and Development Center. Bangkok: Kasetsart University," Retrieved: https://dric.nrct.go.th/index.php?/Search/SearchDetail/272069. 2024.
- [14] B. Sornpaisarn *et al.*, "Fact and analysis of thailand's cannabis policies: A public health perspective," *Journal of Health Science of Thailand*, vol. 32, no. 2, pp. 375–388, 2023.
- [15] R. Ransing *et al.*, "Current state of cannabis use, policies, and research across sixteen countries: Cross-country comparisons and international perspectives," *Trends in Psychiatry and Psychotherapy*, vol. 44, no. Suppl 1, p. e20210263, 2022. https://doi.org/10.47626/2237-6089-2021-0263
- [16] N. Zinboonyahgoon, S. Srisuma, W. Limsawart, A. S. C. Rice, and C. Suthisisang, "Medicinal cannabis in Thailand: 1-year experience after legalization," *Pain*, vol. 162, no. Suppl 1, pp. S105-S109, 2021. https://doi.org/10.1097/j.pain.0000000002266
- [17] BNH Hospital, "Medical cannabis clinic," Retrieved: https://www.bnhhospital.com/medical-cannabis-clinic-bnh-hospital/. 2024.
- [18] A. O. Oriola, P. Kar, and A. O. Oyedeji, "Cannabis sativa as an herbal ingredient: Problems and prospects," *Molecules*, vol. 29, no. 15, p. 3605, 2024. https://doi.org/10.3390/molecules29153605
- [19] J. A. Knottnerus *et al.*, "Cannabis policy in The Netherlands: Rationale and design of an experiment with a controlled legal ('closed') cannabis supply chain," *Health Policy*, vol. 129, p. 104699, 2023. https://doi.org/10.1016/j.healthpol.2023.104699
- [20] K. Jaiyim and P. Nonthanathorn, "Attributes of cannabis dispensary selected by consumers in Bangkok metropolitan," *Journal* of the Association of Researchers, vol. 28, no. 3, pp. 97–113, 2023.

- [21] J. S. Brook, C. Zhang, E. Rubenstone, B. A. Primack, and D. W. Brook, "Comorbid trajectories of substance use as predictors of antisocial personality disorder, major depressive Episode, and generalized anxiety disorder," *Addictive Behaviors*, vol. 62, pp. 114–121, 2016. https://doi.org/10.1016/j.addbeh.2016.06.003
- [22] Thammasart University, "Disputes the ambiguity: What is the cost of cannabis?," Retrieved: https://tu.ac.th/thammasat-040865-law-expert-clearing-confusion-cannabis-law. 2024.
- [23] C. Plengjaroensirichai and P. Nonthanathorn, "Attributes of the cannabis cafés selected by consumers in Bangkok Metropolitan," *Journal of the Association of Researchers*, vol. 28, no. 3, pp. 27-44, 2023.
- [24] Growstuffshop.com, "List of cannabis shops and cannabis cafes that sell cannabis flowers in Bangkok," Retrieved: https://growstuffshop.com/%E0%B8%A3%E0%B9%E0%B8%B2%E0%B8%B2%E0%B8%99%E0%B8%81%E0%B8%B1%E0%B8% 8D%E0%B8%8A%E0%B8%B2-where-to-buy-cannabis-in-bangkok. 2024.
- [25] Bangkokbiznews.com, "Restaurants need to know: If you want to add "cannabis to your food," you need to do it correctly," Retrieved: https://www.bangkokbiznews.com/health/1009970. 2024.
- [26] Hemp and Cannabis.com, "Terms and quantities of use of "hemp" and "cannabis" according to Thai law," 2024. [Online]. Available: https://www.xn--12carlcod7zem.com/05/128/
- [27] Thai Cosmetic Manufacturers Association, "FDA issues law to support the unlocking of cannabis and hemp for the benefit of health products, food, cosmetics and herbal products, and provides full consultation to entrepreneurs," Retrieved: https://thaicosmetic.org/index.php/tcmanews/news-from-media/84-2021-09-08-06-32-37. 2024.
- [28] Food and Drug Administration, "Ministry of Public health. The use of cannabis leaves in cooking or preparing food in food establishments," Retrieved: https://food.fda.moph.go.th/cannabis/info-04. 2024.
- [29] M. o. P. H. Department of Health, "The Department of Health is actively engaged, collaborating with local officials to underscore that restaurants use cannabis must prominently display signs, emblems, and explicit warning statements," Retrieved: https://anamai.moph.go.th/th/news-anamai/43285. 2024.
- [30] G. P. Jacobs *et al.*, "Knowledge and attitudes of adolescents to e-cigarettes: an international prospective study," *International Journal of Adolescent Medicine and Health*, vol. 33, no. 5, p. 20190210, 2021. https://doi.org/10.1515/ijamh-2019-0210
- [31] National Institute on Drug Abuse, Cannabis: The facts youneed to know. 2024.
- [32] P. Wannapaschaiyong, S. Bunman, and O. Choukuljaratsiri, "Cannabis and its effects on the health of children and adolescents," *Siriraj Medical Bulletin*, vol. 16, no. 2, pp. 181–187, 2023. https://doi.org/10.33192/smb.v16i2.260132
- [33] F. R. Lamy and N. Meemon, "Exploring Twitter chatter to assess the type and availability of cannabis-related products in Thailand," *Journal of Ethnicity in Substance Abuse*, 2024. https://doi.org/10.1080/15332640.2024.2367253
- [34] J. Chuenruetai, "Communication of cannabis on social media in thai society," *Journal of MCU Buddhapanya Review*, vol. 8, no. 6, pp. 226-232, 2023.
- [35] E. Yaochuang and B. Jandusitkhajorn, "The effectiveness of cannabis and hemp awareness-enhancing program among 8th grade students in Saraburi Province," *Journal of Health Consumer Protection*, vol. 3, no. 2, pp. 39-49, 2023.
- [36] A. Buapradit, M. D., K. W., and S. Saengungsumalee, "The development of a community network and promoting health literacy in safe medical cannabis use for the people of Nakhon Nayok Province," *Journal of Roi Kaensarn Academi*, vol. 9, no. 5, pp. 312-324, 2024.
- [37] B. Halpern, "Critical awakening: Enhancing students' agency through critical media literacy," *Educational Research and Development Journal*, vol. 27, no. 1, pp. 14–35, 2024.
- [38] N. P. Barnett, G. T. DiGuiseppi, E. A. Tesdahl, and M. K. Meisel, "Peer selection and influence for marijuana use in a complete network of first-year college students," *Addictive Behaviors*, vol. 124, p. 107087, 2022. https://doi.org/10.1016/j.addbeh.2021.107087
- [39] G. Karatay and N. Gürarslan Baş, "Effects of role-playing scenarios on the self-efficacy of students in resisting against substance addiction: A pilot study," *Inquiry: A Journal of Medical Care Organization, Provision and Financing,* vol. 54, p. 46958017720624, 2017. https://doi.org/10.1177/0046958017720624
- [40] B. M. Moffat, R. J. Haines-Saah, and J. L. Johnson, "From didactic to dialogue: Assessing the use of an innovative classroom resource to support decision-making about cannabis use," *Drugs: Education, Prevention and Policy*, vol. 24, no. 1, pp. 85–95, 2016. https://doi.org/10.1080/09687637.2016.1206846
- [41] P. M. King, J. Klemmer, K. Mansell, J. Alcorn, and H. Mansell, "Development of the REACH (Real Education About Cannabis and Health) Program for Canadian youth," *Journal of Nursing Education*, vol. 59, no. 8, pp. 465-469, 2020. https://doi.org/10.3928/01484834-20200723-09
- [42] K. M. Gardiner, J. A. Singleton, J. Sheridan, G. J. Kyle, and L. M. Nissen, "Health professional beliefs, knowledge, and concerns surrounding medicinal cannabis - A systematic review " *PloS One*, vol. 14, no. 5, p. e0216556, 2019. https://doi.org/10.1371/journal.pone.0216556
- [43] Y. Thepa, "The effects of programs promoting health literacy and prevention behavior of new smoker in the lower secondary school students a school in Ngao District, Lampang Province," *Primary health care journal (Northern edition)*, vol. 34, no. 2, pp. 12-26, 2024.
- [44] K. S. Mendoza and M. L. McPherson, "Knowledge, skills, and attitudes regarding the use of medical cannabis in the hospice population: An educational intervention," *American Journal of Hospice and Palliative Medicine*, vol. 35, no. 5, pp. 759-766, 2018. https://doi.org/10.1177/1049909117738246
- [45] G. J. Botvin, K. W. Griffin, C. Botvin, and M. Murphy, "Acevedo, B. Increasing implementation fidelity for school-based drug abuse prevention: effectiveness of enhanced training and technical assistance," *Journal of the Society for Social Work and Research*, vol. 9, no. 4, pp. 599–613, 2018. https://doi.org/10.1086/700972