

Factors Associated with Demand for Medical Cannabis Use among Breast Cancer Patients in Northern Thailand: A Cross-Sectional Study

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Abstract

Objective: Breast cancer is the leading cause of death among women worldwide. Although modern treatments are recognized as effective, they often cause side effects. In Thailand, medical cannabis (MC) was legalized in 2019 with limited research on demand for its use. Therefore, this study aimed to identify factors associated with demand for MC among breast cancer patients in the North of Thailand as a target group. **Methods:** This cross-sectional analytical study administered multistage random sampling to recruit 432 breast cancer patients in northern Thailand. Ethical approval and signed written informed consents were obtained from the patients, prior to the study. A standardized, self-administered structured questionnaire was used to obtain the sociodemographic characteristics, clinical characteristics, social support, attitudes toward MC, knowledge about MC, health literacy about MC, and questions on demand for MC use. The scores from all questionnaires were converted to percentages before analysis. **Result:** A total of 173 (40%) of patients with breast cancer reported demand to use MC. The factors that were significantly associated with demand to use MC included had high levels of health literacy about MC (adj.OR = 4.96; 95% CI: 2.77 to 8.87), higher levels of social support (adj.OR = 4.56; 95% CI: 2.20 to 9.42), higher monthly household income (adj.OR = 4.02; 95% CI: 2.33 to 6.94), and positive attitudes toward MC use (adj.OR = 3.52; 95% CI: 1.91 to 6.52) when controlling for effects of other covariates. **Conclusion:** We found substantial demand for MC use among breast cancer patients. Health literacy, social support, monthly household income, and attitudes about MC were significantly associated with demand for MC use. Therefore, improving health literacy, social support, and attitudes about MC, especially among breast cancer patients, could help increase demand for MC as a complementary and alternative medicine alongside cancer treatment.

Keywords: Alternative medicine- ganja- marijuana- tumor

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Introduction

Breast cancer is a growing problem and one of the most important causes of death among women worldwide, accounting for an estimated 685,000 deaths and 2.3 million diagnoses (WHO, 2021). The burden of breast cancer in Thailand is similarly significant, with more than 22,158 new cancer cases and 8,266 deaths recorded in 2020, comprising over 6.6% of the premature deaths attributable to cancer (WHO, 2021). Currently, there are many methods to treat breast cancer, such as surgery, radiation therapy, chemotherapy, hormone therapy, and novel therapeutic methods, as well as combination therapies. The choice

of the aggressiveness of the treatment depends on several factors, including the biologic aggressiveness of the tumor, progression of disease, potential long-term toxicities, the health status of patient, the preferences of the patients and family members, and the life expectancy of the patient (Das et al., 2019; Barzaman et al., 2020). However, despite many effective treatments, many of these treatments can cause side effects and reduced health-related quality of life (Fisusi and Akala, 2019). Therefore, the cannabis plant may be a potential alternative for reducing the side effects of modern treatments.

Cannabinoids (CBs) from cannabis, such as Δ^9 -tetrahydrocannabinol (Δ^9 -THC) and cannabidiol

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(CBD), have been shown to be an effective treatment for providing relief of symptoms associated with cancer and its treatment, including nausea, anorexia, cancer- and treatment-related cognitive impairment, anxiety, depression, fatigue, insomnia, and cancer-related pain in the palliative treatment of cancer patients. Additionally, in animal models, CBD has been shown to inhibit the tumor progression of several cancer types, including breast cancer (Pellati et al., 2018; Kleckner et al., 2019; Kisková et al., 2019). Many countries have recognized the effectiveness of cannabis and allow the legal use of cannabis for medicinal purposes. In addition, some countries allow the legal use of cannabis for recreational purposes (Hussain et al., 2021). In Thailand, The Thai government authorized the use of cannabis for medical purposes in 2019. The rapid introduction of medical cannabis (MC) has increased patients' desire to use cannabis for treating illnesses, especially among cancer patients.

MC use among breast cancer patients can be considered a form of complementary and alternative medicine (CAM). Sociodemographic factors that appear to be related to CAM use among breast cancer patients have shown some notable trends. For example, a systematic review about CAM use among breast cancer showed that younger age, higher education, higher income, being married, involvement in a support group, having health insurance, and having previously used CAM were all factors associated with use of CAM (Keene et al., 2019). Similarly, in Ethiopia, rural residency, higher educational status, higher average monthly income, and presence of co-morbidity were positively associated with the use of CAM (Ayele et al., 2017). These trends mimic trends in the broader population. For example, in Mongolia, female gender, younger age, higher education, shorter disease duration, and prior use of CAM were significantly associated with CAM use including herbal medicine (Oyunchimeg et al., 2017).

Clinical characteristics are also important. Patients that have undergone or completed radiotherapy or have completed chemotherapy reported a high prevalence of CAM use (Chen et al., 2008). An advanced stage of cancer, longer time since diagnosis, and higher need of CAM information were also significantly associated with CAM use (Shin et al., 2012). Increased usage of CAM has also been associated with reduced trust in physicians (Azhar et al., 2016). Besides demographics and clinical characteristics, social support, attitudes toward MC, and health literacy can be an important factors in determining CAM usage. For example, in northern Thailand, health literacy, social support, and attitudes about MC were significantly associated with demand for MC use among cancer patients (Sukrueangkul et al., 2022). Similarly, another previous study in South Peninsular Malaysia found that social support can be an important factor in determining CAM usage. For example, in that study researcher found that patients' families and friend encouraged them to use CAM, with the internet and social networks being the major sources of information on CAM (Razali et al., 2020). Additionally, health literacy regarding CAM is also important, with younger patients

typically having higher levels of health literacy (Ahmad Sharoni et al., 2019).

Therefore, given the importance of various factors that have been reviewed in previous studies, as well as the novelty of MC use in Thailand, it is imperative to study these factors to understand how these factors may affect the demand for MC use among cancer patients. Thus, to provide data that may direct MC policy, a target group was selected in Thailand. Given the higher incidence of cancer in northern Thailand relative to the rest of the country, we were interested in studying demand of MC use among breast cancer patients in the region. This study aimed to identify factors associated with demand for MC use among breast cancer patients in the North of Thailand.

Materials and Methods

Study design

This cross-sectional study was conducted using an anonymous paper-based survey administered in out-patient cancer clinics located at six public hospitals that are cancer treatment centers within the north of Thailand (within Ministry of Public Health Regions 1 to 3). The six hospitals were multistage randomly selected.

Participants

Participants were eligible for inclusion based on the following criteria: Any cancer patient with a breast cancer diagnosis, receiving treatment at one of the studied hospitals, aged 18 or older, able to read and write in Thai, and mentally and physically able to answer the questionnaire were eligible for inclusion in the study. Recruitment took place between October 2020 and March 2021. Participants were recruited by registered nurse. Participants who received end stage cancer diagnosis or whose severe symptoms prevented them from providing information were excluded.

Instruments

Data were collected using a self-administered questionnaire that included 6 items with structured question format about MC. Social support was assessed using a social support questionnaire, which was coded into a score from 20 to 100. Attitudes about MC were assessed using a questionnaire, which was coded into a score from 15 to 45. Knowledge about MC was assessed using a questionnaire, which was coded into a score from 0 to 20. Finally, health literacy about MC was assessed using a health literacy instrument, which was coded into a score from 47 to 188. The scores from all questionnaires were converted to percentages before analysis. The questionnaire was constructed after reviewing the literature and was evaluated by a panel of five experts in the field of CAM, health behavior, pharmacology, research methodology and other medical sciences for validity. The questionnaire was trialed to test the reliability. The overall average Cronbach's Alpha was 0.88 for the questionnaires.

Data Analysis

All data were analysed using the STATA software version 15.0 with 100% of data entry checked for accuracy.

Descriptive statistics including frequency and percentage were used to describe categorical data, whereas mean and standard deviation were used for continuous data. Simple logistic regression was used to identify association between each individual independent variable and demand of MC use. The independent factors that had a p-value smaller than 0.25 (Bursac et al., 2008) were processed in the multivariable analysis using a generalized linear mixed model (GLMM) to identify factors associated with demand of MC use when controlling for the effect of other covariates. The magnitude of effects were presented as adjusted odds ratio (adj.OR) and 95% confidence interval (CI), using a statistical significance level $\alpha=0.05$.

Ethical considerations

This research has been approved by the Lampang Cancer Hospital Ethics Committee in Human Research based on the Declaration of Helsinki and the ICH Good Clinical Practice Guidelines. Reference No. 8/2020.

Results

Patient Characteristics

In total, 432 cancer patients were included in the final analysis (Table 1). Most of the participants were females (99.8%), and 46.0% were middle-aged with a mean age of 55.2 ± 10.9 years. Most participants reported being currently married or in a domestic partnership (75.0%), having completed only primary school (63.4%), and earning a monthly income less than or equal to 10,000 THB (around 350 USD). Almost one-third of participants lived in rural areas. Considering health coverage, 68.3% were covered under the Universal Coverage Scheme, which is the government welfare health insurance. Many participants (64.4%) had a comorbidity in addition to cancer. The average time from diagnosis of cancer was 12.14 months with a large amount of variability (± 19.81 months). Almost half (57.6%) of participants were categorized into a group with early stage of breast cancer. Treatment included chemotherapy (66.7%), radiation therapy (13.9%), and surgery (12.5%). A large majority of respondents (86.8%) reported having received information about MC. The most common source of MC information was family (75.4%), television (53.7%), and social media (29.3%).

Social Support, Attitudes, Knowledge, Health Literacy, and Demand for MC

Almost one-third of participants had a low level of social support (Table 1), while 39.5% had a high level of positive attitudes about MC. Knowledge about MC was well distributed, with almost one-third of participants having an average level of knowledge about MC. Concerning health literacy, just over half were categorized as having problematic health literacy (56.2%). Overall, less than half of participants (40.0%) reported having a demand for MC.

Bivariable analysis of factors associated with demand for MC use

Simple logistic regression was used to identify

Table 1. Sociodemographic Factors among Breast Cancer Patients on Demand for Medical Cannabis use in the North of Thailand (n=432)

Factors	Number	Percentage
Gender		
Female	431	99.8
Male	1	0.2
Age group		
≤45 (young adult)	79	18.3
45-59 (middle-aged adult)	199	46
≥60 (elderly)	154	35.7
Mean ± S.D. = 55.2 ± 10.9		
Marital Status		
Married/domestic partnership	324	75
Divorced/separated/widowed	62	14.3
Single	46	10.7
Highest education level		
Primary school	274	63.4
Junior high school and higher	158	36.6
Employment Status		
Unemployed/Retired	279	64.6
Employed/Government officer/ Businesses	153	35.4
Monthly income (THB)		
≤10,000	289	66.9
≥10,000	143	33.1
Mean ± S.D. = 11,069.87 ± 11,902.01		
Place of residence		
Rural area	272	63
Metropolitan area	160	37
Scheme		
Universal Coverage	295	68.3
Civil Servant Medical Benefit	66	15.3
Social Security	71	16.4
Health status		
Comorbidity	278	64.4
No Comorbidity	154	35.6
Time from diagnosis with cancer (month)		
< 12	354	81.9
≥12	78	18.1
Mean ± S.D. = 12.14±19.81		
Stage of Cancer		
Unknown	19	4.4
Early-stage	249	57.6
Advance stage	164	38
Current treatment received		
Chemotherapy	288	66.7
Radiation therapy	60	13.9
Surgery	54	12.5
Other	30	6.9
Received information about MC		
Yes	375	86.8
No	57	13.2

Table 1. Continued

Factors	Number	Percentage
Source of MC information (patients can choose more than one)		
Family	326	75.5
Television	232	53.7
Social media	127	29.4
Doctor, pharmacist, and medical staff	92	21.3
Newspaper/ brochures/ Academic article	77	17.8
Radio	59	13.7
Thai traditional medicine	43	10
Other	25	5.8
Social support		
Low (less than 60 percentage)	159	36.8
Moderate (60-79 percentage)	145	33.6
High (greater than or equal to 80 percentage)	128	29.6
Mean ± S.D. = 66.19 ± 12.97		
Attitude toward MC		
Poor (less than 60 percentage)	133	30.8
Fair (60-79 percentage)	128	29.6
Good (greater than or equal to 80 percentage)	171	39.6
Mean ± S.D. = 69.29± 14.21		
Knowledge about MC		
Low (less than 60 percentage)	131	30.3
Average (60-79 percentage)	157	36.3
Good (greater than or equal to 80 percentage)	144	33.4
Mean ± S.D. = 60.15 ± 11.20		
Health Literacy for medicinal cannabis use dimensions		
Inadequate (0-50 percentage)	72	16.7
Problematic (51-65 percentage)	243	56.3
Sufficient (66-84 percentage)	58	13.4
Excellent (85 percentage and over)	59	13.6
Mean ± S.D. = 62.86 ±12.48		
Demand to MC use		
No	259	60
Yes	173	40

association between each individual independent variable and demand of MC use (Table 2). The independent factors that had a p-value smaller than 0.25 included being employed/government officer/businesses (OR = 2.88; 95% CI: 1.90 – 4.35 : p-value <0.001), having a higher monthly household income (OR = 3.96; 95% CI: 2.59 – 6.03 : p-value <0.001), having health coverage under the Civil Servant Medical Benefit Scheme (OR = 1.76; 95% CI: 1.17 - 2.65: p-value = 0.007), having a moderate to high level of social support (OR = 6.86; 95% CI: 4.18-11.26; p-value <0.001), having a fair to good attitude toward MC use (OR = 5.22; 95% CI: 3.13 – 8.69;

p-value <0.001), having an average to good knowledge about MC use (OR = 2.92; 95% CI: 1.84 – 4.63; p-value <0.001), and adequate to excellent levels of health literacy about MC (OR = 10.46; 95% CI: 6.29 – 17.39; p-value <0.001) (Table 2).

Multivariable analysis of factors associated with demand for MC use

The multivariable analysis using GLMM with backward elimination indicated that the factors significantly associated with demand to MC use were: adequate to excellent health literacy about MC (adj.OR = 4.96; 95% CI: 2.77 to 8.87), moderate to high levels of social support (adj.OR =4.56; 95% CI: 2.20 to 9.42), higher monthly household income (adj.OR =4.02; 95% CI: 2.33 to 6.94), and positive attitudes toward MC use (adj.OR = 3.52; 95% CI: 1.91 to 6.52) when controlling for effects of other covariates (Table 3).

Discussion

We found that 40.0% of breast cancer patients in the North of Thailand reported having demand for MC use. This finding was comparable to actual CAM usage among breast cancer patients reported in Grömitz, Germany (Hammersen et al., 2020), and in New York, USA (Sura et al., 2022). Those countries have a longer history of legalized MC use compared to Thailand. In 2019, the Thai government legalized MC use as an alternative medicine to treat illnesses. Demand for MC use in Thai cancer patients, including breast cancer patients, may have been enhanced by recent attention. After controlling for covariates with backward elimination in the multivariate analysis, four variables were significantly associated with demand for MC use among breast cancer patients in the North of Thailand. Those variables were adequate to excellent health literacy about MC, higher levels of social support, higher monthly household income, and positive attitudes toward MC use.

In our study, we also found that participants that had adequate to excellent levels of health literacy about MC were 4.96 times more likely to report having demand to use MC when compared with those with insufficient and problematic levels of health literacy about MC. This result is similar to that of a previous study in the North of Thailand by Sukrueangkul et al., (2022). Health literacy is a strong factor that has been shown to correlate with demand for MC usage among cancer patients. Another study reported that CAM usage was significantly associated with adequate levels of health literacy among patients with chronic diseases in Japan (Yukawa et al., 2015).

People who reported moderate to high levels of social support were 4.56 times more likely to report demand for MC use when compared with those with low levels of social support. Previous research in Canada by Leos-Toro, Shiplo and Hammond (2018) has also shown that social support to be related to MC use in cancer patients. Another study among breast cancer patients in the northern region of peninsular Malaysia reported that CAM usage was positively correlated with receiving information about

Table 2. The Bivariable Analysis of Factors Associated with Demand to MC Use among Breast Cancer Patients in the North of Thailand (n=432)

Factors	Number	% Demand to MC use	Crude OR	95% CI	P-value
Occupation					<0.001
Unemployed/Retired	279	31.83	1	-	
Employed/Government officer/Businesses	153	57.34	2.88	1.90 – 4.35	
Monthly income (THB)					<0.001
≤10,000	289	29.41	1	-	
≥10,001	143	62.24	3.96	2.59 – 6.03	
Scheme					0.007
Universal coverage/Social security scheme	295	35.93	1	-	
Civil servant medical benefit	137	49.64	1.76	1.17 - 2.65	
Social support					<0.001
Low	159	15.09	1	-	
Moderate to high	273	54.95	6.86	4.18-11.26	
Attitude toward MC					<0.001
Poor	133	16.54	1	-	
Fair to Good	299	50.84	5.22	3.13 – 8.69	
Knowledge about MC use					<0.001
Low	131	23.66	1	-	
Average to good	301	47.51	2.92	1.84 – 4.63	
Health literacy about MC					<0.001
Inadequate- Problematic	315	26.03	1	-	
Adequate- Excellent	117	78.63	10.46	6.29 – 17.39	

cancer and nutritional supplements from sources apart from doctors, including TV and radio (Knight, Hwa, & Hashim, 2015). Thus, a possible explanation of these results is that most of the participants who received social support had received information about MC products from sources that were mostly close friends and family members, television or radio, or social media.

Breast cancer patients with a higher monthly household income were 4.02 times more likely to report demand for MC use when compared with those with lower monthly household income. This result was similar to that of a previous study in Hungary by Sárváry and Sárváry (2019), which reported higher monthly household income

was positively correlated with CAM use in breast cancer patients. This finding may be explained by the added costs of MC. In Thailand, the price of MC is quite expensive and is not always covered by welfare health coverage. Thus, when participants have higher monthly household income, they can buy MC for alternative medicine in conjunction with conventional treatment. In some previous studies, such as one in Bandung, Indonesia by Azhar et al., (2016), CAM usage was more common in patients who had lower income, which was more a reflection of seeking alternative treatments in response to conventional treatment being unaffordable. Since Thailand has universal health coverage, this health seeking behavior is less common.

Table 3. The Multivariable Analysis of Factors Associated with Demand to MC Use among Breast Cancer Patients in the North of Thailand (n=432)

Factors	Number	% Demand to MC use	Crude OR	Adjust OR	95% CI	P-value
Monthly income (THB)						<0.001
≤10,000	289	29.41	1	1	-	
≥10,001	143	62.24	3.96	4.02	2.33 – 6.94	
Social support						< 0.001
Low	159	15.09	1	1	-	
Moderate to high	273	54.95	6.86	4.56	2.20 – 9.42	
Attitude toward MC use						< 0.001
Poor	133	16.54	1	1	-	
Fair to Good	299	50.84	5.22	3.52	1.91 – 6.52	
Health literacy about MC						< 0.001
Inadequate/ Problematic	315	26.03	1	1	-	
Adequate/ Excellent	117	78.63	10.46	4.96	2.77 – 8.87	

Those participants who reported a fair to good attitude toward MC use were 3.52 times more likely to report demand for MC use when compared to those with poor attitudes toward MC use. This result is similar to that of a previous study in Malaysia by Islahudin et al., (2017), which reported that a positive attitude toward MC was positively correlated with CAM use in cancer patients. As reported in an earlier study in Pennsylvania, USA, by Bauml et al., (2015), attitude toward CAM was the factor that most influenced the decision to use CAM in cancer patients and explained much more variance in CAM use than clinical and demographic variables alone. When participants have a positive attitude towards MC, it reduces fears of the side effects. On the other hand, a lack of knowledge about MC use policy, reduces confidence in the decision to use MC. Similar to a previous study by Sukrueangkul et al., (2022), most patients (53.3%) have positive attitudes toward MC, and demand was intentioned to treat physical and mental symptoms that occur alongside cancer-related symptoms, relieve side effects from treatment, and a desire to live longer and improve their health.

This cross-sectional study found that 40.0% of breast cancer patients in the North of Thailand reported demand to use MC. The factors significantly associated with reported demand to use MC were adequate to excellent health literacy about MC use, moderate to high levels of social support, higher monthly household income, and positive attitudes toward MC use when controlling for effects of other covariates.

In conclusion, this study highlights the factors associated with demand for MC use among breast cancer patients in the of north Thailand. We found substantial demand for MC use among breast cancer patients. Health literacy, social support, monthly household income, and attitudes about MC were significantly associated with demand for MC use. Therefore, improving health literacy, social support, and attitudes about MC, especially among breast cancer patients, could help increase demand for MC as a complementary and alternative medicine to alleviate side effects and enhance cancer treatment.

Author Contribution Statement

All authors contributed equally in this study.

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Limitations of the study

This study used only data from breast cancer patients in the north of Thailand. Therefore, the results may not apply to breast cancer patients overall in Thailand.

Study Implication

The results showed that factors associated with demand for medical cannabis use among breast cancer patients in the of North Thailand included health literacy, social support, monthly household income, and attitudes

about MC. Therefore, improving health literacy, social support, and attitudes about MC, especially among breast cancer patients, could help increase demand for MC as a complementary and alternative medicine use to alleviate side effects and enhance cancer treatment.

Approval

The current study deals with primary data, so approval of the scientific body is not needed.

Ethical considerations

This research has been approved by the Lampang Cancer Hospital Ethics Committee in Human Research base on the Declaration of Helsinki and the ICH Good Clinical Practice Guidelines. Reference No. 8/2020.

Availability of data

The datasets are not publicly available due to ethical restrictions but are available from the corresponding author on reasonable request.

Conflict of interest

All authors declared no conflict of interest.

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