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บทความวิจัย

ปัจจัยที่ส่งผลต่อพฤติกรรมการสูบบุหรี่ไฟฟ้าของนักเรียนชั้นมัธยมศึกษา อำเภอเมือง จังหวัดลำปาง

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บทคัดย่อ

การศึกษานี้มุ่งทดสอบผลกระทบของการสูบบุหรี่ของคนใกล้ชิด การรับรู้สื่อทางออนไลน์ ความเชื่อเกี่ยวกับบุหรี่ไฟฟ้า ทัศนคติเกี่ยวกับบุหรี่ไฟฟ้า ที่ส่งผลต่อพฤติกรรมการสูบบุหรี่ไฟฟ้าของนักเรียนชั้นมัธยมศึกษา อำเภอเมือง จังหวัดลำปาง การวิจัยนี้ใช้การออกแบบการวิเคราะห์เชิงภาคตัดขวางโดยมีตัวอย่างเป็นนักเรียน 250 คน เก็บข้อมูลโดยใช้แบบสอบถามและวิเคราะห์ข้อมูลด้วยการวิเคราะห์เส้นทาง ผลการวิจัยระบุว่าการสูบบุหรี่ของคนใกล้ชิดและการรับรู้สื่อทางออนไลน์มีผลกระทบอย่างมีนัยสำคัญต่อความเชื่อเกี่ยวกับบุหรี่ไฟฟ้าและทัศนคติเกี่ยวกับบุหรี่ไฟฟ้าซึ่งส่งผลต่อพฤติกรรมการสูบบุหรี่ไฟฟ้า โดยการสูบบุหรี่ของคนใกล้ชิดมีผลต่อความเชื่อเกี่ยวกับบุหรี่ไฟฟ้า (β = 0.245) และทัศนคติเกี่ยวกับบุหรี่ไฟฟ้า (β = 0.276) อย่างมีนัยสำคัญ ขณะที่การรับรู้สื่อทางออนไลน์มีผลต่อความเชื่อเกี่ยวกับบุหรี่ไฟฟ้า (β = 0.318) และทัศนคติเกี่ยวกับบุหรี่ไฟฟ้า (β = 0.245) อย่างมีนัยสำคัญเช่นกัน ทั้งนี้ความเชื่อเกี่ยวกับบุหรี่ไฟฟ้าและทัศนคติเกี่ยวกับบุหรี่ไฟฟ้าสามารถร่วมกันอธิบายความแปรปรวนของพฤติกรรมการสูบบุหรี่ไฟฟ้า 41.5% ซึ่งแสดงให้เห็นถึงบทบาทสำคัญในการกำหนดพฤติกรรมการสูบบุหรี่ไฟฟ้า ผลการวิจัยนี้ชี้ให้เห็นถึงความจำเป็นในการพัฒนาแผนที่มุ่งเน้นการลดอิทธิพลของการสูบบุหรี่ของคนใกล้ชิด การรับรู้สื่อทางออนไลน์และการปรับเปลี่ยนความเชื่อและทัศนคติเพื่อช่วยลดการใช้บุหรี่ไฟฟ้าในกลุ่มวัยรุ่น การวิจัยนี้ให้ข้อมูลเชิงลึกที่มีคุณค่าสำหรับผู้กำหนดนโยบาย นักการศึกษา และผู้เชี่ยวชาญด้านสุขภาพในการพัฒนาโปรแกรมการป้องกันที่มีประสิทธิภาพต่อไป โดยโรงเรียนและหน่วยงานรัฐบาลควรแก้ไขปัจจัยที่ส่งเสริมการใช้บุหรี่ไฟฟ้าในกลุ่มนักเรียนมัธยมศึกษาผ่านการจัดการศึกษาเกี่ยวกับความรู้เท่าทันสื่อและบังคับใช้กฎระเบียบที่เข้มงวดมากขึ้นเกี่ยวกับการโฆษณาและการขายบุหรี่ไฟฟ้าโดยเฉพาะทางออนไลน์

คำสำคัญ: การสูบบุหรี่ไฟฟ้า, การสูบบุหรี่ของคนใกล้ชิด, การรับรู้สื่อทางออนไลน์, ความเชื่อ, ทัศนคติ

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Original Article

Factors Influencing E-cigarette Smoking Behavior Among Secondary School Students in Mueang District, Lampang Province

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Abstract

This study examines the impact of peer smoking, online media exposure, beliefs, and attitudes towards e-cigarettes on e-cigarette use among secondary school students in Mueang District, Lampang Province. The research uses a cross-sectional analytical design with a sample of 250 students. Data was collected using a questionnaire and path analysis was analyzed the data. Results indicate that peer smoking and online media significantly impact beliefs and attitudes towards e-cigarettes, which in turn strongly influence smoking behavior. Peer smoking had a notable effect on both beliefs (β = 0.245) and attitudes (β = 0.276), while media exposure significantly affected beliefs (β = 0.318) and attitudes (β = 0.245). Beliefs and attitudes collectively explained 41.5% of the variance in e-cigarette use, highlighting their critical role in shaping behavior. These findings suggest the need for targeted interventions focusing on peer influence, media literacy, and reshaping beliefs and attitudes to reduce e-cigarette use among adolescents. This research provides valuable insights for policymakers, educators, and health professionals in developing effective prevention programs. Schools and government agencies should address factors contributing to e-cigarette use among secondary students by implementing media literacy education and enforcing stricter regulations on -cigarette advertising and sales, especially online.

Keywords: E-cigarette Use, Peer Smoking, Online Media Exposure, Adolescent beliefs and attitudes

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Introduction

The use of e-cigarettes (electronic cigarettes) among young people has become a growing concern worldwide, including in Thailand. E-cigarettes, also known as electronic nicotine delivery systems, are devices that heat a liquid to create an aerosol, which is then inhaled by the user[1]. In 2023, 5.9% of middle and high school students globally reported using e-cigarettes, equating to approximately 1.63 million young people. Among these, 7.8% of high school students (around 1.21 million) were current users, compared to 3.5% of middle school students (approximately 410,000). These statistics indicate that e-cigarette use is more common in older students than in younger ones. The data suggests a need for targeted efforts to reduce vaping among youth, especially in high schools.[2] This liquid often contains nicotine, flavorings, and other harmful chemicals, making e-cigarettes a significant health risk. E-cigarette usage poses significant health risks due to exposure to harmful substances, including nicotine and toxic chemicals. These substances can damage the lungs, increase the risk of respiratory diseases, and affect heart health. Additionally, e-cigarettes may encourage nicotine addiction, especially among young users, potentially leading to long-term health problems[3].

In Thailand, the prevalence of e-cigarette use among youth has been increasing, with more young people experimenting with and regularly using these products[4]. Factors such as peer influence, online media exposure, and personal beliefs and attitudes toward e-cigarettes play a crucial role in shaping the behavior of adolescents regarding e-cigarette use[5,6,7]. Peer smoking is known to be a strong predictor of tobacco use among youth, as adolescents are highly influenced by their friends' behaviors[6]. Similarly, the portrayal of e-cigarettes in online media can glamorize their use, leading to increased curiosity and acceptance among young viewers[7]. Recent data indicates that the use of e-cigarettes in Thailand is increasing, particularly among adolescents and young adults. A national survey conducted in 2021 found that 0.14% of the population aged 15 and older used e-cigarettes, which marked a sevenfold increase from the previous survey in 2017[8]. Notably, males were 13 times more likely to use e-cigarettes than females. Among different age groups, those aged 15-24 had the highest prevalence of e-cigarette use at 0.26%[9]. This trend highlights a growing concern as e-cigarettes have become increasingly accessible, appealing, and often perceived as less harmful than traditional cigarettes.

Beliefs and attitudes toward e-cigarettes are also critical factors that influence usage[5]. Many adolescents perceive e-cigarettes as less harmful than traditional cigarettes, which may lead them to underestimate the associated health risks[9]. This perception is often reinforced by targeted marketing strategies that promote e-cigarettes as trendy and less dangerous[5]. Additionally, the belief that e-cigarettes can help with stress or social integration further encourages their use among teenagers[9]. The growing trend of e-cigarette use among youth represents a significant public health challenge. As

such, it is crucial to investigate the underlying factors contributing to this issue and develop comprehensive strategies to mitigate the associated risks[3]. This study contributes to the existing body of knowledge by examining the combined impact of peer influence, media exposure, and personal beliefs on e-cigarette use among secondary school students (Mattayom 1 to Mattayom 6), with the goal of promoting healthier behaviors and reducing the burden of nicotine addiction in young populations.

The study was conducted among secondary school students in Muang District, Lampang Province, due to concerns about youth e-cigarette use. Data from the 2021 Population Health Behavior Survey indicated that the Northern Thailand had a high proportion of young e-cigarette users compared to other regions. Specifically, 3.81% of youth aged 15-19 in the Northern Thailand who currently smoked were using e-cigarettes[12]. This age group is a critical period for health behavior development and long-term health risks. By focusing on Muang District, this study aimed to better understand the local factors influencing e-cigarette use among students. The findings can help develop targeted prevention strategies to reduce youth smoking in the region.

This study aims to explore the impact of peer smoking, online media exposure, and the beliefs and attitudes of secondary school students towards e-cigarettes on their usage patterns. By focusing on students in Mueang District, Lampang Province, the research seeks to identify the key factors that drive e-cigarette use among this population. Understanding these influences is essential for developing targeted interventions to reduce the prevalence of e-cigarette use and prevent the initiation of smoking among adolescents. Moreover, the findings from this research will provide valuable insights into the specific socio-cultural dynamics that influence e-cigarette use among Thai youth. It will also help to inform policymakers, educators, and health professionals in designing effective prevention programs that address the unique challenges faced by adolescents in Mueang District, Lampang Province.

Research Objective

1 . To study the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province.

2. To exam the impact of smoking by peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the e-cigarettes smoking behavior of secondary school students in Mueang District, Lampang Province.

Research Methodology

The research design is a cross-sectional analytical study aims to exam the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province, and

investigating the impact of peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the smoking behavior of these students.

Population and Sampling

The population consists of students currently studying at the lower (Mattayom 1 to Mattayom 3) and upper secondary school levels (Mattayom 4 to Mattayom 6) in Mueang District, Lampang Province, who are e-cigarette smokers. The exact number of the population is unknown in this study, making it an infinite population.

The sample size for this research was calculated using Cochran's formula[9]. The study determined that the population proportion is represented by students currently enrolled in lower (Mattayom 1 to Mattayom 3) and upper secondary levels (Mattayom 4 to Mattayom 6) education in Mueang District, Lampang Province who engage in e-cigarettes smoking, set at 0.5. The confidence level was set at 95%, with an allowable margin of error of 5%[9]. Based on these calculations, the sample size was determined to be 345.74, approximately 346 participants. A purposive sampling method was employed, targeting students in lower (Mattayom 1 to Mattayom 3) and upper secondary levels (Mattayom 4 to Mattayom 6) education in Mueang District, Lampang Province who are e-cigarettes smokers. This was combined with convenient sampling, considering eligibility criteria for selecting participants into the study. The eligibility criteria used in this study included inclusion criteria: students who consented to participate in the research and agreed to answer the survey questions, and exclusion criteria: students who refused to answer the survey questions. Data collection took place between April and May 2024, resulting in 250 students who consented to participate in the research and agreed to complete the survey, representing 72.25% of the calculated sample size.

Research Instrument

The research instrument used in this study is a questionnaire developed based on concepts related to the research objectives. The questionnaire is divided into six sections as follows:

Section 1 The Prevalence of E-cigarettes Smoking

This section examines the proportion or number of students in lower and upper secondary school in Mueang District, Lampang Province, who smoke e-cigarettes. It includes questions on gender, age, age at first e-cigarette use, reasons for trying e-cigarette for the first time, the duration of e-cigarette use per day, the most frequent time of e-cigarette use, types of e-cigarettes used, the purchasing channels for e-cigarettes, and the most frequent places for vaping, using a nominal scale for measurement.

Section 2 Peer Smoking

This section measures the perception of lower and upper secondary school students in Mueang District, Lampang Province, who smoke e-cigarettes and have experienced seeing close individuals—such as parents, siblings, relatives, close friends, or partners—engaging in smoking behaviors, including both traditional cigarettes and e-cigarettes. This section includes six questions using a four-level ordinal scale to measure perceived facts.

Section 3 Online Media Exposure

This section measures the perception of lower and upper secondary school students in Mueang District, Lampang Province, who smoke e-cigarettes regarding the frequency and understanding of advertisements or information that promote a positive image of e-cigarettes. It also includes the perception of positive messages about e-cigarettes that appear on various online platforms, such as websites, social media (e.g., Facebook, Instagram, TikTok), and other online applications. This section includes five questions using a four-level ordinal scale to measure perceived facts.

Section 4 Beliefs About E-cigarettes

This section measures the perception of lower and upper secondary school students in Mueang District, Lampang Province, who smoke e-cigarettes and believe that e-cigarettes are not harmful to health, can help quit traditional cigarettes, enhance one's image, and are socially accepted, as well as having good flavors and scents. This section includes six questions using a four-level ordinal scale to measure perceived facts.

Section 5 Attitudes Towards E-cigarettes

This section measures the perception of lower and upper secondary school students in Mueang District, Lampang Province, who smoke e-cigarettes and have positive feelings or a liking towards e-cigarettes. It reflects positive opinions about e-cigarettes in various aspects, such as being trendy, modern, safe, helpful for quitting smoking, and having good flavors and a variety of scents. This section includes five questions using a four-level ordinal scale to measure perceived facts.

Section 6 E-cigarettes Smoking Behavior

This section measures the perception of lower and upper secondary school students in Mueang District, Lampang Province, who smoke e-cigarettes and intend to continue using e-cigarettes regularly or continuously in the near future. This section includes five questions using a four-level ordinal scale to measure perceived facts,

The questionnaire sections 2 to 6 use a Likert scale with the following scoring: 4 points for “most closely reflects reality,” 3 points for “reflects reality,” 2 points for “somewhat reflects reality,” and 1 point for “does not reflect reality.”

To ensure the quality of the research instrument, each part of the questionnaire was reviewed for validity by three experts: one pediatric specialist, one child and adolescent nursing academic, and one experienced pediatric nurse. The validity of the questionnaire was determined using the Index of Item-Objective Congruence (IOC), with results ranging from 0.70 to 1.00, indicating

that all parts of the questionnaire were consistent with the definitions intended to be measured. Subsequently, the validated questionnaire was piloted with a sample of 30 secondary school students who were not part of the target group to test its reliability using Cronbach's Alpha Coefficient. The overall reliability score of the questionnaire was 0.911.

Data Collection

Data was collected from students studying in lower and upper secondary levels in Mueang District, Lampang Province, who are involved in e-cigarettes smoking. The participating students were required to consent to join the research and to agree to respond to the questionnaire, totaling 250 students, which accounts for 72.25% of the sample size as calculated. Data collection for this research was conducted according to the eligibility criteria for selecting participants, and the data was gathered between April and May 2024.

Data Analysis

The data analysis of the prevalence of e-cigarette smoking among the sample group was conducted using frequency and percentage calculations. The mean, standard deviation, kurtosis, and skewness were used to test the normal distribution of the data. For hypothesis testing on the impact of peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the smoking behavior of secondary school students in Mueang District, Lampang Province, Path Analysis was performed using JAMOVI, with statistical significance set at the 0.05 level, and influence coefficients were calculated.

Research Result

The presentation of the research results is divided into two parts: part 1 covers the findings of the study on the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province. For part 2 covers the findings of the study on the impact of peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the e-cigarettes smoking behavior of secondary school students in Mueang District, Lampang Province. The details are as follows:

Part 1 the findings of the study on the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province

To address the first research objective, which is to study the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province, the research findings are as follows:

Table 1 the findings of the study on the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province N = 250

Variable	Frequency	Percentage
Gender		
Male	126	50.40
Female	114	45.60
LGBTQ+	10	4.00
Age		
11 – 12 years	2	8.00
13 – 14 years	81	32.40
15 – 16 years	103	41.20
17 – 18 years	64	25.60
Age at first e-cigarette use		
Less than 8 years	16	6.40
8 – 10 years	70	28.00
11 – 12 years	84	33.60
13 – 14 years	61	24.80
15 – 16 years	7	2.80
17 – 18 years	11	4.40

Table 1 the findings of the study on the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province (cont.) N = 250

Variable	Frequency	Percentage
Reasons for trying e-cigarette for the first time		
Curiosity or experimentation	148	59.20
Peer influence	38	15.20
Stress relief	47	18.80
Perceived as cool or stylish	15	6.00
Encouragement from a partner/significant other	2	0.80
Duration of e-cigarette uses per day		
1 Time	98	39.20
2 Times	33	13.20
3-5 times	52	20.80
More than 5 times	67	26.80
The most frequent time of e-cigarette use		

Variable	Frequency	Percentage
Morning	11	4.40
Lunchtime	26	10.40
After school	63	25.20
Evening	54	21.60
Night	96	38.40
Types of e-cigarettes used		
Disposable	147	58.80
Refillable	103	41.20

Table 1 the findings of the study on the prevalence of e-cigarettes smoking among secondary school students in Mueang District, Lampang Province (cont.) N = 250

Variable	Frequency	Percentage
Purchasing channels for e-cigarettes		
Online stores, such as Facebook, Instagram, TikTok, and Grab	152	60.80
Friends/acquaintances	92	36.80
Family members	6	2.40
The most frequent places for vaping		
Own home	94	37.60
School	19	7.60
Outside of school	50	20.00
Places where they often gather with friends	84	34.80

The finding on the prevalence of e-cigarette uses among secondary school students in Mueang District, Lampang Province, (Table 1) reveals significant insights into the demographic characteristics and behaviors associated with e-cigarette use. Among the participants, 50.4% were male, 45.6% were female, and 4% identified as LGBTQ+. The majority of students who reported using e-cigarettes were aged 15-16 years (41.2%), followed by those aged 13-14 years (32.4%), and a smaller proportion were 17-18 years old (25.6%). The initiation of e-cigarette uses commonly occurred at ages 11-12 (33.6%) and 8-10 years (28%), indicating early exposure to e-cigarette products.

Curiosity or experimentation was the leading reason for trying e-cigarettes, reported by 59.2% of the students. Other notable reasons included stress relief (18.8%) and peer influence (15.2%). A substantial number of students (39.2%) reported using e-cigarettes once per day, while 26.8% used them more than five times daily. The most common times for e-cigarette use were at night (38.4%)

and after school (25.2%). Disposable e-cigarettes were more popular (58.8%) compared to refillable types (41.2%).

E-cigarettes were mainly purchased online through platforms like Facebook, Instagram, TikTok, and Grab (60.8%), highlighting the accessibility of these products through digital channels. Friends or acquaintances were also common sources (36.8%), whereas family members were the least frequent source (2.4%). The most frequent places for vaping were the students' own homes (37.6%) and locations where they gathered with friends (34.8%), suggesting that these environments play a critical role in their vaping habits. Overall, these findings emphasize the prevalence of e-cigarette use among secondary school students in Mueang District, Lampang Province and underline the need for targeted interventions to address this growing public health concern.

Part 2 the findings of the exam on the impact of peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the e-cigarettes smoking behavior of secondary school students in Mueang District, Lampang Province

To address research objective 2, which is to exam the impact of peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the e-cigarettes smoking behavior of secondary school students in Mueang District, Lampang Province, the research findings are as follows:

Before conducting the path analysis test, the researcher examined the normal distribution of the data. It was found that the variables peer smoking, online media exposure, beliefs about e-cigarettes, attitudes towards e-cigarettes, and e-cigarette smoking behavior had means ranging from 1.606 to 2.262 and standard deviations ranging from 0.732 to 0.804, which are below 1, indicating a moderate distribution of values[10]. The kurtosis values ranged from -0.006 to 0.939, which are within 10, and the skewness values ranged from -0.675 to 0.395, which are within 2, suggesting that the data are within acceptable limits[10]. The variables appear to be normally distributed, as the skewness and kurtosis values fall within acceptable ranges, indicating that the data meet the assumptions for normality. The details are shown in Table 2.

Subsequently, the researcher examined the linear relationships among the variables by calculating the Pearson Product Moment Correlation Coefficient. The analysis revealed that each pair of variables had a statistically significant positive correlation at the 0.01 level, with correlation coefficients (r) ranging from 0.321 to 0.872. This indicates that the relationships among all variables are linear. However, considering the criterion that a correlation coefficient (r) exceeding 0.70 between certain pairs of variables may suggest the presence of multicollinearity, the researcher further analyzed the Tolerance and Variance Inflation Factor (VIF) values. The results showed that the Tolerance values ranged from 0.227 to 0.644, all above 0.1, and the VIF values ranged from 1.522 to 4.412, all below 10. These results indicate that the independent variables are not highly correlated with each other, thus not causing multicollinearity issues in the path analysis[10]. Details are presented in Table 3.

Table 2 the results of the normality test of the data distribution

Variable	Mean	Standard deviation	Kurtosis	Skewness
Peer Smoking (PSM)	2.174	0.742	0.132	-0.641
Online Media Exposure (OME)	2.262	0.749	-0.006	-0.675
Beliefs About E-cigarettes (BEC)	1.820	0.732	0.802	0.041
Attitudes Towards E-cigarettes (AEC)	1.173	0.752	0.939	0.078
E-cigarettes Smoking Behavior (EMC)	1.606	0.804	1.206	0.395

Table 3 the results of the linear relationship analysis of the variables

	EMC	PSM	OME	BEC	AEC	Tolerance	VIF
EMC	1.000					-	-
PSM	0.321**	1.000				0.644	1.552
OME	0.362**	0.559	1.000			0.628	1.591
BEC	0.682**	0.423**	0.455**	1.000		0.227	4.412
AEC	0.702**	0.413**	0.400**	0.872**	1.000	0.238	4.210

*Note ** Correlation is significant at the 0.01 level.*

Based on the analysis of the impact of peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the e-cigarettes smoking behavior of secondary school students in Mueang District, Lampang Province, using path analysis, the findings are as follows (Table 4 and Figure 1):

Peer smoking (PSM) influences beliefs about e-cigarettes (BEC) with an unstandardized regression coefficient of 0.241 and a standardized regression coefficient (β) of 0.245, which is statistically significant at the 0.05 level. Peer smoking (PSM) influences attitudes towards e-cigarettes (AEC) with an unstandardized regression coefficient of 0.280 and a standardized regression coefficient (β) of 0.276, which is statistically significant at the 0.05 level. For online media exposure (OME) influences beliefs about e-cigarettes (BEC) with an unstandardized regression coefficient of 0.311 and a standardized regression coefficient (β) of 0.318, which is statistically significant at the 0.05 level. Online media exposure (OME) influences attitudes towards e-cigarettes (AEC) with an unstandardized regression coefficient of 0.246 and a standardized regression coefficient (β) of 0.245, which is statistically significant at the 0.05 level. For beliefs about e-cigarettes (BEC) influences e-cigarettes smoking behavior (EMC) with an unstandardized regression coefficient of 0.320 and a standardized regression coefficient (β) of 0.319, which is statistically significant at the 0.05 level. For attitudes towards e-cigarettes (AEC) influences e-cigarettes smoking behavior (EMC) with an unstandardized

regression coefficient of 0.480 and a standardized regression coefficient (β) of 0.492, which is statistically significant at the 0.05 level. Beliefs about e-cigarettes (BEC) has a coefficient of determination (R^2) of 0.248, or 24.80%, which is statistically significant at the 0.05 level. Attitudes towards e-cigarettes (AEC) has a coefficient of determination (R^2) of 0.212, or 21.20%, which is statistically significant at the 0.05 level. E-cigarettes smoking behavior (EMC) has a coefficient of determination (R^2) of 0.415, or 41.50%, which is statistically significant at the 0.05 level.

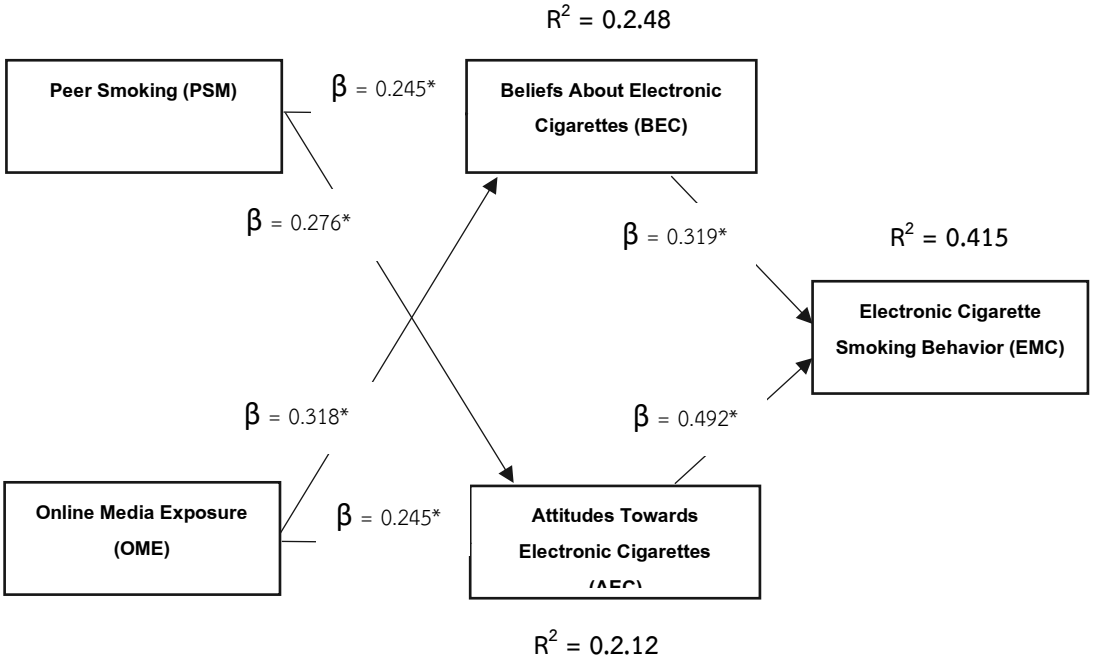
Further calculations in Table 5 of influence revealed the following as peer Smoking (PSM) affects beliefs about e-cigarettes (BEC) through its impact on e-cigarettes smoking behavior (EMC), with an effect size of 0.078, which is statistically significant at the 0.05 level. Peer smoking (PSM) affects attitudes towards e-cigarettes (AEC) through its impact on e-cigarettes Smoking Behavior (EMC), with an effect size of 0.136, which is statistically significant at the 0.05 level. Online media exposure (OME) affects beliefs about e-cigarettes (BEC) through its impact on e-cigarettes smoking behavior (EMC), with an effect size of 0.102, which is statistically significant at the 0.05 level. Online media exposure (OME) affects attitudes towards e-cigarettes (AEC) through its impact on e-cigarettes smoking behavior (EMC), with an effect size of 0.121, which is statistically significant at the 0.05 level.

Table 4 Parameter estimation for unstandardized regression coefficient and a standardized regression coefficient

Variables		Parameter estimation				
Dependent	**Independent**	**Estimate**	**S.E.**	**β**	**z**	**Sig.**
EMC	BEC	0.320	0.049	0.319	6.43	< 0.005
EMC	AEC	0.480	0.048	0.492	9.90	< 0.005
BEC	PSM	0.241	0.065	0.245	3.70	< 0.005
BEC	OME	0.311	0.064	0.318	4.82	< 0.005
AEC	PSM	0.280	0.068	0.276	4.08	< 0.005
AEC	OME	0.246	0.067	0.245	3.63	< 0.005

Table 5 Parameter estimation for unstandardized regression coefficient and a standardized regression coefficient

Description of Variables	Parameter estimation				
	Estimate	**S.E.**	**β**	**z**	**Sig.**
PSM → BEC → EMC	0.077	0.024	0.078	3.210	< 0.005
PSM → AEC → EMC	0.134	0.036	0.136	3.775	< 0.005
OME → BEC → EMC	0.100	0.026	0.102	3.855	< 0.005
OME → AEC → EMC	0.118	0.035	0.121	3.405	< 0.005



*Note * is significant at the 0.05 level.*

Figure 1 The findings of the study on the impact of peer smoking, online media exposure, beliefs about e-cigarettes, and attitudes towards e-cigarettes on the e-cigarettes smoking behavior of secondary school students in Mueang District, Lampang Province

Conclusion and Discussion

The study highlights a concerning prevalence of e-cigarette use among secondary school students in Mueang District, Lampang Province, with significant insights into the associated demographic characteristics and behaviors. The findings indicate that male students and those aged 15-16 years are more likely to use e-cigarettes, with many starting as early as 8-12 years old. Curiosity, stress relief, and peer influence are key drivers of e-cigarette use, and usage patterns suggest frequent daily consumption, often in private settings like homes or social gatherings. The popularity of disposable e-cigarettes and the ease of online purchasing through social media platforms point to the accessibility of these products. These results underscore the urgent need for targeted public health interventions to reduce e-cigarette use among adolescents in this region, addressing both the social and digital influences that contribute to early initiation and sustained use. Moreover, the findings of this study show that peer smoking and online media exposure significantly influence beliefs and attitudes towards e-cigarettes among secondary school students in Mueang District, Lampang Province. Specifically, peer smoking has a notable impact on both beliefs and attitudes, with standardized regression coefficients of 0.245 and 0.276, respectively. Similarly, online media exposure

significantly affects beliefs (β = 0.318) and attitudes (β = 0.245) towards e-cigarettes. These beliefs and attitudes, in turn, strongly influence e-cigarettes smoking behavior, with attitudes showing a higher impact (β = 0.492) compared to beliefs (β = 0.319). The study reveals that beliefs and attitudes together explain 41.5% of the variance in e-cigarettes use, highlighting the critical role of these factors in shaping students' smoking behavior. This underscores the importance of addressing both peer influence and media exposure in interventions aimed at reducing e-cigarette use among adolescents.

The findings of this study are consistent with previous research, which highlights the significant impact of peer influence, online media exposure, and individual beliefs and attitudes on e-cigarette use among adolescents. Ueamporn and Kitipong[4] found that peer encouragement and exposure to friends using e-cigarettes significantly increased the likelihood of use among students, similar to this results that peer smoking significantly influences beliefs and attitudes towards e-cigarettes. This underscores the critical role of social circles in shaping smoking behaviors, suggesting that interventions aimed at reducing e-cigarette use should address peer influence as a primary factor.

Furthermore, the influence of online media exposure on beliefs and attitudes towards e-cigarettes, as demonstrated in this study, aligns with the findings of Boontaeng et al.[5]. This previous study observed that students exposed to online content promoting e-cigarettes were more likely to use them. This results, which showed that online media exposure significantly affects both beliefs and attitudes towards e-cigarettes, reinforce the idea that media plays a crucial role in normalizing and promoting e-cigarette use among adolescents. These findings indicate that regulating online content and implementing media literacy programs could be effective strategies in reducing e-cigarette use.

Additionally, this research found that both beliefs and attitudes towards e-cigarettes significantly influence smoking behavior, which is consistent with Seeherunwong et al[6]. This previous study reported that positive beliefs and favorable attitudes towards e-cigarettes were associated with a higher likelihood of use among students. This supports the notion that individual cognitive factors, such as beliefs and attitudes, are key drivers of smoking behavior. The alignment of our findings with these studies emphasizes the need for comprehensive prevention strategies that not only address peer and media influences but also aim to reshape students' beliefs and attitudes towards e-cigarettes.

This study's findings are in agreement with existing literature that highlights the multifaceted nature of factors influencing e-cigarette use among adolescents. By recognizing the consistent impact of peer influence, online media exposure, and individual beliefs and attitudes, targeted interventions can be developed to effectively mitigate the increasing prevalence of e-cigarette use among secondary school students in Mueang District, Lampang Province.

For a limitation of this research is the relatively small sample size of 250 participants, which may affect the generalizability of the findings. The results might not fully represent the broader population of secondary school students in Muang District, Lampang Province.

Recommendation

Schools and government agencies should take proactive measures to reduce e-cigarette use among secondary school students by addressing the significant influences identified in this study: peer smoking, online media exposure, beliefs, and attitudes towards e-cigarettes. Schools should implement comprehensive educational programs that focus on media literacy and critical thinking skills to help students recognize and resist persuasive online content promoting e-cigarettes. Additionally, peer-led initiatives and support groups can be effective in reducing the influence of peer smoking by fostering a school environment where healthy behaviors are promoted and peer pressure is mitigated.

Government agencies should enforce stricter regulations on the advertising and sale of e-cigarettes, particularly targeting online platforms where students are exposed to promotional content. Policies should include age verification systems for online purchases and restrictions on advertisements that glamorize e-cigarette use. Furthermore, collaboration between schools and health agencies can enhance awareness campaigns that not only inform students of the risks associated with e-cigarette use but also actively challenge the positive beliefs and attitudes that drive this behavior. By targeting these key areas, both schools and government agencies can play a critical role in curbing the rising trend of e-cigarette use among adolescents.

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