

# Determinant of Intention E-cigarettes Use Among a Sample of Senior High School Students in Surabaya

Hendra Eka Alifiyanto<sup>1</sup>, Sri Widati<sup>2</sup>, Rachmat Hargono<sup>2</sup>

<sup>1</sup>Master's Student, <sup>2</sup>Senior Lecturer, Departement of Health Promotion and Behavioral Science, Faculty of Public Health Universitas Airlangga, Surabaya 60115 East Java, Indonesia

## Abstract

**Background:** The prevalence of smoking in Indonesia in 2018 among adolescents (10-18 years old) was 9.1%. Surabaya has 9,28% of boys who are active smokers and acknowledged smoking every day. Adolescents using conventional cigarettes are also tend to be interested to using e-cigarette.

**Objective:** The aim of this study was to analyze the factors that associate the intention of e-cigarettes use in adolescents in Surabaya.

**Method:** The type of study was observational analytic design with cross sectional. The sample size was determined by cluster random sampling, in 8 school which includes 291 students. Data collection was through filling out the online questionnaire and analyzed using logistic regression test to determine the association between variables.

**Results:** This results of this study show that the factors that have positively associated to intentions of e-cigarettes use by adolescent are instrumental attitudes (3,035), injunctive norm (2,561), descriptive norm (4,896) and self efficacy (3,526). Experiential attitude and perceived control did not associated the intention of adolescents e-cigarette use.

**Conclusion:** Providing education to adolescents, parents and educational stakeholders about the dangers of using e-cigarettes and restrictions on adolescents access to e-cigarettes should take considered the long-term impact of e-cigarette.

*Keywords :* e-cigarette, intention, adolescent

## Introduction

In general, deaths by cigarette occur in several countries with low and medium income per capita.<sup>18</sup> WHO states Indonesia occupy on third in the world in the number of active smokers of 65 million (28%) after China with 390 million and India with 144 million from 718 million total of active smokers in the world.<sup>18</sup>

One of the methods used by WHO to reduce the dangers of tobacco smoking is by using Nicotine Replacement Therapy (NRT). NRT is a method by providing nicotine needed by smokers without burning tobacco, one of which is an e-cigarette. This tool uses electricity from battery power to deliver nicotine in the form of vapor and WHO calls it the Electronic Nicotin Delivery System (ENDS).<sup>20</sup>

E-cigarette was initially considered as a safe product for health because the solution does not contain TAR and other toxic substances contained in tobacco cigarettes.<sup>20</sup> Adolescents who use conventional cigarette tend to be interested in using e-cigarettes.<sup>14</sup> America conducted to e-cigarettes research related and the results found that e-cigarettes contain toxic Tobacco Specific

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### Corresponding Author:

Sri Widati,

Department of Health Promotion and Behavioral Science Faculty of Public Health, Universitas Airlangga Kampus C Mulyorejo Surabaya City, East Java, 60115, Indonesia Tel: +62315920948, Fax: +62315924618 E-mail: sri-widati@fkm.unair.ac.id

Nitrosamines (TSNA) and Diethy Glycol (DEG) which is known as a carcinogen.<sup>5</sup>

The presences of toxic and carcinogenic substances causes the issuance of warnings about the dangers of toxic and carcinogens in e-cigarettes to restrict the distribution and sale of e-cigarettes in the United States and several other countries.<sup>5</sup> Another danger of e-cigarettes is that they can significantly increase plasma nicotine levels, plasma carbon monoxide levels and pulse rates within five minutes of use. Surely it would be detrimental to health if consumed long term.<sup>17</sup>

There was an increase in the use of e-cigarettes from 2011 to 2017 among adolescents in junior high school and senior high school in the United States.<sup>13</sup> The average proportion of population aged ≥10 years in Indonesia who use e-cigarettes was 2.8%. The most age groups that use e-cigarettes was the age group 10-14 years (10.6 %) and age 15-19 years (10.5%).<sup>4</sup>

The most adolescents motivation to use e-cigarettes because they think e-cigarettes are cool and fun.<sup>10</sup> Adolescents also belief that e-cigarettes can help them to stop using conventional cigarettes.<sup>12</sup> According to WHO, the awareness about the existence of e-cigarettes greater on the people who live in urban.<sup>19</sup> Surabaya becomes a research area because it becomes the second largest city in Indonesia after Jakarta with a population of 2,892,200 peoples.

The behavior of using e-cigarettes of adolescents which is associated by aspects of themselves and

the environment can be studied using the Integrated Behavioral Model theory. Integrated Behavioral Model is a theory at the individual level to analyze the causes of individuals to take certain actions or not.<sup>7</sup>

Based on the problems above, this study aims to determine the association of experiential attitude, instrumental attitude, injunctive norms, descriptive norms, perceived control and self-efficacy of the intention of Surabaya adolescents to use e-cigarettes.

**Methods**

This study is observational analytical with cross sectional design. The population in this study was all students in senior high school from 22 public high schools in Surabaya with a total of 22,448 students. Sample size was determined by using cluster random sampling. This technique is used for sampling through two stages and involves more than one sample method. The first stage is to determine the school as a research sample so that eight schools are selected. The second stage is to determine the number of respondents using so that it produces 282 as the minimum respondent. Data collection is done through filling out online questionnaires and analyzed using logistic regression tests to determine the association between variables.

**Results and Discussion**

The questionnaire was filled by 291 students from eight senior high schools in Surabaya . Table 1 shows the characteristics of adolescents based on their e- cigarette behavior.

**Table 1 Characteristics of Adolescents Based on E-cigarettes Use**

Variable	E-cigarettes Use				Total	
	Current User		Never User			
	n	%	n	%	n	%
Age						
<16 years old	14	13,2	92	85,8	106	100,0
17-18 years old	47	25,7	136	74,3	183	100,0
19 years old	1	50,0	1	50,0	2	100,0

**Cont... Table 1 Characteristics of Adolescents Based on E-cigarettes Use**

Variable	E-cigarettes Use				Total	
	Current User		Never User			
	n	%	n	%	n	%
Gender						
Male	49	31,8	105	68,2	154	100,0
Female	13	9,5	124	90,5	137	100,0
Allowence						
<IDR500.000	25	20,7	96	79,3	121	100,0
IDR500.000 – IDR1.000.000	33	19,9	133	80,1	166	100,0
>Rp.1.000.000	4	100	0	0,0	4	100,0
Source information about e-cigarette						
Surrounding Environment (friends and family)	59	24,7	180	75,3	239	100,0
Internet	0	0,0	18	100	18	100,0
Social Media	3	8,8	31	91,2	34	100,0

Almost adolescents who actively use e-cigarette are 17-18 years old with a male gender and have an allowance of IDR500,000-IDR1,000,000 per month. The surrounding environment of both friends and family of adolescents becomes a source of information about e-cigarettes.

**Table 2 Cross Tabulation of Behaviors, Perceived Norms and Personal Agency on E-cigarette Use**

Variable	E-cigarette Use				Total	
	Current User		Never User			
	n	%	n	%	n	%
<b>Experiential Attitude</b>						
Positive	45	41,3	64	58,7	109	100,0
Negative	17	9,3	165	90,7	182	100,0
<b>Instrumental Attitude</b>						
Helpful	39	41,9	54	58,1	93	100,0
Harmful	23	11,6	175	88,4	198	100,0
<b>Injunctive Norms</b>						
Good	38	40,0	57	60,0	95	100,0
Less	24	12,2	172	87,8	196	100,0
<b>Descriptive Norms</b>						
Good	37	37,4	62	62,6	99	100,0
Less	25	13,0	167	87,0	192	100,0

**Cont... Table 2 Cross Tabulation of Behaviors, Perceived Norms and Personal Agency on E-cigarette Use**

Variable	E-cigarette Use				Total	
	Current User		Never User			
	n	%	n	%	n	%
Perceived control						
Easy	33	43,4	43	56,6	76	100,0
Difficult	29	13,5	186	86,5	215	100,0
Self Efficacy						
Strong	44	47,3	49	52,7	93	100,0
Less	18	9,1	180	90,9	198	100,0
Intention to electric smoking						
Strong	43	8,8	33	91,2	76	100,0
Less	19	56,6	196	43,4	215	100,0

Adolescents who have a positive experiential attitude think that e-cigarettes are useful tend to actively use e-cigarettes. Almost adolescents who have injunctive norms and descriptive norms that are good for e-cigarettes tend to actively use e-cigarettes. Almost adolescents who have good descriptive norms tend to actively use e-cigarettes. Almost adolescents who feel the ease of use of e-cigarettes tend to be actively using the e-cigarette. Almost adolescents who have strong self-efficacy for using e-cigarettes tend to be active in using e-cigarettes. Adolescents feel confident in their ability to keep using e-cigarettes despite some obstacles of using e-cigarettes.

**Table 3 Association of experiential attitude, instrumental attitude, injunctive norms, descriptive norms, perceived control and self-efficacy of intentions**

Variable	Intention to use e-cigarette				Total		p-value	Exp (B)
	Strong		Less					
	n	%	n	%	n	%		
Experiential attitude								
Positive	48	44,0	61	56,0	109	100,0	0,228	1,585
Negative	28	15,4	154	84,6	182	100,0		
Instrumental attitude								
Helpful	46	49,5	47	50,5	93	100,0	0,003	3,035
Harmful	30	15,2	168	84,8	198	100,0		
Injunctive norm								
Good	49	51,6	46	48,4	95	100,0	0,011	2,561
Less	27	13,8	169	86,2	196	100,0		

**Cont... Table 3 Association of experiential attitude, instrumental attitude, injunctive norms, descriptive norms, perceived control and self-efficacy of intentions**

Variable	Intention to use e-cigarette				Total		p-value	Exp (B)
	Strong		Less					
	n	%	n	%	n	%		
<b>Descriptive norm</b>								
Good	55	55,6	44	44,4	99	100,0	0,001	4,896
Less	21	10,9	171	89,1	192	100,0		
<b>Perceived control</b>								
Easy	40	52,6	36	47,4	76	100,0	0,180	1,699
Difficult	36	16,7	179	83,3	215	100,0		
<b>Self efficacy</b>								
Strong	49	52,7	44	47,3	93	100,0	0,001	3,526
Less	27	13,6	171	86,4	198	100,0		

### A. Experiential attitude

Table 3 showed that there was no associated between experiential attitude to adolescent intentions to use e-cigarettes. The experiential attitude in this study was the adolescent positive or negative response to e-cigarettes use. Experiential attitude is a response that arises from the individual to the recommended behavioral idea. A person with a strong negative experiential attitude, it is unlikely that someone will display such behavior. Conversely, a person with a strong positive experiential attitude, then will be more likely to perform the suggested behavior. Fishbein's statement did not match the conditions on the ground in this study.<sup>6</sup>

The results are not in line with Thrasher & Sargents research which states that adolescents try to use e-cigarettes because of the tendency to look for something, sensations and new experiences from e-cigarettes.<sup>16</sup> Some adolescents consider that e-cigarettes are cool and a new trend. Its use of e-cigarettes in adolescents was associated with the positive perception of adolescents that e-cigarettes are more acceptable in society, the appeal of the taste of e-cigarettes, as well as the new experiences and sensations of e-cigarettes.<sup>11</sup>

### B. Instrumental Attitude

Table 3 show that instrumental attitude have a positive association on adolescent intention to use e-cigarettes. Adolescents with a instrmental attitude had a strong intention in using e-cigarettes by 3,035 times greater. Instrumental attitude is a person's response based on cognitive beliefs determined by beliefs about the outcome of performing such behavior.<sup>6</sup> The response is based on the benefits and disadvantages resulting from performing a particular behavior.

Most adolescents who actively use e-cigarettes consider that e-cigarettes have benefits such as being able to help reduce the use of conventional cigarettes and not cause health problems. In line with the results of the research Bernat, Gasquet, Wilson, Porter, & Choi that there is a correlation between adolescents with the perceived benefits of e-cigarettes.<sup>2</sup> The benefits felt by adolescents of e-cigarettes include helping to quit conventional smoking, having more friends, looking cooler and making more confident. Bigwanto, Nurmansyah, Orlan, Farradika, & Purnama also mentioned adolescents who have the perception that cigarettes do not cause addiction and do not cause health

problems but will have a tendency to use e-cigarettes.<sup>3</sup> The instrumental attitude that actively use e-cigarettes can be caused by a lack of knowledge or information received by adolescents regarding the dangers of e-cigarettes.

### C. Injunctive Norm

The injunctive norm had a significant effect on adolescent intentions in using e-cigarettes. Adolescents with good injunctive acidity on e-cigarette use were 2,561 times greater. Table 3 shows that there is positive association between injunctive norms on adolescent intentions to use e-cigarettes. The injunctive norm referred to this study is the belief of adolescents due to the opinions of people or groups of society that are considered important in e-cigarettes use.

The results of this study are in line with the research of Schoren, Karin, & Heinyang showed that the e-cigarettes use occurs because of the positive perception and support from the surrounding environment related to e-cigarettes use.<sup>15</sup> Positive opinions of the surrounding environment against e-cigarettes include family and friends are more agreeable using e-cigarettes than conventional cigarettes, and consider that e-cigarettes are better and safer.

In adolescence, it is common to spend more time with friends so it can be seen that the association of peers on attitudes to behavior greater than family.<sup>9</sup> This is also in line with field findings that many adolescent age groups choose to hang out with peers after school hours. Opinions or thoughts that arise also affect the pattern of behavior owned. They usually tends to choose something that considered their peers.

### D. Descriptive Norm

Table 3 shows that descriptive norms have a positive association with adolescent intentions in e-cigarettes use. Descriptive norm have a significant associated on adolescent intentions in e-cigarette use. Adolescents with descriptive norms both have a strong intention in using cigarettes by 4,896 times greater than less intention.

The descriptive norm in this study is the belief of adolescents due to the actions of most people or communities around that is using e-cigarettes or not. Descriptive norms are a state of norms prevailing in

society.<sup>7</sup>

The results are in line with research by Hua, Hua-Hie, Ron, Ann, & Sara which showed that adolescents who have close friends who use cigarettes will also be more likely to use e-cigarettes.<sup>8</sup> Research Bigwanto, Nurmansyah, Orlan, Farradika, & Purnama, also Barrington-Trimis, et al. found that adolescents who have families, especially parents who use e-cigarettes, cause adolescent tendencies and intentions to use it.<sup>1,3</sup>

The results showed that almost adolescents who actively use cigarettes such as close friends and parents also use e-cigarettes. In addition, e-cigarettes which is one of the growing trends today is also the reason adolescents use e-cigarettes. The habits of parents who use cigarettes give rise to a sense of inconsistency with the dangers and health problems caused by e-cigarettes. This can be seen by most adolescents consider there are examples or role models that are used as a reference in doing something, especially e-cigarettes.

### E. Perceived Control

Table 3 shows that perceived control has no association on adolescent intentions to use e-cigarettes. Almost adolescents who have easy perceived control over their use of cigarettes tend to have a strong intention to use e-cigarettes. However, there was no significant difference with adolescents who had difficult behavioral controls over e-cigarette use.

Perceived control is a person's perception or feeling to control behavior determined by various environmental factors that can make it easier or harder to perform such behaviors.<sup>7</sup> The perceived control determined by the individual's beliefs regarding the availability of resources whether equipment, compatibility, competence and opportunities that support or inhibit such behavior. The stronger confidence in the availability of resources and opportunities, the stronger the control of the behavior that the individual feels towards the behavior.

Almost adolescents who find it easier to find seller e-cigarettes and the free use of e-cigarettes in public places feel the price of e-cigarettes is increasingly expensive and can reduce the intention to use e-cigarettes. The government set a maximum excise rate of 57% on cigarettes which led the initial price of e-cigarettes

quite expensive. Almost adolescents especially those who actively use e-cigarettes, have an allowance of IDR500.000-IDR1.000.000 per month. This is in line with the results of research Bigwanto, Nurmansyah, Orlan, Farradika, & Purnama that adolescents who have enough money to buy cigarettes will also tend to use e-cigarettes.<sup>3</sup>

## F. Self Efficacy

Table 3 shows that self-efficacy has a positive association on adolescent intentions to use e-cigarettes. Self-efficacy have a significant associated with adolescent intentions to use e-cigarettes. Adolescents with self-efficacy had a strong intention to use cigarettes 3,526 times greater than those with less intentions. Adolescents who have high self-efficacy due to the large number of support from close friends to use e-cigarettes.

Adolescents with strong self efficacy encourage the strong intention of adolescents to use e-cigarettes. Almost adolescents who had strong self efficacy tended to have a strong intention to use e-cigarettes. Self-efficacy is a person's level of confidence in the ability to perform certain behaviors in various obstacles and obstacles.<sup>7</sup> Self-efficacy in this study is a adolescent's level of confidence in the ability to use e-cigarettes despite the obstacles that come with it. A person with high self efficacy does not necessarily have the ability to perform such behavior.<sup>21</sup>

The results of this study are in line with the research of Schoren, Karin, & Hein which showed the results that users of e-cigarettes with high self-efficacy will tend to continue to use e-cigarettes.<sup>15</sup> Current user will look at the situation and the surrounding environment that is able to support them to use e-cigarettes.

Almost adolescents have the confidence to keep using cigarettes because of the support of close friends who also use e-cigarettes. The findings in the field, there are some adolescents who claim the high price of supporting components e-cigarettes are still sure to use it and shares with their friends. Adolescents also claim that sharing or dues with their friends can be used as an opportunity to try more new variants, especially e-cigarette liquids.

Based on the findings in the field, some adolescents claimed to be allowed by their parents because it is considered healthier than conventional cigarettes. In addition, the increasing number of shops to online shops that sell e-cigarettes makes it easier for adolescents and sure to keep using e-cigarettes despite the obstacles faced.

## Conclusions

The conclusion is adolescents intentions to use cigarettes are associated by attitude factors, perceived norms and self-efficacy. Educating adolescents, parents and education stakeholders about the dangers of using cigarettes are important. Restrictions on adolescent access to e-cigarettes should also be taken into account the long-term impact of e-cigarette use.

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## References

1. Barrington-Trimis, J., Berhane, K., Unger, J., Cruz, T., Huh, J., Leventhal, A., et al. Psychosocial Factors Associated With Adolescent Electronic Cigarette and Cigarette Use. *Pediatrics*. 2015;136:308-317.
2. Bernat, D., Gasquet, N., Wilson, K., Porter, L., & Choi, K. Electronic Cigarette Harm and Benefit Perceptions and Use Among Youth. *American Journal of Preventive Medicine*. 2018;55(3):361-367.
3. Bigwanto, M., Nurmansyah, M., Orlan, E., Farradika, Y., & Purnama, T. Determinants of e-cigarettes Use Among a Sample of High School Students in Jakarta. *International Journal of Adolescent Medicine and Health*. 2018;1:1-8.
4. Departemen Kesehatan Republik Indonesia. *Riset Kesehatan Dasar: Berita Data Rokok*. Jakarta: Litbang Departemen Kesehatan Republik Indonesia. 2018.
5. FDA. *Summary Report on Antimicrobials Sold or Distributed for Use in Food-Producing Animals*.

- Food and Drug Administration Departement of Health and Human Services. 2009.
6. Fishbein, M., Ajzen, D., Albarracin, & Hornik, R. *Prediction and Change of Health Behavior: Applying the Reasoned Action Approach*. Hillsdale: Erlbaum. 2007.
  7. Glanz, K., Rimer, B., & Visvanath, K. *Health Behaviour and Health Education. Theory, Research and Practice 4<sup>th</sup> Edition*. USA: Jossey Bass. 2008.
  8. Ma, B.H., Hua-Hie, Y., Ron, B., Ann, M., & Sara, C. Factors Associated with Future Intentions to Use Personal Vaporisers among Those with Some Experience of Vaping. *Drug and Alcohol Review*. 2018; 37:216-225.
  9. Hurlock, E. *Psikologi Perkembangan: Suatu Pendekatan Sepanjang Rentang Kehidupan*. Jakarta: Erlangga. 1994.
  10. Khoury, M., Manlhiot, C., Fan, C., Gibson, D., Stearne, K., Chahal, N., et al. Reported Electronic Cigarette Use Among Adolescents in The Niagara Region of Ontario. *CMAJ*. 2016; 188(11):794-800.
  11. Lee, H., Lin, H., Seo, D., & Lohrmann, D. Determinants Associated with E-cigarettes Adoption and Use Intention Among College Students. *Addictive Behaviour*. 2017; 65:102-110.
  12. Lontrean, L. Use of Electronic Cigarettes among Roanian University Students: A Cross-sectional Study. *BMB Public Health*. 2015; 15:358.
  13. National Academies of Sciences Medicine. *Public Health Consequences of E-Cigarettes*. Washington DC: The National Academies Press. 2018.
  14. Rosanne, P., & Britt, H. *Young People and The Use of E-cigarettes in Wales*. London: ASH. 2014
  15. Schoren, C., Karin , H., & Hein, D. Electronic Cigarettes Use : Comparing Smokers, Vapers, and Duel Users on Characteristic and Motivational Factors. *Tobacco Prevention and Cessation*. 2017; 3(8).
  16. Thrasher, J., & Sargent, J. Prevalence and Correlates of E-cigarettes Perceptions and Trial Among Early Adolescents in Mexico. *Journal of Adolescent Health*. 2016; 58(3):358-365.
  17. Vansickel, A. R., Cobb, C. O., Weaver, M. F., & Thomas, E. E. A Clinical Laboratory Model For Evaluating The Acute Effects of Electronic “Cigarettes”: Nicotine Delivery Profile and Cardiovascular and Subjective Effects. *Cancer Epidemiol Biomarkers*. 2010; 19(8)1945-1953.
  18. WHO. *Factsheet 2013 Indonesia*. Dipetik September 26, 2018, WHO:<http://www.who.int/mediacentre/factsheets/fs339/en/>. 2013.
  19. WHO. *Global Youth Tobacco Survey Indonesia Report*. Indonesia. 2014.
  20. Trtchounian, A., William, M., & Talbot, P. Conventinal and Electronic Cigarette (e-Cigarette) Have Different Smoking Characteristics. *Nicotine Tobacco Research*. 2010; 12(9):905-912.
  21. Yzer, M. *Health Communication Message Design: Theory and Practice Chapter 2*. Los Angeles: SAGE. 2012.