

**Research Article**

# Does The Behaviour of Using Electronic Cigarette Correkates with Respiratory Disease Symptoms?

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Received: 25.04.20, Revised: 18.05.20, Accepted: 04.06.20

## ABSTRACT

There is a growing number of people who use an electronic cigarette in Surabaya, Indonesia. The use of electronic cigarettes can lead to breathing problems and cause toxicity in the respiratory tract as well as the worsening of airway obstruction. The study was carried out because there was a little study of electronic cigarettes. This study aimed to analyze the behavior of using an electronic cigarette and its effect on respiratory disease symptoms. The design of this study was descriptive correlational with a cross-sectional approach. The population was the electronic cigarette users in Surabaya. The sample was 100 respondents, recruited with snowball sampling. The independent variable was the behavior of using an electronic cigarette. The dependent variable was respiratory disease symptoms. The instrument was a questionnaire that has been tested the validity and reliability. The instrument used was a questionnaire. Data were analyzed using the Spearman rho test. The results showed that there was a correlation between the behavior of using an electronic cigarette and respiratory disease symptoms ( $p = 0.000$ ), and the correlation level was moderate ( $r = 0.457$ ). The behavior of using electronic cigarettes can cause respiratory disease symptoms.

**Keywords:** electronic cigarette, respiratory disease symptoms, smoking

## INTRODUCTION

The smoking behavior is an activity of someone burning then inhale, and exhale then cause smoke (Diana, Khomsan, Nurdin, Anwar, & Riyadi, 2018; Latiang, Nasir, & Masni, 2019; Sari, Sari, Darlan, & Prasetya, 2018; Wulaningsih, Serrano, Utarini, Matsuguchi, & Watkins, 2016). Electric cigarette users are currently found mainly in big cities. Users of an electric cigarette making as an alternative option to inhale nicotine (Damayanti, 2017). Electronic cigarettes can be found easily, through online, and offline sales. The average users of electric cigarettes are youth (Badan Pengawas Obat dan Makanan, 2015). According to the report of the Global Youth Tobacco Survey (GYTS) in 2014 that Indonesia is at the highest position as the number of smokers in the world. Results of the survey found 19.4% of teens lap up a conventional cigarette, as much as 2.1% of the teens who carried out the survey, including electric cigarette lap up 3% on boys and 1.1% on girls (Kemenkes RI, 2015). A study that was hold on March 20, 2019, found as many as 56 respondents are at a 17 year age range up to 28 years old with the new user of electric cigarettes to five years of using an electronic cigarette. As many as 14 respondents experiencing cough while using an electric cigarette, five of the

respondents experienced a sore throat, and as many as eight of the respondents experienced a shortness of breath.

Electronic cigarette (e-cigarette) have elements and cartridges containing solution or known by the e-liquid containing nicotine, propylene glycol, air, flukes, and glycerine and produce the aerosol (Flora et al., 2017). Some studies find the magnitude of variability in the concentration of nicotine in the cartridges, label, brand, and fluid refill, while other products are also found in smaller variability. There are two studies found that the concentration of nicotine in cigarettes electric cigarettes are lower than conventional (Ilyas, Murdela, Hutahaeon, & Situmorang, 2019; Pisinger & Døssing, 2014). The toxic potential of the electronic cigarette is the carbonyl-containing compounds, among which there are three, acetaldehyde, formaldehyde, and acrolein (Farsalinos et al., 2018). The most part exposed to the aerosol of electronic cigarette exposure is bronchial epithelial cells.

Electric cigarette usage relations with respiratory disorders showed a significant correlation (Wills, Pagano, Williams, & Tam, 2019). Electronic cigarette usage history also affects the increase in the prevalence of respiratory disorders. Electronic cigarettes also lead to toxicity in the respiratory tract as well as the worsening of airway

obstruction. The use of electric cigarettes are worsening airway condition for users who have history of asthma (Martinasek, White, Wheldon, & Gibson-Young, 2019). Phenol on electronic cigarettes can irritate the skin, eyes, and mucous membranes through oral exposure. A study of five phenolic compounds found in e-liquid refill solution with total concentration below five micrograms per gram ( $\mu\text{g/g}$ ). In a study, total phenol was found at level 1200 times lower in all liquid e-cigarette smoke in smoking compared to conventional (Pisinger & Døssing, 2014). According to WHO (World Health Organization), electronic cigarettes are not recommended for Nicotine Replacement Therapy due to the content of Tobacco Specific Nitrosamines (TSNA), which are toxic and Diethylene Glycol (DEG), which are carcinogenic (Food and Drug Administration, 2009).

The research aimed to figure the relationship between the behavior of the use of electric cigarettes against the emergence of respiratory disorder symptoms as well as educate the user of the harms of electronic cigarettes on society and analyze further the use of the electric cigarette.

## MATERIALS AND METHODS

## RESULTS

The design of this research is a descriptive correlation with a cross-sectional approach. The population in this research is the use of electric cigarettes, with 100 electronic cigarette users. Sampling used by researchers is a nonprobability sampling with the snowball sampling technique. There are two types of the variables examined in the study, the dependent variable is a symptom of respiratory disorders, and the independent variable is the behavior of the use of the electric cigarette. The instruments used in this study is a questionnaire of Hanifah (2016) and questionnaire of Andanrini (2017).

Questionnaire validity has been tested with  $r$  count between 0,389-0,846 ( $r$  table = 0.361) and test reliability with alpha Cronbach between 0,616-0,878 and the statistical test using the Spearman rho. The questionnaire filled in the google form then explained about the content, as well as how to fill out a questionnaire. Researchers also provide leaflets to electrical cigarette users following the Ministry of Health of the Republic of Indonesia. This research has been tested and implemented by the Committee of ethics of Fakultas Keperawatan Universitas Airlangga with certificate number of ethics is 1449-KEPK

**Table 1:Data distribution Characteristics of respondents the user Electronic Cigarette**

Variables	n	%
<b>Gender</b>		
Male	94	94
Female	6	6
Total	100	100
<b>Age (Years)</b>		
17 – 25	84	84
26 – 35	14	14
36 – 45	2	2
Total	100	100
<b>Job</b>		
Employee	45	45
Students	55	55
Total	100	100
<b>Last Education</b>		
Elementary School	0	0
Junior High School	1	1
Senior High School	61	61
University	37	37
Total	100	100
<b>Respiratory symptoms cause electronic cigarette</b>		
Yes	72	72
No	28	28

Total	100	100
Duration of respiratory symptoms		
Yes	51	51
No	49	29
Total	100	100
Go to public health during the use of electronic cigarette		
Yes	11	11
No	89	89
Total	100	100

Based on table 1 it can be noted that the distribution of the respondents based on demographic characteristics on electric cigarette users that add up to 100 people majority were male as much as 94 people (94%). The age range of the majority electric cigarettes users are teens (17-25 years) as many as 84 people (84%). The users of the electrical cigarette were not yet working, including still attend school (students) with a population of as many as 55 people

(55%). The level of education on electric cigarette users a lot more on the level of knowledge of colleges as many as 37 people (37%). For using electronic cigarettes, 72 people (72%) experiencing respiratory disorders. The often and rarely duration of respiratory disorder experienced by 51 people (51%). At the moment of experiencing respiratory electronic cigarette users the majority did not go to the public health by the number 89 people (89%).

**Table 2: Distribution of causes of using electric cigarettes on the data collection questionnaire**

Behavior use electronic cigarette	n		%
	Yes	No	
Predisposing factors	49	51	100
Reinforcing factors	53	47	100
Enabling factors	75	25	100

Based on table 2 distribution of the above can note that the behavior of the electrical use of smoking, there were three parameters are, predisposing factor, factor, reinforcing, and enabling factor. According to the three cases of

the use of electric cigarettes, the enabling factor has a huge factor in giving the influence of behavior using electronic cigarettes, amounting to 75 people (75%).

**Table 3: Distribution of respiratory symptoms in questionnaire data collection**

Respiratory diseases symptoms	n		%
	Yes	No	
Cough and sputum	65	35	100
Breathless	37	63	100
Wheezing	35	65	100

Based on the distribution Table 3 above, the majority of the 100 respondents that there were

65 persons (65%) respondents who experienced coughing due to using an electric cigarette.

**Table 4: Analysis of the correlation between electric Cigarette Usage Behavior and Respiratory Diseases Symptoms**

Variable Independent	Respiratory Diseases Symptoms				Total		p-	r
	Yes		No		Σ	%		
	n	%	n	%				

Behaviour of using electronic cigarette	72	72	28	28	100	10	0,000	0,45
Total	72	72	28	28	100	10	0,000	0,45

Note: \*p value < 0,05 is corellated

Analysis results in table 4 above showed that of the 72 people of 100 respondents experiencing respiratory disorders for using electronic cigarettes. The symptoms include cough, shortness of breath, wheezing. Caused by increase exposure from the electronic cigarette usage, this will irritate the respiratory tract. In comparison, for the other 28 people, not too often use the electric cigarette. So, the behavior of the use of electronic cigarettes has a significant correlation with the presence of respiratory symptoms experienced by the respondents because of the results of statistical tests spearman rho p-value = 0.000 ( $\alpha < 0.05$ ).

The level of correlation between the behavior of electronic cigarette use with respiratory symptoms was moderate ( $r = 0.457$ ). The result of the table above shows that there is a positive correlation between these two variables with the same value. This can be interpreted, when the behavior of the use of electronic cigarettes, it increases.

## DISCUSSION

The behavior of the use of electric cigarettes can cause respiratory disease symptoms with a significant correlation. Based on statistical tests indicates that there is a significant link between the behavior of the use of electronic cigarettes with respiratory disease symptoms. It is proved that the use of electronic cigarettes can affect the increase in the prevalence of respiratory disorders occurring, these electric cigarette causes the presence of toxicity to the respiratory tract and cause airway obstruction (Martinasek et al., 2019). The behavior of the use of electric cigarettes is divided into three such as, predisposing factor, reinforcing factor, and enabling factor. At the time of research, it turns out that the predisposing factor of the family has a greater influence on the individual to use the electronic cigarette, some individuals want to use electrical cigarettes because of their desires, and some individuals use electric cigarettes because they were copying their parents that using cigarettes. Following the smoking habit of having genetic components, smoking parents have a greater possibility of lowering smoking behavior to the child (Mays et al., 2014). Visual factors can influence the transmission of smoking from

parents to children. If the child rarely sees a smoking parent, then the child is also a small possibility to start smoking (White et al., 2011). Various reasons, among them, can influence children using electric cigarettes to assume if the electronic cigarette is "more economical," "more efficient," and "healthier" used than using conventional cigarettes. Once bought, the electric cigarette liquid can run out longer than to buy conventional cigarettes, thus saving the expenditure for smoking. They can smoke with other media than conventional cigarettes, for example, with electric cigarettes. Some people also assumed that the electric cigarette is healthier and better to use than conventional cigarettes because, according to the research conducted, respondents know the content that is in the electronic cigarette. Still, they do not know anything about the danger that can be caused by electronic cigarettes.

The behavior of use of electronic cigarettes based on reinforcing factors derived due to friendship environment as much as 53 respondents (53%) With results of more than 50% can influence the use of electrical cigarettes. Individu with smoking friends have an eight times greater risk of smoking than individuals with has not smoking friends (Anjarsari, 2014). The need for acceptance and effort to avoid the rejection of a friendship group because individuals do not want him to feel rejected. Using cigarettes for individuals is a symbol of power, virility, and maturity (Sutha, 2016). The influence of friends or others with an offer as a friendship solidarity can also be the cause of the individual to use electronic cigarettes, the individuals who often spend time gathering with friends will be pleased when doing the same with other friends, and have a sense of pride with the smoking activities (Priyatno & Sugiyanto, 2012). Friendship can provide a warm, close, and trusting relationship with other individuals, links relating to admission oneself. The admission is a close relationship between individuals and starts from regular and shared frequency between individuals (Aryani, 2010). Peers can also influence the reason that individuals use electrical cigarettes because the individual wants an admission to enter into the sphere of friendship itself, and feel himself slang.

After all, it has used an electronic cigarette that is currently being used everywhere.

The use of electronic cigarettes is reviewed from the enabling factor, which means play environment can be known as the playground could potentially increase the behavior of the use of electronic cigarettes as much as 75 respondents (75%). The environment in the sense of psychology is everything that affects individuals in behavior and participates in development and human life. Individuals will also be encouraged to use electronic cigarettes when some friends or associates and environments use an electronic cigarette because smoking is one way to socialize and make friends (Atmojo, 2017). When individuals join a friendship, with the majority using an electronic cigarette, it is likely to have curiosity over the flavor of using the electronic cigarette and the influence of a friend's persuasion during play to taste the electric smoke. Smoking behavior can be influenced by your desires, peers, or the friendship environment or playground. Smoking with using an electronic cigarette is often found in major cities such as Surabaya. An electronic cigarette is one type of cigarette that is a new phenomenon in society. An electronic cigarette can be found easily and sold freely both online and offline, as a new device electric cigarette can make many people curious. Many people make this electronic cigarette as a media of switching from conventional cigarettes, because it is considered safer, healthier without reducing the sensation of smoking such as conventional cigarettes (Badan Pengawas Obat dan Makanan, 2015; Sudarmin et al., 2019). Many people prefer to use electronic cigarettes rather than conventional cigarettes because of the claims they hear from various parties. At the time of research found that the users of electronic cigarettes know what the content that is in the liquid cigarette electricity is, but they do not know that the electronic cigarette has a hazard that can cause respiratory. According to research, Bowler et al. (2017) mentioned that there were no benefits to the transition using conventional cigarettes and electronic cigarettes. They showed that electronic cigarettes resulted in respiratory tract toxicity. Although the electronic cigarette has a harmful substance is not as much as conventional cigarettes but does not support the absence of harmful impact caused by the electronic cigarette. The use of electronic cigarettes can trigger the occurrence of asthma with the use of more than 30 days, negative effects caused by the use of electronic cigarettes include cough and throat irritation (Hajek, Etter, Benowitz, Eissenberg, & McRobbie, 2014).

The content of harmful substances that exist in the electronic cigarette includes Tobacco Specific Nitrosamine (TSNA-s), Diethyl glycol (DEG), metal (tin particles, silver, nickel, aluminum and chromium in an aerosol electric cigarette with a minimal size so that can enter the respiratory tract), carbonyl (carcinogens include formaldehyde, acetaldehyde, and Akrolein), propylene glycol that can irritate the lungs and eyes causing respiratory tract disease (asthma, shortness of breath, and Pulmonary obstruction). Nicotine that contained in an electronic cigarette can cause an opiate effect that triggers depression, headache, body shaking, breathlessness, and permanent pulmonary damage. The diacetyl flavor contained in the electronic cigarette that serves as a taste giver on the liquid can cause chronic obstructive pulmonary disease (Badan Pengawas Obat dan Makanan, 2015). In the results of the study has shown that the explanation of electronic cigarette usage behavior divided into predisposing factor, reinforcing factor, and enabling factor have a different percentage rate. Anyhow still increase the risk of respiratory disorder symptoms. The liquid content of the electric cigarette can cause respiratory disorders such as cough, wheezing, and shortness of breath.

## CONCLUSIONS

The behavior of the use of electric cigarettes is divided into three factors, including the predisposing factor, reinforcing factor, and the enabling factor. Predisposing factors consists of individuals and families can improve the behavior of the use of electronic cigarette with the emergence of respiratory disease symptoms. Reinforcing factors that include peers or playmates can enhance the behavior of the use of electronic cigarettes with respiratory disease symptoms because smoking is a means to gather and socialize between friends. Enabling factors that include a playground can improve the behavior of the use of electronic cigarettes and respiratory disorder symptoms. Furthermore, smoking behavior using electronic cigarettes may increase respiratory disorder symptoms in users of electronic cigarettes.

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