

Risk And Benefit Perception Of Electronic Cigarette Among Non-Smokers In Yogyakarta Province

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Abstract: Smoking cigarette or tobacco in any form can be a serious killer and harmful for millions of people every year. Tobacco has been developed into many variants, the latest one is electric cigarette (e-cigarette) or vape. This research aimed to find out the perception of e-cigarette's risk and benefit among non-smokers and what factors affecting the risk and benefit perception of e-cigarette. This study was a cross-sectional design and used validated self-administered questionnaire. Questionnaire divided into three section: sociodemographic characteristics, smoking characteristics, risk and benefit perception statements. Respondents were non-smokers in the province of Yogyakarta and selected by convenience sampling. Data were analyzed descriptively and bivariate by using Chi-Square to identify the factors associated with risk and benefit perception among non-smokers. The results showed that from 241 respondents, 18 (7.5%) were former smokers who had experience using vape but already quit, and 223 (92.5%) were never use vape. Most of non-smokers respondent in Yogyakarta province have a high perception about e-cigarette risk and low perception about e-cigarette benefit. Respondent sociodemographics (sex, age, education level, current usage of vape and income/pocket money) are not significantly influence the e-cigarette risk perception among non-smokers in Yogyakarta province. Only smoking status or current respondent usage of vape that significantly influence e-cigarette benefit perception among non-smokers in Yogyakarta province (p-value < 0.05). Smoking status or current vape usage from respondent is significantly influence the benefit perception of e-cigarette by OR value 0.155 (0.054-0.444) and p-value 0.001 (p-value <0.05). This study provides novel information on the use and risk-benefit perception of e-cigarette among non-smokers in Yogyakarta. However, further research is needed with different study designs so that it can identify predictors of future e-cigarette use from non-smokers. It is needed to explore the factors associated with e-cigarette use in various regions and cities in Indonesia so it can represent nationally. Further, the government can make a more comprehensive e-cigarette policy regarding to the all levels of society.

Index Terms: e-cigarette, vape, risk, benefit, perception, Yogyakarta.

1 INTRODUCTION

Smoking Smoking cigarette or tobacco in any form can be a serious killer and sickens millions of people every year. Indonesia is the third-largest cigarette consumer in the world after China and India (1). Because of the increasing trend of cigarette consumptions in Indonesia, the kind of cigarette have been developed into many variants, such as kreteks, white cigarette, pipe, shisha, and the latest one is electric cigarette (e-cigarette). According to WHO Global Progress Report on Implementation of the WHO Framework Convention on Tobacco Control (2), the use of Electronic Nicotine Delivery Systems (ENDS), such as e-cigarettes, has become increasingly popular in many countries. The use of e-cigarette has increased rapidly especially in Europe and United States (3,4). In early 2014, Indonesian people began to know e-cigarette or vape (5) and become quite popular among young people because it perceived to be alternative therapeutic media for conventional cigarette addicts (6). A study from United States found that very few people who had never smoked cigarettes had ever used e-cigarettes and most of them are believe that e-cigarette were less harmful than smoked cigarettes (7). Also in the United Kingdom (UK), e-cigarettes are considerable as a great interest to smokers and may offer a new option for those who are unable or unwilling to quit, permitting the total or partial replacement of smoked tobacco without making any commitment to reduce or abstain from recreational nicotine use (4).

Because there is no scientific evidence to confirm the e-cigarette's marketers claim that e-cigarette helps smokers to quit smoking, World Health Organization (WHO) and US Food and Drug Administration (FDA) have asked the e-cigarette's marketers to remove their claim (8). Determining the function of e-cigarette as smoking cessation aid and the impact of its dual use with tobacco cigarette is still need to be explored. Government organization must perform safety testing of e-cigarettes product to guarantee that all of e-cigarette products circulating in public, especially in Indonesia, are safe. Although e-cigarette's vapor has nicotine amount 85% lower than the smoke from conventional cigarettes (9), these hazard substances still can be harmful to passive smokers. Study from Czogala et al. (10) found that although in indoor environment, using electronic cigarette can expose nicotine to non-smokers, eventhough it did not produce combustion products like conventional cigarette on its smoke. Another important aspect about the impact of e-cigarette to passive smokers and non smokers is the fact that e-cigarette can leaves the residues of smoking on clothes, furniture and other indoor surfaces (11). E-cigarette's solvents can be remain on available surface and be a source of the chemical contamination in public space. A study from Milam et al. (12) found that adolescents who ever tried smoking had greater perceive about smoking-related risks than those who have not smoked. Previous study from Song et al. (13) stated that perception of risk and benefit has a relationship with adolescent tobacco initiation. Adolescents who have initiation to smoke tobacco is stimulated by perceptions of low risks and high benefits. Individual perceptions about the consequences of their actions, and their perceptions of vulnerability to those consequences, play a key role in behavior and behavior change (14). By the finding from previous studies above, it is very important to know how the perceptions of the risks and

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benefits of e-cigarettes from non-smokers so that government can make regulation such as prevention and intervention programs to prevent or reduce e-cigarette's used.

2 METHODS

This research was a cross-sectional design with a survey approach using Risk and Benefit (RABE) questionnaire. The questionnaire had been developed through literature review, and reviewed by health workers, and academics who expert on cigarette or tobacco research. Respondents were non-smokers in the province of Yogyakarta. Samples were selected by convenience sampling based on the ease of researchers in getting respondents. Self-administered questionnaires were distributed by online and offline to respondents. The inclusion criteria for the respondent were society who is non user both of e-cigarette or tobacco cigarette and people who are living in Yogyakarta province for six months or longer and aged 18-60 years old. Exclusion criteria were those who never heard about e-cigarette before, who did not complete all the questions inside questionnaire and those who cannot use the questionnaire application. Data was collected at periode of May to July 2019. The questionnaire consisted of three parts namely respondent characteristics, smoking characteristics, and risk-benefit perceptions. Non-smoker respondents obtained from those who answered "I have used it once or several times, then I don't use it right now" or "never at all" in the question about current usage of vape. RABE questionnaire (29 statements) was measured by Likert scale ranged from 0 (don't understand) to 4 (strongly agree) then the total value was calculated for each category, risk perception and benefit perception. For risk perception, respondents who have a total score of risk perception between 0 and 30 was categorized as 'Low', and those who have total score 31 until 60 was categorized as 'High'. For benefit perception, respondents who have a total score of benefit perception between 0 and 28 was categorized as 'Low', and those who have total score 29 until 44 was categorized as 'High'. Questionnaire piloting was conducted on twenty people of society who had e-cigarette awareness, was not health profession students and lived in Special Region of Yogyakarta beside the respondents. Reliability score or internal consistency of the questionnaire piloting was calculated with Cronbach's alpha, resulting score of alpha 0.781. Descriptive analysis was used in this study to see the characteristics of e-cigarette non-smokers in Yogyakarta province. The relationship between respondent characteristics and risk-benefit perceived of e-cigarette was done by Chi-square test. Odd ratio also used to see the closeness relationship between two variables tested. The independent variables of the study include respondent characteristics (sex, age, education level, income) and smoking characteristics (current habit of smoking, source of information about e-cigarette and experience of seeing e-

cigarette's advertisements). The dependent variables of the study include perceived of e-cigarette risk and perceived of e-cigarette benefit. Data analysis was performed using SPSS version 23 and Microsoft Excel 2016.

3 RESULTS

In this study, non-smoker respondents in Yogyakarta province who met the inclusion criteria are 241 respondents. Description from respondent characteristics is presented in Table 1. From 241 respondents, 18 (7.47%) of them were former vape users and the rest were non-smokers who never smoked or used e-cigarette. Respondent characteristics in this study showed that non-smoker respondents were dominated by female as many as 146 respondents (60.6%), 166 (68.9%) aged above 25 years old. Most of respondents (83.0%) had high level of education (diploma, bachelor or higher) with an average monthly income or pocket money less than IDR

TABLE 1
DEMOGRAPHIC CHARACTERISTIC OF NON-SMOKERS IN YOGYAKARTA PROVINCE

Characteristics (n = 241)	Categories	N	%
Sex	Male	95	39.4
	Female	146	60.6
Age	< 25 years old	75	31.1
	≥ 25 years old	166	68.9
Last education	Senior high school	41	17.0
	University	200	83.0
Smoking status	Non smokers	223	92.5
	Former smokers	18	7.5
Income / Pocket money	Less than IDR 3,000,000	126	52.3
	More than IDR 3,000,000	115	47.7

3,000,000 (52.3%). Table 2 exhibited characteristics of smoking status among non-smokers in Yogyakarta province. All of vape former smokers in this study were never use tobacco cigarette before. Our study found that about 119 (49.4%) respondents answered that they heard e-cigarette for the first time from their friends. More of half respondent still have relatively low awareness related to e-cigarette's advertisement. It can be seen from question about their noticed on vape advertisement, 141 (58.5%) of respondents were never seen vape advertisement on vape store, and 124 (51.5%) were never seen vape advertisement on the internet. However, there was slightly no difference in vape store advertisement awareness between former smokers and non-smokers ($p = 0.07$). Table 3 presented the relationship between respondent sociodemographic characteristic and e-cigarette risk perception. There was no characteristic that significantly influence the risk perception of e-cigarette, including their current habit of vape usage, because all the p-value were higher than 0.05.

TABLE 2
CHARACTERISTICS OF SMOKING STATUS

Questions of Smoking Status (241 respondents)	Categories	N	%
Current use of vape	Ever used vape once or several times then quit using it right now	18	7.5
	Never use vape at all	223	92.5
First time hearing vape	Friends	119	49.4
	Observing vape store	7	2.9
Noticed vape advertisement on vape store	Internet/social media	115	47.7
	Yes, ever seen	100	41.5
Noticed vape advertisement on the internet	No, never seen	141	58.5
	Yes, ever seen	117	48.5
	No, never seen	124	51.5

TABLE 3
ASSOCIATION BETWEEN CHARACTERISTIC SOCIODEMOGRAPHIC AND PERCEPTION OF E-CIGARETTE'S RISK

Characteristics (n = 241)	Categories	n	E-cigarette risk perception		P-value
			Low	High	
Sex	Male	95	14	81	0.590
	Female	146	18	128	
Age	< 25 years old	75	6	69	0.105
	≥ 25 years old	166	26	140	
Last education	Senior high school	41	8	33	0.197
	University	200	24	176	
Smoking status	Non smokers	223	31	192	0.316
	Former smokers	18	1	17	
Income / Pocket money	Less than IDR 3,000,000	126	21	105	0.105
	More than IDR 3,000,000	115	11	104	

Table 4 presented the relation between respondent sociodemographic characteristic and e-cigarette benefit perception. From the p-value, only smoking status of respondents that significantly influence the benefit perception of e-cigarette (p-value <0.05). Other characteristics such as sex and age did not significantly influence the benefit perception of e-cigarette among non-smokers regarding from the p-value. Last education level and monthly income/pocket money were slightly influence the benefit perception of e-cigarette among non-smokers as its p-value close to 0,05. Most of non-smoker respondents in Yogyakarta province perceived that e-cigarette had low benefit.

TABLE 4
ASSOCIATION BETWEEN CHARACTERISTIC SOCIODEMOGRAPHIC AND PERCEPTION OF E-CIGARETTE'S BENEFIT

Characteristics (n = 241)	Categories	n	E-cigarette's benefit perception		P-value
			Low	High	
Sex	Male	95	84	11	0.881
	Female	146	130	16	
Age	< 25 years old	75	65	10	0.481
	≥ 25 years old	166	149	17	
Last education	Senior high school	41	33	8	0.064
	University	200	181	19	
Smoking status	Non smokers	223	203	20	0.000*
	Former smokers	18	11	7	
Income / Pocket money	Less than IDR 3,000,000	126	116	10	0.092
	More than IDR 3,000,000	115	98	17	

Association between smoking status and risk-benefit

perception is presented in the Table 5. Smoking status or current vape usage from respondent was significantly influence the benefit perception of e-cigarette by OR value 0.155 (CI 0.054-0.444) and p-value 0.001 (p-value < 0.05). This study results found that respondents had higher risk perception than e-cigarette benefit. It means that most of society in Yogyakarta province perceived that e-cigarette were as harmful as tobacco cigarette.

4 DISCUSSION

This is the first report examined e-cigarette smoking

TABLE 5
ASSOCIATION BETWEEN SMOKING STATUS AND PERCEPTION OF RISK AND BENEFITS

Perception	Non Smokers (n=223)	Former Vape User (n=18)	OR (95%CI)	P-value
Risk	Low	31 (12.9%)	1 (0.4%)	0.364 (0.047-2.836)
	High	192 (79.7%)	17 (7.1%)	
Benefit	Low	203 (84.2%)	11 (4.6%)	0.155 (0.054-0.444)
	High	20 (8.3%)	7 (2.9%)	

characteristics and risk-benefit perceptions among non-smokers in adult population at Yogyakarta province. All of vape former smokers in this study were never use tobacco cigarette, therefore, awareness of e-cigarettes among surveyed non-smokers is quite high. In accordance with previous systematic review (15), our study shows that non smokers Indonesian adolescents who had never used tobacco at baseline were more likely to not use e-cigarette. Considering the lack of mass media advertising, high awareness via word of mouth, mall kiosk sales, retail outlets and internet advertising is noteworthy (16), that is why in this study researchers want to explore information related to respondent's awareness of e-cigarette. This study pattern was different with previous study by McCoy (17) which was found that perceptions of smoking risk differed as a function of smoking status, such as current smokers, former smokers and non-smokers. This can be explained because of the cross-sectional design of this study, where we did not know whether the former smokers have held the observed risk perception before they quit using vape or whether their risk perceptions arose after quitting. From the result, it can be seen that more than half of non-smokers respondent in Yogyakarta province have high score of e-cigarette risk perception. They mostly perceived that e-cigarette still have a high risk to their health. Unlike prior research (17), we did not find a significant association between of current usage of vape and risk perception level. However, most of non-smokers and former vape users were likely to have high perception of e-cigarette risk. According to the Health Belief Model (18), perceived risk is one of factors that is likely to influence the decision to engage in or stop a risky behavior. Smoking cessation is one reason that youth use e-cigarettes in Canada (2) and the UK (3). In particular, Canada adolescents who tried to quit smoking are more likely to use e-cigarettes, which suggests that e-cigarettes promote cessation (2). It has been argued that the observation that e-cigarettes increase the likelihood of subsequent cigarette smoking initiation merely reflects the fact that some users may share a similar propensity toward two behaviors (12,15). The odds ratios found in our study are

smaller than those reported in Western countries (7,13). This difference could be due to the unformulated e-cigarette policy in Indonesia, which the government has not yet approved any legal nicotine-based product and marketing of e-cigarettes is not allowed. In the current regulatory context, without visible marketing, frequent vaping scenes on TV, and exposure in daily life, adolescents may be less likely to use e-cigarettes. The consistent finding of a prospective association between e-cigarette use and cigarette smoking in all the prospective studies suggests the need for policies to make e-cigarettes less attractive to youth. The WHO has recommended a restrictive approach adopted towards advertising e-cigarettes (8). In the market, the availability of a wide range of refill flavors has been identified as an important motive for smoking e-cigarettes among young users (13), indicating that banning any flavored liquids would be a good action for prevention, as well as implementing the same restrictions on marketing currently applied to tobacco cigarettes. The results of Indonesia's Global Adults Survey also revealed that smoking prevalence among youth has continued to increase, reaching 36% in 2018, while at the same time e-cigarette use has increased about 1.8% (1). Nicotine dependence may be the major reason pushing young "vapers" towards conventional smoking, especially given that cigarettes are largely affordable in Indonesia (15). Caution for Asian countries like Indonesia, about new initiation of tobacco cigarette, since tobacco are still more affordable and ubiquitously available than e-cigarettes, which remain de facto illegal. In general, the benefit perception of this study is consistent with the risk perception results because the greater risk-perception of e-cigarette, the less perceived benefit of using e-cigarette. This study provides novel information on the use and risk-benefit perception of e-cigarette among non-smokers in Yogyakarta. There are also several limitations in our study. First, the cross-sectional design does not allow for identification of predictors of future e-cigarette use. Our results seem to exclude the existence of major confounders, as the odds ratios in our analysis were only come from bivariate analysis. Moreover, it is not representative nationally because Indonesia is a multiethnic country with gaps major in education and literacy. Research is needed for explore the knowledge and risk perception of e-cigarette throughout 27 regions and local cultural characteristics. Communication strategy and government intervention are needed to raise society awareness about the dangers of e-cigarette.

5 CONCLUSION

Based on the results of this study, it can be concluded that among non-smokers (92.5% never smokers; 7.5% former vape user) in Yogyakarta province, most of them have a high perception about e-cigarette risk and low perception about e-cigarette benefit. Respondent characteristics (sex, age, education level, current usage of vape and income/pocket money) were not significantly influence the e-cigarette risk perception. Only smoking status or current respondent usage of vape that significantly influence e-cigarette benefit perception among non-smokers in Yogyakarta province (p -value < 0.05). Smoking status or current vape usage from respondent was significantly influence the benefit perception of e-cigarette by OR value 0.155 (0.054-0.444) and p -value 0.001 (p -value < 0.05). Further research is needed with different study designs so that it can identify predictors of

future e-cigarette use from non-smokers. More research are needed to explore in more regions and cities in Indonesia so that the government can make a more comprehensive e-cigarette policy regarding to the all levels of society and restricts e-cigarette import. Health professional must be more active to make a movement which can increasing public knowledge about the dangers of e-cigarette.

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