

# Evaluating the Influence of Warning Labels on E-cigarette Products and Their Efficacy in Shaping User Perceptions Toward Smoking Cessation

## Abstract

**Background:** The effectiveness of warning labels on tobacco products in conveying health risks and promoting smoking cessation has been extensively studied. However, with the rise in electronic cigarette (E-cigarette) usage, there is a need to assess the impact of warning labels specifically tailored to this emerging market. This study aims to fill this gap by examining the effectiveness of warning labels on E-cigarette packaging in influencing smokers' perceptions and intentions to quit. **Method:** A laboratory experiment was conducted, involving 180 participants comprising both conventional smokers and E-cigarette users. There are three experimental designs used in this research, which are subjected to conventional smokers and E-cigarette smokers. Participants were randomly located within each of the six cells. Each cell was given a different stimulus. **Results:** The study revealed that warning labels on E-cigarette products significantly influenced participants' perceptions and intentions to quit smoking. Specifically, E-cigarette users perceived packaging with warning labels differently from those without. Moreover, visual warning labels were found to be more effective than textual ones in eliciting perceptions and intentions to quit smoking. **Conclusions:** These findings underscore the importance of warning labels in conveying health risks and promoting smoking cessation intentions among E-cigarette users, offering valuable insights for public health strategies.

**Keywords:** E-cigarette, social marketing, visual-textual warning label

## Introduction

Electronic cigarette (E-cigarette), better known as 'vape', shows usage uplift within the Indonesia market. According to the data from The Association of Personal Vaporizer Indonesia (APVI), it states that in 2018 the number of E-cigarette users in Indonesia has reached 1.2 million people. This growth implies the marketing success of E-cigarette products. Although E-cigarettes have less risk than ordinary cigarettes, this product still contains toxins, and users also get addicted because of the nicotine content.<sup>[1]</sup> The proliferation of marketing activities has ingrained itself deeply within the fabric of human needs, manifesting ubiquitously across time and space. As societies have evolved, so too have the methods and media through which products and services are promoted, creating a symbiotic relationship between consumer desires and marketing strategies.<sup>[2]</sup> Social marketing activists believe that marketing practices, in addition to being a tool to assist human needs, have negative consequences that can

endanger human life itself. How effective the use of warning labels is an important question in the field of social marketing research.<sup>[3]</sup> Many academics measure the effectiveness of warning labels under used through how well such warning label can influences the buying intentions – to stop buyers and preventing people to start buying. Since 2003, academics in the field of marketing and health have worked together to answer such question. Warning labels communicating the potential risks of tobacco products is one of the forefront components of the tobacco control approach. However, in contrast to the research on cigarette warning labels, there is limited evidence about whether E-cigarette warning labels, including those warning labels currently under used by manufacturers, can affect the perception of E-cigarette in young adults and the intention to smoke it. Empirical inspections of the warning label on E-cigarette products are still very small. Meanwhile, academic urgency is required to thwart the rate of consumer behavior deception in marketing practices. Previous study

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found that warning label on E-cigarette product packaging affect smokers' perceptions, and textual warning label on cigarette packaging have been shown to reduce smoking intentions.<sup>[3,4]</sup> Since there is limited research on warning label on E-cigarette product packaging, academic urgency is required and encouraged. Previous studies encouraged that E-cigarette smokers are entitled to obtain proper information regarding E-cigarette products. For an instance, in 2016 the European Union (EU) issued a regulation stating that on each external packaging of E-cigarette products with nicotine content there must be text warning included on at least 30% of the two largest surfaces, stating that nicotine is addictive.<sup>[4]</sup> In fact, all E-cigarette packaging now required to include leaflets with sufficient information about, *inter alia*, addiction and toxicity of E-cigarettes.<sup>[4]</sup> Results from previous studies also found that E-cigarette smokers do pay attention to warning label especially the textual content.<sup>[5]</sup> Another recent experimental study shows that adult smokers that exposed to the warning label, in which E-cigarette manufacturer currently deploy, were more likely to consider the product to be dangerous.<sup>[6,7]</sup> Gantiva *et al.*<sup>[8]</sup> tested the effectiveness of warning labels on smokers' perception and intention. Furthermore, Duan *et al.*<sup>[9]</sup> research more specifically tested the effectiveness of warning labels on electric cigarette packaging on smokers' perceived risk. Studies on the effectiveness of warning labels on E-cigarette packaging have also provided sufficient evidence of the effectiveness of warning labels in influencing smokers' risk perceptions, as researchers found that warning labels proving effective on harm perceptions, and relatively effective.<sup>[10,11]</sup> There has been sufficient literature to prove the effectiveness of warning labels on E-cigarette packaging, useful as academic texts in a country's health regulations. Reiter *et al.*<sup>[12]</sup> highlight the potential of warning labels as a tool for public health policy, particularly in reducing E-cigarette consumption. While existing research has explored various aspects such as health risk perceptions, threat perceptions, and language use in warning labels, there remains a dearth of studies on the impact of warning labels specifically on E-cigarette packaging, particularly in Indonesia. The existing literature primarily focuses on traditional tobacco products, leaving a gap in understanding the effectiveness of warning labels on E-cigarettes.<sup>[13-15]</sup>

The study aims to address several research gaps: first, the scarcity of research on warning labels for E-cigarettes despite growing concerns about their health effects; second, the competition for consumer attention between warning labels and other advertising elements, which may lead to ineffective communication of health risks; and third, the need to investigate the effectiveness of warning labels in influencing consumption patterns among both traditional tobacco and E-cigarette smokers.

To fill these gaps, the study seeks to examine the impact of warning labels on E-cigarette packaging on the perceptions

and intentions of E-cigarette smokers, aiming to contribute to the understanding of how warning labels can effectively deter E-cigarette consumption.

## Theoretical Background

### Use of warning label on the product packaging

As discussed in previous studies, packaging can be an important promotional tool for marketers in helping to create a profitable brand image and linking to strategic marketing elements.<sup>[16-19]</sup> To increase brand value, marketers strive to develop attractive packaging able to create the desired brand positioning and able to reinforce promotional messages, delivered through integrated marketing communications.<sup>[6,20,21]</sup> Packaging can contribute to a more positive promotional effect than advertising, with which marketers always try to create appealing packaging thus improving purchase intentions. Especially true for any products that are potentially harmful to consumers, putting warning labels and the disclosure of information on product packaging can potentially be seen as an important communication tool for the interest of public health policy-makers and government agencies.<sup>[22]</sup> The warning label on the product is one form of consumer protection.<sup>[23,24]</sup> Putting warning labels and the disclosure of information will help consumers to understand the potential risks and hazards associated with the product and, in turn, promote positive consequences derived from the effective packaging design.

Textual warning label has been used on cigarette products in order to protect consumers.<sup>[3,24,25]</sup> Some researchers suggested that textual warning label might affect individual behavior based on the principles of persuasive communication theory, warning labels promote different effects on individual beliefs and attitudes.<sup>[26-28]</sup> The research findings suggest that health-warning labels, including those on E-cigarette products, can be effective in changing people's behavior and perceptions.<sup>[29,30]</sup> Studies by various researchers have shown that warning labels contribute to better understanding of health consequences among E-cigarette users.<sup>[4]</sup> Additionally, shorter text in warning labels tends to be noticed more frequently by smokers.<sup>[5]</sup>

### Visual warning label

The visual message is intended to attract the consumer's attention to interpret the message. Within her study, Lin and McFerran found that displaying visual labels, such as green, yellow, and red lights, proved to be more effective than textual messages.<sup>[31]</sup> Effertz, Franke, and Teichert explains in his research that visual warning label on beverage packaging perform better in reducing the purchase intention compared to textual warning label.<sup>[32]</sup> The result from previous studies emphasize that the visual warning label is more effective than textual warning label against cognitive and emotional reactions as well as behavioral intentions. Visual warning labels presenting with careful consideration of color tone will be more clearly seen and

considered easier to understand. It also promotes increasing awareness and knowledge about the product's health consequences.<sup>[33,34]</sup>

As described in the previous section, research on warning label in social marketing has proven that warning label can influence the purchase intention.<sup>[32,35-37]</sup> Although many previous studies have shown that the effectiveness of warning labels can affect consumer consumption patterns, social marketing academics still worries about the increasingly vigorous promotion of health-damaging products such as done by beverages and junk food.<sup>[23,37,38]</sup> This concern is evidenced by the increasing demand for such products, which in turn rising concern on the health implication on the consumers. Visual warning labels, especially for unhealthy food and beverage products, are still rarely encountered on the product packaging. Unlike cigarette products, food and beverage products seem to be in a 'safe' position for years just by putting textual warning labels on its product packaging. By the definition of 'safe', it means that currently there is no government regulation imposing the necessity of warning labels aside from the textual warning located on the product packaging. As an implication, companies often place textual warning label on a hard-to-read location – on product packaging – which eventually hardly being noticed by the consumers. Therefore no wonder the demand on these products is unobstructed. The above-mentioned issues become the main reason why this study urges to add visual elements on warning label. Aside from testing the effectiveness of the visual warning label, this study also aims to provide reliable literature to guide the use of visual warning labels on E-cigarette products, which eventually adding academic repositories in the field of warning labels.

## Hypotheses Development

### Warning label and nonwarning label

The product containing health-risk substances such as cigarettes, either in the form of regular cigarettes or E-cigarettes, is supposed to have a warning label on its packaging. In fact, many countries already applied regulations that required company to put warning label on their product packaging. Previous studies on the effectiveness of warning labels on cigarette packaging have proven that warning labels can affect the intention to quit and prevent smoking.<sup>[23,32,34,37,39]</sup> Due to the still limited research on the warning label effectiveness on E-cigarettes, we thus hypothesize, H1: Packaging with a warning label has a significant effect on perception when compared to packaging without a warning label. H2: Packaging with a warning label has a significant effect on intention to quit when compared to packaging without a warning label.

### Dual smoker and E-cigarette smoker

Conventional cigarette smokers think that smoking is fun, thus it is more difficult to change their perceptions,

and even more so to change their behavior, as compared to nonsmokers. A research by Levy *et al.* found that it is important to compare ratings from each category of smokers. In this study, we will test the ratings of E-cigarette smokers and conventional cigarette smokers (dual smokers) against E-cigarette smokers only.<sup>[24]</sup> This is based on the fact that many E-cigarette smokers do not smoke conventional cigarette and some smoke both the conventional and electric (dual smokers). The author believes that dual smokers tend to believe that conventional cigarettes are more dangerous than E-cigarette cigarettes. Therefore, we hypothesize, H3: E-cigarette smokers consider that warning label on the packaging has a significant effect on perception when compared to (E-cigarette and conventional cigarette)/dual smokers.

### Visual and textual

Currently, only textual warning label is applied on E-cigarette packaging. This is mainly because E-cigarette is considered as a new product innovation and thus developing regulations for visual warning label will require quite some time. A textual warning label is less attractive for consumers to notice it, let alone to read it. Consequently, it is very understandable that the demand for this product keeps increasing. Gallopel-Morvan *et al.*<sup>[39]</sup> found that the use of visual warning labels highly recommended to further attract consumers' attention. Reflecting on that fact, the study adds visual elements on warning label. Aside from testing the effectiveness of the visual warning label, this study also aims to provide reliable literature to guide the use of visual warning labels on E-cigarette products. In line with previous research, we hypothesize, H4: Visual warning label has a significant effect on perception when compared to textual warning label. H5: Visuals warning labels have a significant effect on the intention to quit smoking when compared to textual warning labels.

## Methodology

### Pretest

To test the effect of warning labels on E-cigarette packaging, this study uses two stimuli. The first stimulus is a textual warning label with a health content. The second stimulus is a textual visual warning label with a health content. The stimulus label warning is determined based on the pilot study stages. The first step is determining the list of brands of E-cigarette products. The second stage, the determination of textual warning labels to contend with health hazards in respondent assessment. The third stage, determining the label textual visual warning content of health hazards, is most appropriate in conveying warnings in the assessment of respondents. We conducted a qualitative study to find out whether the variable manipulation of the warning label



was successful or not. Exploratory studies were carried out in the form of in-depth interviews, with participants of 10 people given a picture of a warning label to find out their opinion about the warning label. If the results of this interview show the warning label was successful, then the warning label will be used as a warning label that will be tested in subsequent quantitative studies. The next step is done to test the validity and reliability of the dependent variable. By using analysis factor technique, the validity test results in KMO value above 0.5, with factor loading value and MSA to score above 0.6. Meanwhile the Cronbach alpha value greater or above 0.6. Accordingly, as per Malhotra stated, it safe to say that the measuring tools using in this study is valid and reliable to be used in the main research.<sup>[40]</sup> We revise the text to clarify that the research test was conducted off-campus. We confirm that ethical approval was obtained from the Ethics Committee at Universitas Islam Negeri Fatmawati Sukarno Bengkulu, Indonesia No. 2279/UN.23/HM.00/5/2023 granted on 10 May 2023.

## Main Study

### Procedures and sample

To answer the research questions, experimental laboratory method were used, which was conducted outside the university campus, in Bogor, Indonesia in 2023. Experimental method is a causal study used to describe evidence from a causal relationship.<sup>[40]</sup> There are three experimental design used in this research, that are nonwarning label, textual warning label, visual warning label, which are subjected to conventional smoker and E-cigarette smoker. There were as many as 180 participants, consisted of 90 dual smokers and 90 E-cigarette smokers. Participants were randomly located within each of the six cells. Each cell was given different stimulus. Warning label is the independent variable being used in this research, consisted of three types of labels, that is, nonwarning label, textual warning label, visual warning label. Purchase intention and perception are both a dependent variables. For the purchase intention variable, the research used question items in accordance with those defined by Baker and Churchill.<sup>[41]</sup> As for the perception variables, the research used question items in accordance with those defined by Van Mourik *et al.*<sup>[4]</sup> To measure purchase intention variable, the research applied 1 to 7 scale with 1 being very want to and 7 to be very not want to.

## Results

Through the pilot study stages, the stimulus, which acts as experimental tool, was generated. Prior to conducting the experiment, a series of validity and reliability test has been performed. Using factor analysis and Cronbach alpha test in accordance with that proposed by Hair, Black, Babin, and Anderson, the results show that all measuring

instruments in this study are valid and reliable for further research.<sup>[42]</sup> This study uses univariate analysis-of-variance to test whether the interaction of each warning label stimulus is of significant.

## Dependent Variables Measurement and Hypothesis Test

Data in Table 1 show that the participant's rating on the nonwarning label toward perception is 2,820 and 2,400 for intention to quit. This means that the visual warning label has a greater effect on perception and intention to quit when compared to the nonwarning label and textual warning label, which indicated by mean value of 5,106 on perception and by mean value of 4,920 on intention to quit. From Table 2, we can infer that all hypotheses were accepted. Hypothesis 1 states that packaging with a warning label has a significant effect on perception when compared to packaging without a warning label, as evidenced in this study. Furthermore, hypothesis 2 also proves that the packaging with a warning label has a significant effect on intention to quit when compared to packaging without a warning label, as evidenced in this study. Hypothesis 3 shows E-cigarette smokers consider that warning label on

**Table 1: Dependent variables measurement**

	Mean Perception	Mean Intention to Quit
Nonwarning label	2.820	2.400
Textual warning label	4.405	4.200
Visual warning label	5.106	4.920

Source: Data Processing

**Table 2: Hypothesis Test**

Warning label against nonwarning label on perception			
	t-value	Sig. (2-tailed)	Mean Difference
Warning label	33,41	,000	5,1005
Nonwarning label	41,28	,000	2,8025
Warning label against nonwarning label on intention to quit			
	t-value	Sig. (2-tailed)	Mean Difference
Warning label	43,41	,000	4,7500
Nonwarning label	41,28	,000	2,7500
E-cigarette and conventional cigarette (dual smoker) against E-cigarette only smoker on perception			
	t-value	Sig. (2-tailed)	Mean Difference
Dual smoker	22,35	,000	5,2500
E-cigarette smoker	32,85	,000	5,7500
Textual against visual on perception			
	t-value	Sig. (2-tailed)	Mean Difference
Textual warning label	24,40	,000	4,8250
Visual warning label	35,57	,000	5,2500
Textual against visual on intention to quit			
	t-value	Sig. (2-tailed)	Mean Difference
Textual warning label	40,65	,000	4,0250
Visual warning label	37,01	,000	5,1000

Source: Data Processing

the packaging has a significant effect on perception when compared to (E-cigarette and conventional cigarette)/dual Smokers. As well as hypotheses 4 and 5 which argue that the visual warning label is more likely to affect perception and intention to quit smoking as compared to the textual warning label, which indicated by mean value of 4.8250 for perception and by mean value of 4.0250 for intention to quit.

## Discussion

The application of warning labels on E-cigarette product packaging in Indonesia has been around since this product was first marketed. To this day, there is only a textual warning label with the following statement “this product contains Nicotine, nicotine is an addictive chemical content”. As confirmed by this study, the textual warning label significantly affects the participants’ perceptions, which is indicated by the fact that the textual warning label had succeeded in conveying the contents of warning messages about health concerns on the product. Language-wise, however, warning labels on E-cigarette product packaging have a few weaknesses. As a native language that is easily understood by almost all Indonesians, English should not replace the use of Bahasa Indonesia for product packaging. Also important to note that a visual warning label is even more effective than a textual warning label.

The results of this study reinforce the results of our previous study, that the warning label is very important to place on the packaging of products that are harmful to health. Specifically the results of this research have filled several research gaps around the warning label. First, fill the gap in the study of the warning label on the E-cigarette. These results support our belief that the warning label on E-cigarette is a possible way to achieve the goal of reducing E-cigarette consumption. Second, in accordance with Halim states that the warning label position competes with other advertising elements for consumer attention and cognitive.<sup>[23]</sup> The results of this study also support that the use of visual elements on warning labels can increase perception which ultimately increases the intention to quit for E-cigarette and dual smoker smokers. This research has measured the impact of labels on conventional smokers and E-cigarette smokers. So, these results have successfully filled the gap mentioned above, these results are important as research that contributes to the problem of E-cigarette product warning labels on tobacco smokers and E-cigarette smokers.

## Managerial implication

The study served as a reliable literature to guide the use of warning labels on E-cigarette products, especially for the visual warning label, which eventually added academic repositories in the field of warning labels. It is important to consider warning labels on E-cigarette product packaging as a means to help smokers perceive the health consequences

which eventually leads to the intention to stop smoking. As a matter of fact, it is suggested that the government release new guidelines regarding E-cigarettes that will impose the use of Bahasa Indonesia for textual warning labels and add a visual warning label on top of that. The hope is to protect the younger generation from nicotine content which is directly related to addictions and health concerns.

## Future research

Our research is limited to the use of warning labels on e-cigarette products, specifically for visual warning labels, ultimately adding to the academic repository in the field of warning labels. Further research needs to be carried out that tests the location, design, font, and warning labels on E-cigarette packaging. Furthermore, we suggest testing age and gender groups, there may be differences in effectiveness by comparing different participant groups. Testing the effectiveness of label warnings on E-cigarette packaging is still limited, we suggest that research should continue to be carried out on this theme.

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## Conflicts of interest

There are no conflicts of interest.

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