



THE IMPACT OF PICTORIAL HEALTH WARNINGS ON SMOKING CESSATION INTENTION: A NARRATIVE REVIEW BASED ON THE THEORY OF PLANNED BEHAVIOR

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Abstrak

Tingkat konsumsi rokok di Indonesia masih tinggi, sehingga diperlukan strategi pengendalian tembakau yang efektif, salah satunya adalah *Pictorial Health Warning* (PHW). Penelitian ini bertujuan untuk menganalisis pengaruh PHW terhadap komponen-komponen *Theory of Planned Behavior* (TPB) yaitu sikap (*attitude*), norma subjektif (*subjective norm*), dan kontrol perilaku yang dirasakan (*perceived behavioral control*) serta niat berhenti merokok. Kajian diidentifikasi melalui berbagai basis data ilmiah terindeks (2020-2024) mengenai PHW dan TPB seperti Scopus, DOAJ, dan PubMed. Tinjauan ini mencakup tiga penelitian utama yang memenuhi kriteria inklusi dan relevan dengan tema perilaku berhenti merokok berdasarkan *Theory of Planned Behavior* (TPB) dan penggunaan media bergambar sebagai intervensi. Hasil telaah dari ketiga studi memberikan bukti konsisten bahwa gambar atau visualisasi bahaya rokok berpengaruh terhadap perubahan sikap, peningkatan kesadaran sosial, serta memperkuat persepsi kontrol individu terhadap kemampuan berhenti merokok. Kombinasi antara pesan emosional dan pendekatan kognitif terbukti efektif dalam memperkuat niat berhenti merokok sesuai dengan kerangka TPB. Peringatan kesehatan bergambar (PHW) terbukti efektif memengaruhi sikap, norma subjektif, dan persepsi kontrol perilaku yang berperan dalam pembentukan niat berhenti merokok. Pendekatan visual yang kuat secara emosional mampu meningkatkan kesadaran dan motivasi perokok untuk berhenti, sejalan dengan prinsip *Theory of Planned Behavior* (TPB).

Kata Kunci: Peringatan Kesehatan Bergambar, Teori Perilaku yang Direncanakan

Abstract

Cigarette consumption in Indonesia remains high, underscoring the need for effective tobacco control strategies such as Pictorial Health Warnings (PHWs). This study aims to analyze the influence of PHWs on the components of the Theory of Planned Behavior (TPB)—attitude, subjective norm, and perceived behavioral control—and their subsequent effect on the intention to quit smoking. A systematic Narrative review was conducted using indexed scientific databases, including Scopus, DOAJ, and PubMed, for the period of 2020–2024. The review included three primary studies that met the inclusion criteria and focused on smoking cessation behavior, the TPB framework, and pictorial media as an intervention. The findings consistently demonstrate that graphic visualizations of smoking-related hazards positively influence smokers' attitudes, enhance social awareness (subjective norm), and strengthen perceived behavioral control over quitting. The combination of emotionally compelling imagery and cognitive messaging proved effective in reinforcing quit intentions within the TPB framework. In conclusion, PHWs effectively target the key determinants of behavioral intention outlined in the TPB. An emotionally powerful visual approach significantly boosts smokers' awareness and motivation to quit, affirming the utility of PHWs as a critical public health intervention.

Keywords: *Pictorial Health Warning, Theory of Planned Behavior*

INTRODUCTION

The level of cigarette consumption in Indonesia is still high, including among the working population (Ghany Vhiera Nizamie & Achmad Kautsar, 2021) such as Loading and Unloading Workers (TKBM) at the port. According to Riskesdas 2018 data, the prevalence of smokers over 15 years old in Indonesia reached 62.9% for men (Salsabila et al., 2022). This consumption contributes to the burden of non-communicable diseases and premature death. Effective and sustainable tobacco control efforts are needed (PKJS-UI, KOMNAS PT, 2021) to lower this number. Effective tobacco control efforts are needed, and one of the strategies that *cost-effective* is the use of *Pictorial Health Warning* (PHW) or Pictorial Health Warning on cigarette packaging (Tobacco Control Support Center of the Indonesian Association of Public Health Experts (TCSC-IAKMI), 2015).

PHWs are designed to communicate the health risks of smoking more clearly and conspicuously than textual warnings alone (Deborah et al, 2019). Research by Nian *et al.* (2023) in China proved that exposure to PHW designed with specific themes, such as harm to children and families, significantly increased intention to quit smoking, with 26.9% of participants reporting faster intention to quit. The study emphasizes the importance of culturally and contextually sound health messages to maximize their impact.

To analyze the mechanisms of behavior change, theoretical frameworks such as *Theory of Planned Behavior* (TPB) is often used (Chen, 2012). This theory explains that a person's intention to engage in a behavior (such as quitting smoking) is directly influenced by three main factors (Khairunnisa et al, 2025) : Attitude (*Attitude*), subjective norms (*Subjective norm*), and Perceived Behavior Control (*Perceived Behavioral Control*). The development of a valid and reliable instrument to measure the components of TPB in the context of smoking cessation has been successfully carried out by Narmawan & Narmi (2021), which provides a powerful measuring tool for further research. Meanwhile, the effectiveness of visual media in conveying health messages has been proven in different contexts. Kodir *et al.* (2021) shows that health education with audio-visual media is significantly more effective in increasing smoking cessation motivation in students than print media (*leaflet*). This proves the power of visual and audio elements in attracting attention, processing information (Setiyanto et al., 2023), and motivate change.

Based on a review of the three studies, there are gaps and opportunities to explore how specially designed PHW images can affect the key cognitive components of the TPB, namely attitudes, subjective norms, and *perceived control*

beliefs that ultimately shape the intention to quit smoking. Therefore, this study aims to conduct a systematic *Narrative review* to describe the influence of PHW images on attitudes, subjective norms, *perceived control beliefs*, and intention to quit smoking, as well as provide insight for the development of effective health promotion strategies based on *the Theory of Planned Behavior* (TPB).

METHOD

Data Source

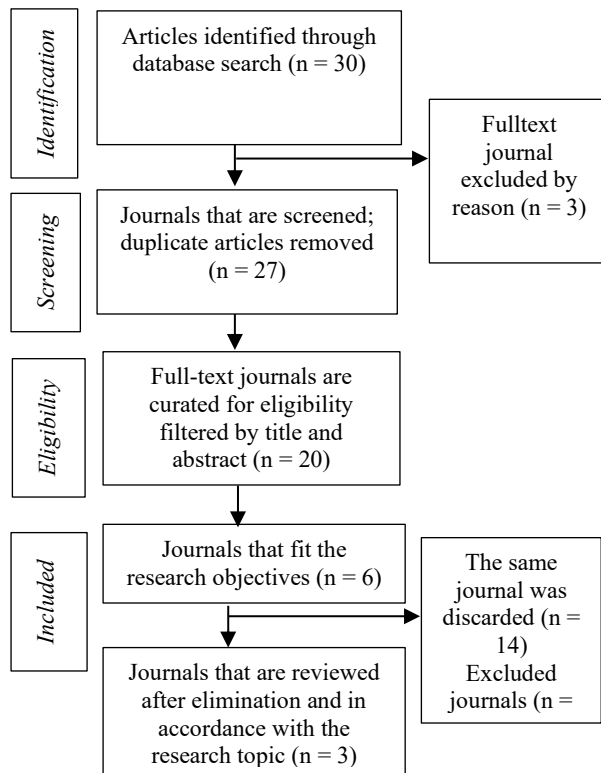
This study uses *the Narrative review* method to analyze and synthesize scientific evidence related to the influence of *Pictorial Health Warning* (PHW) images on attitudes, *subjective norms*, *perceived control beliefs*, and intention to quit smoking. Data for this study were collected from scientific articles published between 2021 and 2023. Narrative searches were conducted through various leading electronic databases, including Google Scholar, PubMed, Garuda Portal, and ScienceDirect, using a series of keywords such as "*Pictorial Health Warning*", "*health warning labels*", "*theory of planned behavior*", "*smoking cessation intention*", "*attitude, subjective norm, perceived behavioral control*", "*quit smoking intention*", "*tobacco control*", and "*port workers*".

Inclusion criteria include articles that discuss the influence of PHW on the components of *Theory of Planned Behavior* (attitudes, subjective norms, behavioral control, and intention to quit smoking), research on adult populations (including workers), publications in Indonesian or

English, quantitative methods, and the availability of full texts. In contrast, articles that are not relevant to PHW or SDGs, qualitative studies, *reviews*, editorials, publications before 2021, and articles without full access are excluded from the study. There are 3 scientific journals that are the main references that meet all the criteria for further analysis.

Data Extraction

The data extraction stage is carried out by recording key information from each selected article, which includes the research objectives, methods and designs used, variables measured (such as attitudes, *subjective norms*, *perceived control*, and intention to quit smoking), main results and findings, as well as research conclusions and implications. Furthermore, the data that has been collected is analyzed narratively by comparing, contrasting, and concluding the findings of each article to understand the patterns and mechanisms of the influence of PHW images on the components of TPB and smoking cessation intentions. The three major journals show that graphic images create negative associations through cognitive (formation of new mental schemas) and affective (responses of disgust and fear). PHW activates the injunctive norm by highlighting the impact on the family, very effective in a collectivist society. The inclusion of help information transforms *helplessness* into a belief in changeability.



In conducting data extraction, 30 articles were first identified through Scopus, PubMed, DOAJ, and SINTA indexed scientific databases (2020–2024). After the initial screening, 3 duplicate articles were excluded and another 21 articles were excluded because they were irrelevant to *the Theory of Planned Behavior* (TPB), did not examine the effects of *Pictorial Health Warning* (PHW), or did not present adequate empirical data. Then 6 articles were fully reviewed to assess the methodological suitability and context of the research, until 3 final articles were obtained that met the inclusion criteria, consisting of two quantitative studies and one mixed *methods* study that was relevant to the topic of smoking intention to quit. Data extraction and identification methods using PRISMA guidelines (Swartz, 2011).

This study adopts the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) method in the process of identifying and

selecting Narrative studies. The methodological stages are explained as follows:

1. *Identification Stage*
The researcher conducted an initial search through various indexed electronic databases, including Scopus, PubMed, Directory of Open Access Journals (DOAJ), ScienceDirect, Google Scholar, and the Garuda Portal. The search strategy used a combination of keywords related to "*pictorial health warning*", "*theory of planned behavior*", "*smoking cessation intention*", and TPB component variables such as "*attitude*", "*subjective norm*", and "*perceived behavioral control*". This initial identification process successfully gathered 30 potential articles relevant to the research topic.
2. *Screening Stage*
Of the 30 articles identified, a screening process was carried out by eliminating duplication, leaving 27 unique articles. Furthermore, a feasibility assessment was carried out based on the title and abstract, which resulted in 20 articles that met the initial criteria for further study.
3. *Eligibility*
A total of 20 articles then underwent a feasibility assessment through a full text review. The inclusion criteria applied included: focus on the influence of pictorial health warnings on the Theory of Planned Behavior component, adult research population (including workers), quantitative

research design, publications in the 2021-2023 range, and availability of full text. This process eliminated 14 articles that did not meet methodological criteria or research topics.

4. *Inclusion Level (Included)*

After going through a rigorous selection process, only 3 articles met all the inclusion criteria and were worthy of further analysis. The three studies consist of research by Kodir et al. (2021), Narmawan & Narmi (2021), and Nian et al. (2023), all of which provide empirical evidence on the influence of pictorial health warnings on the components of the Theory of Planned Behavior in the context of smoking cessation intentions.

The findings of the three journals support the implementation of PHW as an evidence-based strategy in tobacco control, with an emphasis on a comprehensive approach that targets all three components of the SDGs simultaneously. Visual media is able to change behavioral beliefs by presenting the negative consequences of smoking in a concrete way. Social support from the nearest environment is a determining factor in strengthening the intention to quit smoking. The combination of emotional messages and practical solutions is effective in overcoming the barriers to quitting smoking. In the study of Nian et al. (2023), 26.9% of participants reported the intention to quit sooner. Meanwhile, in the study of Kodir et al. (2021), 100% of the participants in the intervention group experienced increased motivation to quit smoking after the implementation of PHW.

RESULT AND DISCUSSION

This study analyzed three main journals that met the inclusion criteria that discussed the influence of *Pictorial Health Warning (PHW)* on psychological factors of smoking cessation behavior based on *the framework of the Theory of Planned Behavior (TPB)*. Based on the results of *the Narrative review*, it was found that the components of attitude, *subjective norms*, and *perceived control beliefs* have a significant contribution in forming the *intention to quit smoking*. The following is a summary of the results of the three studies:

1. *Attitude:*

Research by Kodir et al. (2021) shows that health education through audiovisual media that displays the message of the dangers of cigarettes is able to increase positive attitudes towards smoking cessation behavior. The results showed a significant increase in motivation to quit smoking after the intervention, which confirms the important role of visual media in shaping awareness and attitude change.

2. *Subjective norms:* A study conducted by Narmawan & Narmi (2021) developed a TPB-based smoking cessation behavior instrument and found that subjective norms have a strong influence on an individual's intention to quit. Social support from the surrounding environment, especially family and friends, is a determining factor that strengthens a person's beliefs and motivation to change his smoking behavior.

3. *Perceived control belief:*

Research by Nian et al. (2023) conducted in three major cities in China (Beijing, Shanghai, and Shenzhen) found that exposure to health warning images (PHWs) on cigarette packaging increased the perception of *self-efficacy* to quit smoking. Images with the theme of danger to children and families have been shown to be most effective in increasing the intention to quit, as they elicit an emotional reaction that reinforces the individual's behavioral control of the smoking habit.

Key Findings:

1. Each component in *the Theory of Planned Behavior (TPB)*, namely attitudes, subjective norms, and *perceived control beliefs*, has a significant role in increasing smoking cessation intentions, although the degree of influence varies depending on the social and cultural context of the respondents.
2. The combination of exposure to emotionally powerful health warning images (PHW), social

support from the immediate environment, and an individual's belief in one's own abilities are key factors in shaping motivation to quit smoking.

3. The emphasis on contextual and culturally relevant visual messages is an important aspect in strengthening the effectiveness of PHW as a risk communication strategy to encourage smoking cessation behaviors.

Table 1 Review of Main Journal

No.	Researcher (Year)	Country	Title and Year	Research Variables	Research Methods	Results
1	Kodir <i>et al.</i> (2021)	Indonesia	The Effect of Health Education with Audio-Visual Media on Smoking Cessation Motivation in Students (2021)	Independent : Health education with audio-visual media Dependent: Motivation to quit smoking	Quantitative with <i>quasi experimental pretest-posttest control group design</i> , sample of 52 students, Mann-Whitney test analysis	There was a significant effect of health education with audio-visual media on increasing smoking cessation motivation (p=0.000)
2	Narmawan & Narmi (2021)	Indonesia	Development of Smoking Cessation Behavioral Instruments: Model <i>Theory of Planned Behavior</i> (2021)	Variables: Smoking cessation based on the components of the SDG (attitudes, subjective norms, behavioral control, intentions)	Developmental research with cross-sectional design, validity (CVI) and reliability (Cronbach's Alpha) tests on 93 respondents	The instruments developed are valid (I-CVI 0.75–1.0) and reliable (Cronbach's Alpha 0.870).
3	Nian <i>et al.</i> (2023)	China	The Association Between Viewing Cigarette Health Warning Labels and <i>Intention to quit smoking</i> Among Chinese Adult Smokers (2023)	Independent: <i>Exposure of Pictorial Health Warning labels</i> (HWLs) with various themes Dependent: Intention to quit smoking	An experimental cross-sectional study with a survey of 1,625 smokers in three cities in China, ordinal logistic regression analysis	Pictorial exposure to HWLs was significantly associated with increased smoking cessation intention. The theme of " <i>self-harm</i> " is most effective in increasing the intention to quit.

Based on a Narrative review of three main journals, it was found that the use of images in *Pictorial Health Warning* (PHW) significantly affected the components of *the Theory of Planned Behavior* (TPB), namely *attitude*, *subjective norms*, and

perceived behavioral control, which ultimately increased the intention to quit.

1. The Influence of PHW on Attitude

Study by Kodir *et al.* (2021) showed that health education

with audio-visual media (which includes image elements) significantly increased smoking cessation motivation ($p=0.001$). Images and videos are able to form negative attitudes towards cigarettes by visually presenting health impacts.

Nian *et al.* (2023) found that PHW images featuring specific health impacts (such as lung cancer) were considered more credible and effective in shaping risk perceptions, which in turn reinforced negative attitudes towards smoking behavior.

2. The Influence of PHW on Subjective Norms

PHWs that show the impact of smoking on families or children (such as the theme of secondhand smoke) have been shown to reinforce subjective norms. Nian *et al.* (2023) reported that health warnings highlighting dangers to children increased smokers' concerns about their social and family impacts.

Narmawan & Narmi (2021) developed a TPB-based instrument that measures the influence of the perception of the closest people (family, friends) on the intention to quit smoking. Visual media is considered to be able to strengthen the perception of social norms that do not support smoking habits.

3. The Effect of PHW on Perceived Behavioral Control

Kodir *et al.* (2021) concluded that audio-visual media not only increased motivation, but also respondents' belief that they were capable of quitting smoking. This is reflected in

the increase in motivation scores from medium to high categories after the intervention.

Nian *et al.* (2023) also found that PHWs accompanied by messages of support (such as smoking cessation helpline phone numbers) increased an individual's perception of control over their ability to change.

4. The Effect of PHW on Intention to Quit

Third, studies consistently show that exposure to PHW increases smoking cessation intentions.

Kodir *et al.* (2021) found that as many as 100% of the intervention group respondents experienced increased motivation.

Nian *et al.* (2023) found that as many as 26.9% of participants reported an intention to quit earlier after seeing PHW.

Narmawan & Narmi (2021) through validated TPB showed that smoking cessation intentions can be predicted through the components of attitudes, subjective norms, and behavioral control.

The findings in this Narrative analysis strengthen the proposition *Theory of Planned Behavior* (TPB) that the intention to behave is influenced by three main factors, namely attitude, subjective norms, and behavior control. The image on the PHW acts as an external stimulus that is able to modify the three components simultaneously.

The findings of the three journals support the implementation of PHW as

an evidence-based strategy in tobacco control, with an emphasis on a comprehensive approach that targets all three components of the SDGs simultaneously. Visual media is able to change behavioral beliefs by presenting the negative consequences of smoking in a concrete way. Social support from the nearest environment is a determining factor in strengthening the intention to quit smoking. The combination of emotional messages and practical solutions is effective in overcoming the barriers to quitting smoking. In the study of Nian et al. (2023), 26.9% of participants reported the intention to quit sooner. Meanwhile, in the study of Kodir et al. (2021), 100% of the participants in the intervention group experienced increased motivation to quit smoking after the implementation of PHW.

Explicit and graphic images of health impacts (such as organ damage) create strong and direct negative associations to cigarette products, thus altering an individual's cognitive and affective evaluation of the consequences of smoking.

By highlighting the impact of smoking on others (family, children), PHW activates awareness of social norms and interpersonal responsibility. This reinforces the perceived "social pressure" to quit smoking, which stems from the desire to protect loved ones.

PHWs that are not only scary but also empowering by including information on how to quit or resources for help can cope with feelings *helplessness* and increase an individual's confidence that they have the resources and ability to change.

Study São Paulo *et al.* (2023) emphasizing that the effectiveness of PHWs depends heavily on their suitability with local cultural values.

Messages emphasizing the dangers to families and children, for example, have proven to be very effective in a collectivist society such as China, and this is also very relevant to Indonesia's socio-cultural situation.

Kodir Findings *et al.* (2021) in Indonesia supports the use of visual media that is in accordance with the characteristics of the target population, showing that students (as a representation of the young population) are more responsive to dynamic audiovisual content.

These findings confirm that PHW is not just regulatory compliance, but is a behavioral intervention tool based on evidence and theory. The integration of PHWs into broader public health campaigns can amplify their impact.

The effectiveness of PHW lies not only in its striking visual properties, but also in its ability to activate *Multiple pathways* cognitive, affective, and social simultaneously. At the attitude level, PHW functions as a visual *Evidence* that concretizes abstract health threats through *Dual Pathway Mechanism*. Through cognitive processes, graphic images such as tissue necrosis or lung cancer build new mental schemas about the consequences of smoking. While affectively, these images trigger *Disgust Response* and *Mortality salience* that forms *affective conditioning*, creating a persistent negative association between cigarettes and aversive stimuli. However, the effectiveness of the mechanism *fear appeal* This largely depends on the balance between threat and *efficacy message*, which if without the belief that oneself is able to overcome the threat, PHW's message will only

trigger *defensive avoidance*. PHW successfully leveraged *Socio-cultural leverage* by activating the *vicitive norm* through *victim visualization* *Secondhand Smoke* such as children and families.

Health education with audio-visual media significantly increases the motivation to quit. This medium presents the dangers of cigarettes through attractive and easily digestible sounds and images. This kind of presentation can change beliefs about the consequences of smoking (benefits vs. harms), which is the basis of attitude formation.

According to Edgar Dale's cone quoted from Kodir *et al.* (2021), people remember 50% of what they see and hear, so the message becomes meaningful. The message will also be able to change negative perceptions about smoking. PHWs that depict specific health impacts (such as lung cancer) graphically directly shape attitudes by linking the act of smoking to highly undesirable negative consequences. Theme "*Self-harm*" (self-harm) was shown to be most effective in increasing intention to quit, which indicates that attitudes toward smoking behavior become more negative after seeing the image.

Both audio-visual media and PHW function as a powerful source of information to change behavioral *beliefs*. They make the negative consequences of smoking (disease, suffering, death) more real, concrete, and accessible in memory. This changes an individual's evaluation of the act of "continuing to smoke" from something that might be considered "normal" or "enjoyable" to something high-risk, dangerous, and scary. This change underlies the increase in intention to quit.

Studi Nian *et al.* (2023) emphasizes that warnings about the dangers of secondhand smoke for children are significantly related to an increase in the intention to quit sooner. This message effectively shifts the focus from *self-harm* to social and family responsibility. In a collectivist culture like China (and also Indonesia), the "desire not to harm others, especially the family" is a very powerful source of social pressure (subjective norms). Each PHW designed in this study included a clear quit message: "*Thinking about quitting? Call 400-808-5531.*" These findings are key components that directly affect PBC. By providing helpline phone numbers, PHWs not only scare away smokers but also provide tools and resources to overcome perceived barriers. This changes the perception from "*I can't stop*" to "*there is help available to me*". Findings of Nian *et al.* shows that different themes target different SDG constructs. A combination of the themes of "*self-harm*" (for attitudes), "*harm to children*" (for subjective norms), and the inclusion of stop-help messages (for PBCs) in a PHW campaign would be a comprehensive and most effective strategy.

Therefore, the implementation of *the Pictorial Health Warning labels* (PHW) policy that is large, clear, and rotates themes that include aspects of personal health, social impact, and information on cessation assistance, is an evidence-based policy step that is highly recommended to encourage smoking cessation intentions in the population.

CONCLUSION

Based on the results and discussion of the research above, here are the conclusions in several main points:

1. *Pictorial Health Warning* (PHW) effectively affects all three components of the *Theory of Planned Behavior* (TPB). A Narrative review proves that health warning images are not only an informational tool, but behavioral interventions that are able to simultaneously change attitudes, reinforce *subjective norms*, and increase smokers' *perceived behavioral control*, which ultimately encourages *intention to quit*.
2. Mechanisms of PHW's influence on attitudes: PHWs that are graphic and display specific health impacts (such as lung cancer) serve as "visual evidence" that alter cognitive beliefs and trigger negative affective responses (such as disgust and fear) to cigarettes, thus forming more negative attitudes toward smoking behaviors.
3. Mechanisms of PHW's influence on subjective norms: PHWs that highlight the impact on others (especially children and families) successfully activate social pressure and interpersonal responsibility. This approach is particularly effective in the context of collectivist cultures such as Indonesia and China, where the norm of protecting the family is a strong driver.

Mechanisms of PHW's influence on behavior control: The effectiveness of PHW increases significantly when accompanied by messages that build *self-efficacy*, such as smoking cessation helpline phone number information. It transforms feelings of powerlessness into the belief that resources and the ability to change are available.

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