

Beyond the Pack: How Pictorial Warnings Shape Perception and Belief Among Smokers

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ABSTRACT (10 PT)

This study explores how pictorial health warnings (PHWs) on cigarette packages influence perceptions of threat and efficacy among smokers and non-smokers in Sleman District, Yogyakarta, using the Extended Parallel Process Model (EPPM) as the guiding framework. Employing a qualitative grounded theory design, nineteen participants—comprising both smokers and non-smokers—were interviewed using five official Indonesian PHWs as visual stimuli. Findings show that the blackened lung, oral cancer, and throat cancer images elicited the strongest perceptions of severity, often provoking fear and disgust, while the smoker near a child image generated mixed responses depending on personal relevance. Perceived susceptibility was higher among non-smokers, particularly regarding second-hand smoke exposure. Response efficacy was generally high, but self-efficacy varied greatly, with low self-efficacy often linked to defensive avoidance among smokers. Personal experiences with smoking-related illness and the realism, clarity, and emotional salience of images significantly shaped message reception. The study concludes that PHWs are most persuasive when they combine high threat with high efficacy, are contextually relevant, and are supported by cessation resources, offering critical insights for strengthening tobacco control strategies in Indonesia.



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INTRODUCTION (Capital, bold, Times new romance 11 pt)

Tobacco use remains one of the leading causes of preventable death worldwide, responsible for more than eight million deaths annually (Annareddy et al., 2024; Jha, 2020; Joshy et al., 2025). Including over 600,000 among non-smokers exposed to second-hand smoke (Bhore, 2020; Kumar & Sood, 2020). In Indonesia, the smoking prevalence remains high, positioning the country as the third-largest cigarette consumer globally. The Special Region of Yogyakarta (DIY) has shown an upward trend in cigarette consumption, contributing to the increased burden of non-communicable diseases such as cancer, stroke, and cardiovascular diseases. In an effort to curb tobacco use, the Indonesian Ministry of Health issued Regulation No. 28 of 2013, requiring cigarette manufacturers to display pictorial health warnings (PHWs) covering 40% of the front and back panels of cigarette packages.

Pictorial health warnings are designed to go beyond textual messages by providing vivid, emotionally charged images that convey the dangers of smoking more directly. International evidence suggests that PHWs are more effective than text-only warnings in attracting attention, increasing awareness, and influencing behavioral intentions to quit smoking (Durkin et al., 2013; Hammond et al., 2012). Images depicting severe health consequences such as cancer, respiratory diseases, and harm to children are intended to provoke emotional reactions, such as fear or disgust, which can act as catalysts for behavior change. However, the extent to which these warnings influence perception and belief depends on individual factors, cultural context, and previous exposure to health communication campaigns.

The Extended Parallel Process Model (EPPM) offers a useful framework for understanding how PHWs work by assessing two key dimensions: perceived threat and perceived efficacy. Perceived threat relates to the severity and susceptibility communicated by the image, while perceived efficacy involves the belief that the recommended action such as quitting smoking can effectively reduce the risk and that the individual is capable of taking that action (Domosławska-Żylińska et al., 2023; Zarghami et al., 2021a). According to the EPPM, messages that successfully combine high threat with

high efficacy are more likely to motivate protective behaviors, whereas high threat combined with low efficacy may lead to avoidance or denial (Witte & Allen, 2000).

This study investigates how smokers and non-smokers in Sleman District, Yogyakarta, perceive and respond to various PHWs in terms of threat and efficacy. Using a qualitative grounded theory approach, the research explores how these visual warnings shape emotional reactions, risk perceptions, and beliefs about quitting smoking. The findings will provide insights for policymakers, public health practitioners, and communication designers to optimize PHW content and presentation, ensuring that warnings are not only attention-grabbing but also empowering, ultimately contributing to stronger tobacco control measures in Indonesia.

RESEARCH METHODS

This study employed a qualitative research design using a grounded theory approach to explore perceived threat and perceived efficacy elicited by pictorial health warnings (PHWs) on cigarette packages. The grounded theory method was chosen to generate a conceptual understanding of how individuals respond to PHWs based on their lived experiences and perceptions.

The study was conducted in Depok Subdistrict, Sleman District, Yogyakarta Special Region (DIY), Indonesia, which includes both urban and rural areas. Nineteen informants participated in this research, comprising smokers and non-smokers, selected through maximum variation sampling to capture a diverse range of perspectives. Selection criteria included being a resident of the study area, aged 18 years or older, and representing variations in knowledge about smoking hazards and attitudes toward tobacco use. Additionally, one key informant with expertise in visual communication design was included to provide professional insights on PHW content and presentation.

Data collection methods consisted of in-depth interviews and direct observation. Original cigarette packs containing the five official PHWs mandated by the Indonesian Ministry of Health Regulation No. 28/2013 were used as interview stimuli. The PHWs included images depicting oral cancer, a smoker with a skull-shaped smoke, throat cancer, a smoker near a child, and blackened cancerous lungs. Interviews explored participants' understanding of each image, emotional and cognitive reactions, and perceived effectiveness in motivating behavior change. Observations focused on non-verbal cues, such as facial expressions and body language, during the interview sessions.

All interviews were audio-recorded, transcribed verbatim, and analyzed using OpenCode 4.2 software. The analysis followed the grounded theory procedure: initial coding to identify meaningful units, grouping codes into categories, and developing thematic relationships between categories. Triangulation of sources was achieved by comparing responses from different participant groups and incorporating expert insights. Ethical approval was obtained from the Ethics Committee of the Faculty of Medicine, Universitas Gadjah Mada (No. KE/FK/609/EC/2015), and informed consent was obtained from all participants prior to data collection.

RESULTS AND DISCUSSION

Results

The study involved 19 participants comprising smokers (n=10) and non-smokers (n=9) from Depok Subdistrict, Sleman, Yogyakarta. Participants varied in age, education, smoking status, and knowledge about the health risks of smoking. Five official pictorial health warnings (PHWs) were assessed: (1) oral cancer, (2) smoker with skull-shaped smoke, (3) throat cancer, (4) smoker near a child, and (5) blackened cancerous lungs.

Perceived Threat

Perceived threat in this study was manifested through two main components—perceived severity and perceived susceptibility—both of which varied across the five pictorial health warnings (PHWs). The blackened lung image was most frequently described as "horrifying" and "disgusting," with participants reporting a visceral reaction and immediate association with severe, irreversible disease. Many linked this image to lung cancer and respiratory failure, often expressing concern about how quickly smoking could damage the body. The oral cancer and throat cancer images also elicited strong severity perceptions, particularly among those with some medical knowledge or who had witnessed similar conditions in real life. In contrast, the smoker near a child image evoked more mixed

reactions; non-smokers tended to interpret it as a moral and social threat—emphasizing the harm to others—while several smokers dismissed it as “less relevant” or “not personally applicable.”

Perceived susceptibility was influenced by the participant’s own smoking status and lifestyle. Smokers often acknowledged that smoking was dangerous but tended to downplay personal risk, especially if they had not experienced symptoms or health issues. Non-smokers, on the other hand, identified higher susceptibility in situations involving second-hand smoke exposure, particularly for children and elderly family members. This divergence indicates that while severity can be communicated effectively through graphic images, susceptibility requires a more personalized and relatable message to resonate with all audiences.

Perceived Efficacy

Perceived efficacy was divided into response efficacy—belief that quitting smoking or avoiding second-hand smoke would reduce health risks—and self-efficacy—confidence in one’s ability to take such action. Participants with high response efficacy often articulated that quitting smoking would “definitely make a difference” and “help the body recover,” showing alignment with the intended goal of PHWs. Non-smokers typically expressed strong agreement that avoiding smoking environments was effective in preventing harm.

Self-efficacy, however, revealed significant variation. Smokers with long-term habits and high nicotine dependence frequently expressed feelings of powerlessness, citing addiction, social environment, and peer pressure as barriers. Statements such as “I know it’s bad, but it’s hard to stop” reflected high threat perception but low self-efficacy—a combination that, according to EPPM, may trigger defensive avoidance. Conversely, smokers who had previously attempted quitting or who had supportive family members reported higher self-efficacy, viewing the PHWs as reminders rather than deterrents.

Influence of Personal Experience and Image Characteristic

Personal experience emerged as a strong moderator of both perceived threat and efficacy. Participants who had witnessed relatives or close friends suffer from smoking-related illnesses—such as lung cancer, throat cancer, or chronic obstructive pulmonary disease—reacted more intensely to disease-related images. For these individuals, PHWs served as confirmation of lived experiences, increasing both emotional salience and credibility. For example, one smoker described recalling his father’s deteriorating health upon seeing the blackened lung image, leading to a momentary urge to quit.

Image characteristics also played a critical role in message reception. High-resolution, realistic depictions of disease were more impactful than stylized or symbolic graphics. Participants valued images with clear contrasts, direct focus on the affected organ, and minimal background distractions, as these elements increased clarity and immediacy of the health threat. The blackened lung and oral cancer images were praised for their “realism” and “shock value,” while the skull-shaped smoke was sometimes perceived as more artistic than alarming, reducing its persuasive effect. Additionally, images that combined visual shock with an implicit narrative—such as the smoker near a child—were more effective among audiences who valued social and moral dimensions of health messaging.

Discussion

The findings support previous research that PHWs can evoke strong emotional reactions and raise awareness of smoking-related risks (Hammond et al., 2012; Durkin et al., 2013). The Extended Parallel Process Model (EPPM) posits that individuals are most likely to adopt protective behaviors such as quitting smoking or avoiding second-hand smoke when they perceive both a high threat (susceptibility and severity) and high efficacy (belief in their ability to act and in the effectiveness of the action)(Quinn-Scoggins et al., 2022; Zarghami et al., 2021b). The Extended Parallel Process Model (EPPM) framework was validated in this context, as participants who experienced high perceived threat and high efficacy reported greater motivation to adopt protective behaviors, such as quitting smoking or avoiding exposure to second-hand smoke. In contrast, participants with high threat but low efficacy often displayed defensive reactions, consistent with Witte and Allen’s prediction(Witte & Allen, 2000).

The blackened lung image emerged as the most effective in conveying severity, aligning with international evidence that realistic depictions of diseased organs are more impactful than symbolic images(Hammond et al., 2012). However, not all PHWs were equally effective. The smoker near a child

image often failed to generate a strong threat perception among smokers, possibly due to a lack of personal relevance or perceived distance from the scenario, suggesting the importance of tailoring images to audience context. Smokers may not identify with the scenario depicted if they do not have children or do not see themselves as someone who would smoke near a child. This reduces the emotional impact and perceived risk, making the warning less persuasive (Rahman et al., 2020).

The role of personal experience highlights that PHWs are more persuasive when they resonate with individuals' lived realities. Additionally, image design elements—such as contrast, realism, and emotional salience—play a crucial role in message reception, supporting the notion that effective PHWs must combine both high visual impact and clear, relevant messaging (Volchan et al., 2013).

From a public health perspective, these findings indicate that PHWs should be periodically updated to maintain salience and that message content should be tested with target audiences before implementation. Furthermore, combining PHWs with supportive cessation resources may enhance perceived efficacy, reducing the risk of defensive avoidance among smokers with low self-efficacy.

CONCLUSION

This study demonstrates that pictorial health warnings (PHWs) on cigarette packages can generate strong emotional and cognitive responses among both smokers and non-smokers, particularly when the images convey high severity and personal relevance. The blackened lung, oral cancer, and throat cancer images were perceived as the most threatening, evoking feelings of fear, disgust, and concern, while the smoker near a child image elicited mixed responses depending on the viewer's personal context and values.

Perceived efficacy emerged as a critical determinant of behavioral intention. High threat perception alone was insufficient to encourage smoking cessation or avoidance of second-hand smoke; messages were more persuasive when accompanied by high response efficacy and high self-efficacy. Smokers with low self-efficacy often reacted defensively, suggesting that PHWs should be supported by cessation resources and empowerment strategies to enhance their effectiveness.

Personal experience and image characteristics significantly shaped message reception. Realistic, high-contrast, and disease-focused images were more impactful than symbolic representations, and personal connections to smoking-related illnesses heightened the perceived credibility and urgency of the message.

Overall, the findings highlight the importance of designing PHWs that not only capture attention but also foster a belief in the individual's ability to take protective action. Policymakers and public health practitioners should consider periodic updates to PHW content, audience-specific tailoring, and integration with supportive interventions to maximize their role in tobacco control efforts in Indonesia.

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