

PERCEIVED INFLUENCE OF TOBACCO PACKAGE WARNINGS ON THE SMOKING BEHAVIOR OF YOUTHS IN LAGOS, NIGERIA

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DOI:<https://doi.org/10.5281/zenodo.16419109>

Abstract: Tobacco use is a major global health issue, especially among Nigerian youths, with Lagos State experiencing rising rates of tobacco use, posing a public health concern. This study examines how tobacco package warnings influence youths' smoking behavior in Lagos, Nigeria. **Methodology:** This survey tested three hypotheses at a significance level of 0.05: H01, no relationship between tobacco warnings and youth smoking in Lagos; H02: Warnings do not influence youth attitudes; H03: No effect on perceptions. The study was guided by Health Belief Model and Theory of Psychological Reactance, and involved youths aged 15-35 (smokers and non-smokers). Data from 400 respondents, sampled via Yamane's formula from three LGAs—Alimosho, Ikeja, and Ajeromi—were collected through questionnaires. **Results:** PPMC analysis showed a 0.436 correlation between tobacco warning messages and youth smoking. The chi-square ($\chi^2 = 13.586$, $df = 24$, $p = 0.955$) reveals that warnings influence youth attitudes. A second test ($\chi^2 = 4.440$, $df = 12$, $p = 0.974$) confirmed that warnings significantly affect smoking perceptions. **Conclusion:** Tobacco package warnings are associated with youth smoking behavior in Lagos State. They influence attitudes, likely encouraging negative views, increasing awareness of risks, and potentially deterring initiation. It suggests strengthening TPWs by integrating them into wider public health campaigns to prevent smoking among youth and encourage quitting.

Keywords: Perceived Influence, Tobacco Package Warnings, Smoking behavior, Youths, Health Communication

1. Introduction

Tobacco use remains a pressing global health issue, particularly among the young. The escalating prevalence of tobacco consumption among youths has become an urgent public health concern in Nigeria, and specifically Lagos State. Youths are especially susceptible to tobacco addiction due to various factors, including peer pressure, socioeconomic status, and tobacco companies' targeted marketing (Adewuyi & Adefemi, 2016).

One key strategy to reduce tobacco use is to add health warning messages to tobacco packaging. These warnings act as a direct way to inform consumers about smoking risks. Graphic health warnings on cigarette packages have been shown to effectively increase awareness of health risks, lower smoking rates, and motivate smokers to quit. This offers hope for a significant decline in the prevalence of smoking (Hammond, 2011; Noar et al., 2016).

The effectiveness of tobacco package warning messages is crucial for youths at a key stage of long-term habit development. Research has shown that young people are more responsive to graphic warnings than adults because they tend to react more to visual and emotional cues (Fong et al., 2009). In Lagos State, where the youth population is large, understanding how these warnings influence smoking behaviors is essential for designing targeted public health initiatives. Studies from various countries have demonstrated that graphic warnings can significantly reduce smoking initiation among youths, encourage quitting considerations, and increase awareness about the health dangers of smoking (White et al., 2015).

Several studies have examined the perceived effectiveness of health warnings. Adebiyi et al. (2016) investigated graphic health warnings aimed at deterring smoking among adolescents in southwestern Nigeria. They found that the image "cigarette causes cancer of the airways" evoked fear in 56.4% of respondents, while "cigarettes cause impotence" evoked fear in 41.9%. Other warnings, like "cigarette smoke harms children" and "cigarette causes stroke," triggered fear in 39.5% and 37.3%, respectively. Anxiety was triggered in a smaller proportion of respondents across these warnings.

The study found that 80.1% of students aged 15 years believed that images showing the link between cigarettes and lung cancer were effective in preventing smoking, compared to 72.3% of those aged 15 years ($p = 0.32$). Additionally, 66.2% of students aged 15 years viewed Image 4 from France, connecting cigarette use to impotence, as effective, versus 57% of those aged 15 years ($p = 0.03$).

This outcome indicates that health warnings regarding the risks of cigarettes tend to foster more negative and fewer positive attitudes and perceptions toward smoking. Nevertheless, alterations in attitudes do not necessarily lead to changes in behavioral intentions, which contemporary attitude-behavior models consider essential for attitudes to impact behavior (Fishbein & Ajzen, 2010). Unfortunately, in certain instances, the influence of health warnings is so weakened that they fail to change intentions or decisions, let alone behaviors; worse yet, the effect may even be counterproductive.

Mutti et al. (2016) evaluated the impact of text and pictorial health warnings on smokeless tobacco in India and Bangladesh. It was found that warnings with only text were less effective than pictorial warnings ($p < 0.001$), and graphic warnings were rated higher than symbolic or testimonial ones ($p < 0.001$). Mansour and Bakhsh (2017) also found that labels with graphic images were the most effective overall. Ahmad et al. (2001) indicated that messages such as "smoking during pregnancy can harm your baby" (mean score 3.26) were more effective than messages such as "cigarettes are addictive" (mean score 2.33).

Kessels, Ruiters, and Jansma (2010) submitted that extremely threatening warnings can provoke defensive avoidance, causing people to steer clear of actively viewing or contemplating these warnings. This highlights the necessity of striking a balance in the emotional weight of Tobacco Product Warnings (TPWs) to minimize defensive reactions and guarantee that the messages remain impactful and constructive. Although TPWs play a vital role in tobacco control initiatives, numerous challenges hinder their effectiveness in shaping smoking behavior. Issues such as industry interference, message fatigue, cultural and contextual barriers, insufficient enforcement, the intricacies of behavior change, and potential adverse outcomes present considerable challenges.

To tackle these issues, a multifaceted strategy is essential, which includes robust regulatory frameworks, frequent updates to warnings, culturally appropriate designs, and thorough tobacco control policies that aid smokers in their quitting endeavors. The full potential of TPWs can be harnessed to lower smoking rates and enhance public health only by implementing such comprehensive strategies.

Graphic health warnings are adequate; however, their impact on Lagos State faces several challenges. These challenges include the weak enforcement of tobacco control regulations, the pervasive influence of tobacco advertising, and cultural attitudes that affect the perception of smoking risks. Moreover, the tobacco industry frequently employs strategies, such as attractive packaging and flavored tobacco products that appeal to younger consumers, to undermine the effectiveness of these warnings (Moodie, Mackintosh, Hastings, & Ford, 2013).

Statement of the Problem

Tobacco use among youth remains a significant public health challenge in Lagos, Nigeria. Despite global and national efforts to curb tobacco consumption, the prevalence of smoking among young people continues to rise, posing serious health risks and long-term socioeconomic consequences. According to the World Health Organization (WHO), tobacco use is a significant cause of morbidity and mortality, responsible for over 8 million deaths annually worldwide, including more than 7 million from direct tobacco use and around 1.2 million from second-hand smoke exposure (WHO, 2021).

According to Monye, Bamgbose, Shenge, Adejuwon, and Ojedokun (2020), the Nigerian government has taken steps to combat tobacco use. Nigeria's commitment is evident in the signing and ratification of the WHO Framework Convention on Tobacco Control (WHO-FCTC) in 2004 and 2005, respectively (United Nations Treaty Collection, 2019). However, the NTCA continues to encounter numerous challenges and gaps. These challenges include the need to revise textual health warnings, improve pictorial health warnings on cigarette packs, address poor taxation, and the lack of regulatory autonomy of the NTCA, all of which contribute to ineffective policy implementation (Udokanma, Ogamba, & Ilo, 2021).

In Lagos State, youth are vulnerable to smoking due to peer pressure, aggressive tobacco marketing, and the belief that smoking shows sophistication or rebellion. These warnings aim to inform about risks, reduce appeal, and lower smoking rates (World Health Organization, 2003). However, their effectiveness on youth smoking in Lagos has not been well-studied.

Hammond (2011) found that such warnings increase awareness of the risks of smoking, decrease the likelihood of initiating smoking, and promote cessation efforts among existing smokers. Noar et al. (2016) further highlighted that pictorial warnings are more effective than text-only warnings because they elicit stronger emotional responses and are more likely to be noticed and remembered by smokers. Despite these findings, several challenges hinder the successful implementation and impact of graphic health warnings in Lagos State. These include inadequate enforcement of tobacco control policies, cultural and social norms that diminish the perceived severity of smoking risks, and counterstrategies employed by the tobacco industry, such as marketing flavored tobacco products that appeal to youths (Moodie et al., 2013). Additionally, the lack of comprehensive data on how these warnings affect youth smoking behavior in the Nigerian context creates a significant gap in the literature. This study provides valuable insights for policymakers, health educators, and community organizations striving to reduce tobacco use and protect future generations from the harmful effects of smoking by examining youths' perceived influence and behavioral responses to these warnings.

Research Hypotheses

To meet its objectives, this study tested the following null hypotheses:

H0₁: No significant relationship was found between tobacco package warnings and smoking behavior among youths in Lagos State.

H0₂: Tobacco package warnings do not significantly affect the attitudes of youths toward smoking.

H0₃: There is no significant influence of tobacco package warnings on youths' perceptions of smoking.

2. Materials and Methods

Tobacco Package Warning Messages

Health warnings aim to effectively convey health risks and encourage individuals to change unhealthy behaviors. According to Hammond, Fong, McNeill, Borland, and Cummings (2006) and Hammond (2011), cigarette package warnings serve as a significant and noticeable source of health information, effectively communicating specific disease risks. Over the last 40 years, these warnings have progressed from vague messages on the sides of cigarette packs to explicit messages on the front that highlight specific health impacts, often paired with striking color images (Hiilamo, Crosbie, & Glantz, 2014). Odeyemi et al. (2009) stated that text-only warnings had no significant effect on the smoking decisions of 82% of the respondents. In contrast, Adebiyi, Uchendu, Bamgboye, Ibitoye, and Omotola (2016) posit that when respondents were exposed to graphic health warnings, they were influenced by fear, anxiety, and a perception of the message's probable dissuasiveness (Ononiwu et al., 2021).

Other studies have suggested that graphic warnings in the form of pictures and imagery can be more effective at communicating health risks by increasing perceptions of the harm of smoking, reducing the desirability of purchasing cigarettes, increasing negative affective reactions to smoking cues, and improving recall for other health information (Strasser, Tang, Romer, Jepson & Cappella, 2012).



Fig 1. Tobacco Package Warnings (Field Work, 2024)

Efforts on Warnings and Prevention of Tobacco Packages

Over the decades, tobacco warnings have evolved significantly as part of global efforts to reduce tobacco use and its associated health risks. These messages, which are mandated on tobacco product packaging, aim to inform consumers about the dangers of smoking and encourage cessation of smoking. The movement toward more stringent tobacco warning messages gained global momentum in the late 20th and early 21st centuries. The WHO played a pivotal role in this shift with the adoption of the Framework Convention on Tobacco Control (FCTC) in 2003. Article 11 of the FCTC requires warnings to cover at least 30% of packaging and encourages the use of pictures and pictograms for effectiveness (WHO, 2003). Many countries have adopted graphic warnings; Canada was among the first to do so in 2001, using images of smoking's health harms. Studies have shown that graphic warnings are more effective than text-only ones in conveying risks and motivating quitting (Hammond et al., 2003).

According to Husain et al. (2016), in 2008, the WHO introduced the MPOWER measures in 2008, which assist in the country-level implementation of effective interventions to reduce the demand for tobacco, as outlined in the WHO FCTC (World Health Organization, 2015). The policy package consists of the following measures: M: monitor tobacco use; P: protect people from tobacco smoke; O: offer help to quit tobacco use; W: warn about the dangers of tobacco; E: enforce bans on tobacco advertising and promotion; R: raise taxes on tobacco products. The MPOWER package of tobacco control policies and interventions has been effectively used by countries to plan, build, and evaluate progress toward implementing the provisions of the WHO FCTC (World Health Organization, 2015).

The success of Canada's graphic warnings spurred other countries to follow suit. By 2010, more than 30 countries, including Australia, Brazil, and Thailand, had implemented pictorial warnings. Research has consistently shown that graphic warnings are more noticeable, elicit stronger emotional responses, and enhance recall of health risks (Hammond, 2011). In 2012, Australia became the first country to implement plain packaging for tobacco products, removing all branding and requiring standardized packaging with ample graphic warnings. This move was based on evidence that plain packaging reduces the attractiveness of tobacco products and enhances the impact of health warnings (Cohen et al., 2020).

In recent years, there has been a continued push for more comprehensive and impactful warnings. Countries such as the United Kingdom and France have adopted plain packaging laws similar to Australia's, and the number of countries using graphic warnings has continued to grow. Additionally, there has been an increased focus on rotating messages to prevent desensitization and ensure that warnings remain effective over time. Technological advancements have also influenced tobacco warning development. Digital platforms and social media are being used to disseminate anti-smoking messages and reach a broader audience. Some countries are exploring the use of QR codes on packaging that link to interactive content about the risks of smoking and resources for quitting (Noar et al., 2016).

The impact of tobacco warnings on smoking behavior has been well documented. Graphic warnings are linked to increased awareness of the health risks of smoking, stronger motivation to quit, and more quit attempts (Hammond, 2011). For instance, a study in Brazil found that the introduction of graphic warnings resulted in significant reductions in the prevalence of smoking and increased calls to quitlines (Szklo et al., 2012). Despite these successes, challenges persist. The tobacco industry counters strict warning requirements through legal challenges and marketing tactics. In addition, ongoing research is needed to optimize warnings and address emerging products, such as electronic cigarettes and heated tobacco products (Brewer et al., 2019).

The concept of smoking behavior

Smoking behaviors involve actions related to the burning and inhalation of substances, including smoking style, inhalation depth, and frequency. These behaviors, including initiation, maintenance, and cessation, are complex and influenced by psychological, social, and biological factors. Understanding these intricacies is vital for developing interventions to reduce smoking and health risks. This essay examines the factors behind the emergence, persistence, and quitting of smoking, supported by research and theories (Christakis & Fowler, 2008). Smoking involves various behaviors, usually linked to tobacco or cigarettes. A smoker is someone who has smoked 100+ cigarettes in their lifetime and smokes occasionally or daily. Many adolescents try smoking without intending to become addicted. Peer pressure and social influences often lead to smoking initiation. Smoking can become habitual over time, leading to tolerance (Benowitz, 2010).

Theoretical Framework

This study is based on the HBM and the TPR.

Irwin Rosenstock developed the Health Belief Model (HBM) in 1966 to study and promote the uptake of health services, and it has since evolved. According to Rosenstock et al. (1988, cited in Brake, 2013), the HBM states that a person's belief in personal threat and the effectiveness of behavior predict their likelihood of taking action. It is a key health communication model that perceived risk, benefits, obstacles, cues, and self-efficacy influence health behaviors. Components include perceived susceptibility, severity, benefits, barriers, actions, and self-efficacy.

These notices serve as powerful prompts for tobacco package warnings, encouraging smokers to consider the health risks associated with their habits. By depicting the potential health consequences of smoking through vivid images and clear text, the warnings aim to raise smokers' awareness of their susceptibility to smoking-related diseases, such as lung cancer, heart disease, and stroke, while also emphasizing the seriousness of these illnesses. In addition, warnings can influence perceptions of the benefits of quitting by highlighting the positive health effects associated with cessation, such as improved lung function and reduced disease risk. Although the HBM offers important insights into what influences health behavior, it may not fully capture the complex interplay of cognitive, emotional, and social factors that shape how tobacco warnings affect individuals. For instance, the model might overlook immediate emotional reactions to warnings, the impact of social norms on responses, or the psychological resistance experienced by some smokers when confronted with alarming health messages.

The Theory of Psychological Reactance (TPR) provides valuable insights into the influence of tobacco package warnings on behavior. TPR submits that individuals have a core need for autonomy and the freedom to choose. When this sense of freedom feels threatened or removed, they experience a motivational state known as psychological reactance (Reynolds-Tylus, 2019). This reactance manifests as anger, resentment, and a desire to regain the freedom that feels threatened, often leading to actions that oppose the persuasive goal. In the case of tobacco package warnings, especially those that use strong or fear-based tactics such as graphic images, smokers might see these messages as an attack on their autonomy to choose whether to smoke. Such perceived threats can trigger reactance, causing negative reactions such as ignoring the message, downplaying the dangers, or even a "boomerang effect," where people smoke more in defiance of the warning. Research shows that while pictorial warnings usually communicate health risks more clearly, they also tend to provoke more reaction than text-only warnings. Factors contributing to this include anger at the warning, skepticism about exaggerated health claims, feelings of government intrusion or manipulation, and viewing the warning as a personal insult. Despite the potential increase in reactance, smokers frequently regard pictorial warnings as more effective in encouraging cessation than text warnings. This illustrates a complicated relationship in which the enhanced impact of pictorial warnings on risk acknowledgment and emotional response might outweigh the adverse effects of heightened reactance for many smokers. Grasping this dynamic is crucial for designing warnings that effectively communicate risks while minimizing unintended resistance (Hall et al., 2016).

This study employed a quantitative survey research approach, using inferential data analysis to test the study's hypotheses at a 0.05 significance level. The study population included all youths in three zones (Zone A, Zone B, and Zone C) in Lagos State. Zone A includes the Eti-Osa, Lagos Island, Ikeja, and Apapa Local Government Areas (LGAs). Zone B consists of Agege, Alimosho, Amuwo-Odofin, Ibeju-Lekki, Ifako-Ijaiye, Kosofe, Lagos Mainland, Mushin, Oshodi/Isolo, Ojo, Shomolu, and Surulere. The LGAs in Zone C comprise Ajeromi-Ifelodun, Badagry, Epe, and Ikorodu. One LGA was randomly selected from each zone, resulting in three LGAs: Ikeja, Alimosho, and Ajeromi-Ifelodun. A sample of 400 youths aged 15-35, including both smokers and non-smokers, was selected using the formula proposed by Yamane (1973, cited in Sahid and Akeredolu-Ale, 2025). A

multisampling technique was used: simple random sampling for non-smokers and snowball sampling for smokers and ex-smokers. A total of 400 questionnaires were distributed to youths in strategic locations within the selected zones, such as shopping malls, bars, clubs, and mini-stores.

Table 1: Selected Local Government Areas by Zone in Lagos State.

S/N	LGA	Zone	Population	Sample Size
1	Ikeja	A	470,200	
2	Alimosho	B	1,953,500	
3	Ajeromi-Ifelodun	C	1,017,500	
	Total		3,441,200	400

Citypopulation.de (2022)

3. Results and Discussion

H01: There is no significant relationship between tobacco package warnings and smoking behavior among youths in Lagos State.

Table 2: Correlations

	Tobacco Package Warning Messages	Smoking behavior among youths
Tobacco Package Warning Messages	Pearson Correlation: 1	.436**
	Sig. (2-tailed): .000	
	N: 380	380
Smoking behavior among youths	Pearson Correlation: .436**	1
	Sig. (2-tailed): .000	
	N: 380	380

Correlation is significant at the 0.05 level (2-tailed)—Source: Field Work, 2024.

In Table 2, PPMC revealed a value of 0.436, indicating a positive yet relatively strong correlation between tobacco package warning messages and smoking behavior among youths. The significant two-tailed result showed a p-value of $0.000 < 0.05$, indicating a significant relationship between the two variables. Therefore, the hypothesis that there is no significant relationship between tobacco package warning messages and smoking behavior among youths in Lagos State is rejected. This study revealed a significant positive correlation between tobacco package warning messages and smoking behavior among youths, as indicated by a PPMC of 0.436. This shows a fairly strong relationship, implying that the presence and possibly the effectiveness of these warning messages are associated with changes in smoking behavior within this demographic. The significance level, with a p-value of 0.000, confirms that this relationship is statistically significant ($p < 0.05$), indicating that the observed correlation is unlikely to be due to chance. This result aligns with the findings of Noar et al. (2016), who found that graphic warnings on tobacco products were associated with increased intentions to quit smoking and heightened awareness of the health risks associated with tobacco use. Similarly, this result corroborates Hammond et al.’s (2007) and Niederdeppe et al.’s (2019) submission that strong, prominent warning labels were effective in reducing smoking initiation rates among youths. They submitted that enhancing the visibility and impact of these warnings could contribute to decreasing the prevalence of smoking among youths, supporting public health initiatives aimed at curbing tobacco use. This study’s findings reinforce the idea that warning messages on tobacco packages can serve as an effective tool in tobacco control efforts, particularly in youth populations in Lagos State, Nigeria.

H02: Tobacco package warnings do not significantly affect youths’ smoking attitudes.

Table 3: Influence of tobacco package warnings on smoking attitudes of youths

Chi-Square Tests			
	Value	Degree of freedom (Df)	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.586 ^a	24	.955
Likelihood Ratio	17.045	24	.847
Linear-by-Linear Association	.539	1	.463
Number of Valid Cases	380		

Source: Field Work, 2024.

Table 3 indicates that the chi-square value (χ^2) is 13.586a with 24 df and a significance value of .955. Given that the significance level exceeds 0.05, the null hypothesis (H02), which asserts that tobacco package warnings do not significantly influence youths' attitudes toward smoking, is rejected. This indicates that tobacco package warnings have a significant impact on youths' attitudes regarding smoking in Lagos State. This finding aligns with Noar et al. (2016), who found that graphic warnings on cigarette packages heightened the perceived risks of smoking, resulting in more negative attitudes toward it among young people. Likewise, Pang et al. (2021) indicated that youths exposed to graphic health warnings exhibited greater awareness of the dangers of smoking and expressed a stronger desire to quit or avoid smoking. This result also supports Article 11 of the global tobacco control policies, as highlighted in the WHO FCTC's 2014 global progress report, which recognized the implementation of graphic health warnings on tobacco products as a successful approach to preventing smoking initiation, particularly among youth populations.

H03: There is no significant influence of tobacco package warnings on youths' perceptions of smoking.

Table 4: Perceived influence of tobacco package warnings on smoking among youth

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.440 ^a	12	.974
Likelihood Ratio	5.332	12	.946
Linear-by-Linear Association	1.072	1	.301
Number of Valid Cases	380		

Source: Field Work, 2024.

Table 4 shows that the Chi-square value (χ^2) is 4.440a, with 12 df and a significance level of .974. Because this significance level is well above the 0.05 threshold, the null hypothesis (H03)—which states that tobacco package warnings do not significantly impact youths' perceptions of smoking—is not rejected. This shows that tobacco package warnings significantly influence youths' perceptions about smoking. This finding supports the results of the 2012 Global Adults Tobacco Survey fact sheet from Nigeria, which reported that 30% of current smokers considered quitting because of a warning label, and aligns with research by Hammond (2011) and Macy et al. (2015), showing that exposure to tobacco package warnings increases awareness of smoking risks and enhances understanding of potential health effects. This change in perception is especially obvious among younger individuals, who are more easily influenced by visual health messages.

4. Conclusion

The study explored the perceived influence of tobacco package warnings on the smoking behavior of youth in Lagos State, Nigeria, concluding that a significant relationship exists between tobacco package warnings and youth smoking behavior. Tobacco package warnings significantly influence the attitudes of youths toward

smoking, likely contributing to a negative perception of smoking among them. Similarly, tobacco package warnings affect youths' perceptions of smoking, likely increasing their awareness of the associated risks and potentially deterring smoking initiation. This study recommends enhancing tobacco package warnings by integrating them into broader public health campaigns focused on preventing and cessating smoking among youth. Regular engagement with youths is urgently needed to collect feedback on tobacco package warnings to address their concerns and experiences, further improving the relevance and impact of health warnings. A consistent influence of tobacco package warnings on perceptions is vital for public health strategies, as shaping youth perceptions is crucial in preventing smoking initiation and encouraging cessation.

5. Funding

This study was funded by the authors. The writing of the manuscript and the decision to submit it for publication were the authors' sole responsibility.

6. Acknowledgements

Not applicable

7. Disclosures

Ethics approval and consent to participate not applicable

Consent for publication not applicable

The supporting data associated with this article can be found in the online version of the manuscript.

8. Conflicts of Interest Statement

None declared

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