

ORIGINAL ARTICLE

Factors Associated with Poor Perceptions of Graphic Warning Signs (GWS) on Cigarette Package among Adult Smokers in Kelantan

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ABSTRACT

Introduction: Initially, studies showed that graphic warning signs (GWSs) on cigarette packages encouraged smoking cessation. However, there have been recent concerns over the effectiveness of GWSs to change smoker perceptions and behavior over time. Our goals were to assess the latest perceptions of GWSs among smokers in Kelantan and to determine the factors associated with them. **Methods:** This cross-sectional study was conducted among respondents who attended outpatient clinics in a teaching hospital in Kelantan. Their perceptions were analyzed with a validated Malay questionnaire containing four domains: fear, influence, credibility, and picture content. **Results:** The average smoking age was 17 (3.04) years old. The mean smoking time was 11 (7.49) years. The average daily cigarettes smoked was 8 (6.26). Most respondents perceived low levels of fear (83%), poor picture content (65.5%), low influence (87.6%), and low levels of credibility (70.1%) in GWSs. Those with low levels of education were significantly associated with poor perceptions of GWSs. **Conclusion:** Despite vigorous efforts by the government to discourage smoking in Kelantan, smokers still poorly perceive GWSs. More effective health-promotion strategies are essential to influence smokers in this area.

Keywords: Adult smokers, Graphic warning signs, Perception, Cigarette package

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INTRODUCTION

The latest National Health Morbidity Survey (NHMS) report (a local population survey) on the smoking statuses of Malaysian adults revealed an overall prevalence of smoking of 22.8%, the prevalence of male smokers significantly higher than female (43% vs. 1.4%) (1). The highest smoking prevalence was observed among smokers 25–44 years old and those with low levels of education. The report also found that 22.6% of Malaysian adults were smokers of many tobacco products but mostly manufactured cigarettes. Meanwhile, the prevalence of smokers in rural areas is consistently higher than urban areas in the series of NHMSs (1996–2015), rising from 28.5% to 29.4% while urban areas only increased from 21.7% to 22.3%. Specifically in Kelantan, a state in northeast Malaysia, the prevalence of ever smokers was 34.0% and current smokers 25.1% (2).

Studies have shown that smoking is most common

among low-income, young, and unmarried people (3). Other factors are primary education attainment, rural residence, lifestyle, and comorbidity status (3). Local research has also shown that adult Malaysian smokers find smoking a way to cope with life hurdles (4); nearly half rationalize smoking, much more than smokers from a neighboring country, Thailand, and they are less likely to quit smoking (5). This disparity in intentions is attributable in part to the country's social norms, feeling guilt, and rationalization discrepancies. Thai smokers were more likely to regret and less likely to rationalize smoking than Malaysian smokers because of the country's strong record of tobacco-control policies, which can significantly affect social norms, guilt, and rationalization among smokers (5).

To combat the increasing prevalence of smokers, especially in young generations, and to protect the public from the harm of smoke in Malaysia, several ministries, health institutes, universities, non-governmental organizations, and the Malaysian Council for Tobacco Control developed the National Strategic Plan for Tobacco Control. The national plan adopted the MPOWER strategy proposed by the World Health Organization. This strategy focuses on six main activities: 1) M: monitor the prevalence and trends of

tobacco; 2) P: protect non-smokers from the dangers of cigarette smoke; 3) O: offer “stop smoking” services; 4) W: enhance warning activities; and 5) E: prohibit advertising, promotional, and sponsorship activities from tobacco or tobacco-related companies. The vision of this plan is to free Malaysia from any form of smoking by the year 2045 (6).

Graphic warning signs (GWS) policy is part of the ‘W’ strategy to boost public awareness and encourage a cessation of smoking through the emotion-driven graphics (7). Some explanation that supports the effectiveness of GWS is due to the individual perception of smoking is predicated on three sources of information which includes prior notion, direct and indirect individual experience and public information that have been absorbed by the individual (8). Research in Australia pointed out that smokers whom smoking 20 cigarettes a day were about 7,000 times a year exposed to the GWS on the tobacco packaging (9) while other studies have supported the effectiveness of the policy especially in low literacy and socio-economic population (10).

The effectiveness of the GWS usually measures by perception, knowledge, and behavioral changes of smokers towards the GWS (11, 12). The perception can be analyzed in domains such as fearfulness, attractiveness, credibility, and influence of graphics, the content of graphics and motivation, and intention to quit smoking (10, 13). Studies have shown that the credibility of GWS can disrupt brand imagery and diminish the urge to smoke (14, 15). However, other studies found that the GWS did not succeed in increasing warning salience but did increase avoidance among low to moderate education smokers (16). Meanwhile, few studies identified the influence of GWS on increasing the knowledge and perception of health risks associated with smoking habits and raise awareness of smoking prevention among the public especially younger populations (10, 17). Also, GWS may communicate potential health consequences, increase awareness of the negative health impacts of smoking, encourage memorability of the effects on health and arouse fear of smokers from smoking with extensive and detailed pictorial information (7, 18).

Few studies evaluated the impact of GWS in Malaysia since the country commenced the GWS regulation on the first January of 2009 and mixed findings were concluded. A study has observed major improvements in the way the message recognized, interpreted, and ignored with the latest GWS in Malaysia as compared with the China text-only warning (19). GWS has been discovered to increase awareness of the risks of smoking and to increase the interest in ceasing smoking among adults (20). These messages prevented cigarette consumption and were an independent predictor of all stages of the theory of change (21). It also provides for the withdrawal of intentions and self-

efficacy to quit smoking (20). Moreover, recognizing the health risks and interpreting the warnings has added additional predictive capabilities for smokers and the public generally and GWS seems able to halt smoking regardless of the strength of the graphic warnings (22). Nevertheless, other researchers have raised concern over the effectiveness of GWS in the last few years (23, 24). They argued that GWS could affect smoker's intent to quit, but they do not always lead to desirable behavior, which is smoking cessation. Studies revealed relationships between self-reported intention and behavior, such as smoking, are not consistently vigorous and sometimes can be transmuted by other factors (25). A study on smoking habits among Chinese women in Hong Kong found that existing, ex-and never-smokers felt smoking cessation ads were less effective than the anti-drug advertisement. However, both present and former smokers in the study were aware of GWS on cigarette packets, which revealed differing degrees of fear and disgust (26). A study in Jordan found no substantial difference between the suggested GWS as opposed to the existing warning signs (27) while an analysis among Turkish university students observed no gaps between female and male respondents in perceiving the efficacy of GWS in inspiring not to smoke to non-smokers and those who still smoking (28). Moreover, the GWS may experience wear and tear effect on its effectiveness over time, resulting in a lower impact on smoking habit (11). Recent studies revealed that the GWS did not produce a more negative perception of smoking for various groups of smokers and evoke a little emotional reaction to reduce risk perception and quit smoking intention (29, 30).

Therefore, it has been almost ten years since the GWS policy implementation in Malaysia, and a re-evaluation of the smoker's perception toward it is necessary to understand current smoker's perception and to develop effective public health interventions to the fight against tobacco consumption (13, 24). Hence, the purpose of this study was to assess the perception of GWS among male adult smokers in Kelantan and to determine the factors associated with their perception toward the GWSs.

MATERIALS AND METHODS

Study design

We conducted a cross-sectional study at outpatient clinics in a teaching hospital in Kelantan (a state in Malaysia where many households are categorized as low-income (31)). The study was held for three months, from June 2018 until August 2018. Our respondents were recruited during their follow-up sessions at the clinics.

Study criteria

The study selected adult active smokers not yet registered to any quit-smoking clinics who were 18–65

years old. Ex-smokers were excluded from the study. Informed consent forms were distributed and signed by the participants before the study was conducted.

Sample size and sampling method

For sample size determination, we applied a single proportion formula with setting up at 95% confidence interval, and precision at 5%. The expected proportion was based on works of literature and the expected dropout rate was set at 20% to acquire the sample size required. After all estimations, the final sample size required for this study was 229 respondents. We then applied a systematic random sampling method to select our participants from the outpatient clinics from their attendance lists, which have approximately 1,500 patients per week. Hence, to acquire the desired sample size, the interval for selecting a subject was 1,500 divided by 200: approximately 7. We chose our respondents randomly from the registration lists starting from participant 3 onward with an interval of 7. Then, the selected respondents were approached and asked about their smoking habits.

Those who fulfilled the study criteria were invited to participate. Once the respondents agreed to participate, they filled out consent forms and returned them to us. The research protocol was then explained to the participants, and they were subsequently asked to complete questionnaires. A total of 194 respondents who met the inclusion and exclusion criteria participated.

Study tool

The study used a validated Malay questionnaire developed to suit the socio-demographics of the local community. The questionnaire was created after a literature search and literature analysis of pictorial warning interpretations and smoking attitudes. We assessed the face validity of the questionnaire by interviewing eight smokers and asking them to evaluate the suitability of the questionnaire using five Likert scale anchors. All respondents agreed that the questions were understandable. We then invited a public health specialist and a clinical psychologist to determine the content validity of our questionnaire. Both experts agreed that the content was appropriate to assess perceptions of GWSs. Also, to ensure the construct validity of our questionnaire, the questions were gathered and developed through adequate literature reviews regarding the perceptions and attitudes of smokers toward GWSs, smoking, and behavior related to cigarette consumption. We had four domains in the questionnaire that denoted smoker perceptions of GWSs: feeling fear, warning credibility, influence on perception, and picture content. The fear domain had a factor-loading range from 0.782–0.794 with a Cronbach's alpha of 0.9; influence had 0.493–0.771 with a Cronbach's alpha of 0.915; credibility had 0.498–0.72 and a Cronbach's alpha of 0.839; and picture content had 0.556–0.871 and a Cronbach's alpha of 0.918. The validation level

of our questionnaire factor analysis was high (more than 0.4), and the reliability of the questionnaire determined by Cronbach's alpha value also was excellent (more than 0.5).

The questionnaire consisted of 22 items. We had three items in the fear domain, six in influence, seven in credibility, and the remaining six items in picture content. Each item was rated based on a five-point Likert scale from 1 (disagree strongly) to 5 (strongly agree). The total score for overall perception was the sum of the fear, credibility, influence, and picture content scores. The mean score of each domain and overall perception were analyzed using explore descriptive statistics. The domains were then categorized as high or low using their mean scores as cut-off points. For example, we labeled fear scores below the domain's mean as 0 for less fear and above the mean as 1 for more fear. We also categorized education levels as primary, secondary, and tertiary education attainment.

We defined the perception of a GWS as how a smoker perceives, reacts, and responds to it, fearfulness as a fearful thought or other negative emotion about it, credibility as belief in the GWS, influence as its depiction of illness, and the picture content as the appropriateness of the color, graphic, and position of the GWS on the cigarette package.

The graphics shown to the respondents were like those on cigarette packs in Malaysia as mandated by the Control of Tobacco Product (Amendment) Regulations 2008. There were six sets of GWSs on the cigarette packs depicting smoking causing lung cancer, mouth cancer, neck cancer, premature birth, miscarriage, and gangrene. Figure 1 shows all the graphics.



Figure 1: Examples of graphic warning signs used in Malaysia

Statistical analysis

We studied the socio-demographic data, smoking profiles, and perceptions of respondents using descriptive analysis. The numerical data are presented as means and standard deviations or median and interquartile ranges depending on distribution normality, and the categorical data are presented by frequency and percentage. To analyze factors associated with poor perceptions of GWSs, we applied logistic regression. In this study, only variables with p-values less than 0.25 or clinically

important factors were selected for further analysis, which was necessary for the purposeful selection process in logistic regression. It began with a univariate analysis of each variable. Any variable with a significant univariate test at some arbitrary level was selected for the multivariate analysis. Then, a preliminary model was obtained after forward and backward logistic regression. Our statistical model showed weak correlation matrices between variables and relatively small standard errors, and no multicollinearity existed in the model. We also checked possible two-way interactions between the independent variables, which were found to be insignificant. The model fitness was determined by the Hosmer-Lemeshow test, classification table, and area under the receiver operating characteristic (ROC) curve. All statistical analyses were conducted in SPSS software version 23.

Ethical consideration

Ethical approval was obtained from the Human Research and Ethics Committee, Universiti Sains Malaysia: USM/KK/PPP/JEPeM(235.4(1.3)).

RESULTS

Socio-demographic data of respondents

The mean age of smokers in our study was 28.50 (± 7.87) years. The youngest was 18, and the oldest was 47. Most participants were between the ages of 20 and 24 (35.1%). All respondents were male, and Malay was their racial background. Table I shows summarizes the findings.

Table I: Socio-demographic of respondents (n =194)

Variables	Characteristics	Mean (± SD)	n (%)
Age (year)		28.50 (± 7.87)	
Gender (Male)			194 (100.0)
Race (Malay)			194 (100.0)
Level of education	Primary		5 (2.6)
	Secondary		85 (43.8)
	Tertiary		104 (53.6)
Income per month (RM)		1184.63 (± 825.73)	

Smoking profiles of respondents

The mean smoking initiation age was 17.46 (± 3.04) years of age. The youngest age they started to smoke was 10. The average smoking years among all respondents were 11.09 (± 7.49), and the average daily number of cigarettes smoked was 8.21 (± 6.26). They usually smoked between 2 and 20 cigarettes a day. Many respondents had no specific cigarette-buying budget (95.9%). Table II summarizes their smoking profiles.

Perceptions among respondents of graphic warnings on cigarette packs

Table III shows the overall and domain-specific perception scores of the respondents. The results revealed that most felt the GWSs did not scare them

Table II: Smoking profile of respondents (n =194)

Variables	Mean (± SD)	n (%)
Age start smoking (year)	17.46 (± 3.04)	
Duration of smoking (year)	11.09 (± 7.49)	
Number of cigarette smoke (stick/day)	8.21 (± 6.26)	
Budget to buy cigarette		
	Not allocate budget	186 (95.9)
	Allocate budget	8 (4.12)

Table III: Level of perception of respondents on graphic warning signs (n =194)

Domain	Percentage (%)
Fear feeling	
Low	83.0
High	17.0
Credibility of graphic	
Low	70.1
High	29.9
Influence of graphic	
Low	87.6
High	12.4
Picture content	
Poor	65.5
Good	34.5
Overall Perception	
Poor	79.9
Good	20.1

enough to quit smoking (83% responded as feeling deep fear from the GWSs). They also perceived the credibility of the GWSs as non-impactful (70.1%), their influence as low (87.6%), and the picture content unpersuasive (65.5%). Overall, the perceptions of the respondents of the GWSs were poor (79.9%).

Factors associated with overall poor perceptions of GWSs on cigarette packs

We found that the socio-demographic factors most associated with overall poor perceptions of GWSs were age, duration of smoking, and level of education using univariate analysis. However, after backward and forward likelihood ratio (LR) elimination methods were conducted, we found that only education level was a significant variable. Further analysis revealed that smokers with low educational levels had 2.39 odds of having poor perceptions of GWSs than those with high educational levels. Table IV shows the findings from the multivariate analysis.

Table IV: Analysis of Factor Associated with poor perception on graphic warning sign (n=194)

Variables	Crude Odds Ratio (95% CI)	P value*	Adjusted Odd ratio (95% CI)	P value**
Age (year)	1.06 (1.01 -1.10)	0.011	-	
Duration of smoking (year)	1.06 (1.01 - 1.11)	0.018	-	
Level of education				
High	1	0.006	1	0.026
Low	2.84 (1.36 - 5.95)		2.39 (1.11 - 5.16)	

*Univariate analysis using single logistic regression
 **Multivariate analysis using binary logistic regression

DISCUSSION

The warning labels policy is intended to ensure that public are properly aware of smoking's health hazards, and to enable smokers to consider quitting. However, warning signs are often useful even when presenting accurate facts, as the transmission of customer knowledge is largely dependent on the delivery and type of messages, as well as their capacity to induce thoughts and emotions (32). In this study, we examined a few domains that influence the perception of GWSs on cigarette packs: feeling fear, GWS influence, picture credibility, and picture content. However, despite much evidence from past studies on the effectiveness of GWSs in changing smoking behavior and increasing tobacco harm awareness, we did not observe good enough perceptions of GWSs on cigarette packs for participants to be dissuaded from their smoking habits in our study. Surprisingly, after almost ten years of policy implementation, our findings were similar to an earlier local study (20). Some possible explanations might account for this result.

Fear is a subjective matter, but studies have shown that powerful fear messages are effective in changing attitudes, intentions, and behaviors (33). According to the fear theory, the fear guided by the drive-reduction model will incrementally grow or shrink when exposed to threatening information (34). In our study, the levels of fear of GWSs were low among our respondents, as they rationalized smoking as a mechanism to cope with their lives, most being from a low-income group, and perceived it as a societal norm (5, 35). Many smokers also believe that they will die whether they smoke or not, so they prefer to keep smoking (36). They attempt to avoid reading or viewing the labels and thus underestimate the messages of GWSs (37).

The credibility of GWSs is consequential to acquire perceptions of believability and veracity among smokers (13). GWSs should be captivating enough to instill trust and beliefs about the perils of smoking (38). In our study, we found that their credibility scores were low. Our respondents probably perceived that GWSs on the cigarette packs had insufficient credibility to change their behavior (30). Similar findings were noted by a study in the United Kingdom (UK) that found no change in the perceived credibility of GWSs after policy implementation (17). The respondents perceived that the graphics did not influence them to take any affirmative action to quit smoking because most probably perceived that smoking increased relaxation, diminished nervousness in social situations, tasted good, and/or increased their enjoyment of parties (24). Besides, other respondents felt no point in quitting smoking because they already suffered from severe illnesses.

Nevertheless, several studies have shown that implementation of GWSs on cigarette packs benefit

smokers by reducing their cigarette intake and introducing avoidance behavior, especially in vulnerable populations (32). A review showed that new or larger GWS could improve salience, trigger more anxiety, and gain more awareness and knowledge about smoking behavior's health risk (7, 12). A US study found that the graphic warning raised harms perception (39) while an earlier research also indicated that the characteristics of warning could affect the degree to which the warning will be remembered and recalled, which will generate reactions later (29). It is also backed by a psychological study that have called for a stronger memory of health risks though large warning labels (40). Moreover, regular updating of health risk images on GWS has been considered to help sustain desirable effects on smokers (41). Such results existed not only among smokers but also among non-smokers (12). It was understood that frequent implementation of a new graphic warnings could sustain, or even raise, the warning salience (42). In addition, new GWS with efficacy and threat messaging may play a role in perceptions about efficacy by dramatically influencing perceptions, especially among low socio-economic populations (10).

Our findings also revealed that low education among smokers explained 139% of their poor perceptions of GWSs compared to highly educated smokers. The finding is inconsistent with other studies in the tobacco advertisement literature showing that emotionally pictorial health labels commonly linked with positive responses among adult smokers and tend to resonate more strongly with lower socio-economic population (43). A cross-sectional study of three Latin American countries showed that smokers with lower education were more likely to learn about smoking-related dangers and to stop smoking because of the GWS (44). However, an experimental study in US showed no difference in reaction of various educational and racial background of smokers on GWS compared to text-only warning labels (45). Other studies have found that participant age and the number of cigarettes smoked per day were other factors associated with perceptions of graphic warnings (11). One reason is that lowly educated smokers are more likely to live in neighborhoods where cigarettes are more affordable and convenient (46). Tobacco consumption also quickly spreads through social relationships; family, friends, or colleagues who smoke are more likely to be around them, and smokers are more likely to accept smoking as a typical culture in a family or society (47). This societal acceptance lowers their chances of quitting smoking. Even if they try to quit, they are more likely to relapse because of continuous exposure to the smoking norm and availability of cigarettes around them (48).

This study has several limitations. First, it is a cross-sectional study, so we cannot prove causal relationships between factors and perceptions. The factors of poor perception among smokers can be found in a cohort study. Secondly, the result of gender (all male) and

income (all from a low-income group) factors gave us limited variables for advanced statistical analysis. The study also contains potential biases, since our respondents probably provided erroneous answers due to unfamiliarity with the questionnaire, being tired during the data collection, and having faulty recall. Finally, this study was based on a single hospital population, not a whole community, which obstructs a better understanding of the problem. Therefore, healthcare access bias probably affected the gender and age factors of our analysis. With all these limitations in mind, we should conduct additional studies in the future on diverse samples to design effective tobacco policies.

CONCLUSION

Despite the vigorous efforts of the government to promote smoking cessation, adult smokers in Kelantan still have poor perceptions of GWSs. Our results showed weak effects of GWSs on cigarette packs on smokers. They induced less fear, had less credibility, and had less influence among adult smokers than other studies found. Smokers were also hardly aware of the graphics' contents and had poor overall perceptions of them. The findings suggest that smokers with low education attainment are associated with these reduced perceptions of GWSs, thus a new strategy to continue or modify the use of GWSs should be considered to achieve the mission, vision, and objectives of the national plan for tobacco control.

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