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Perceived emotional and cognitive reactions to tobacco graphic health warning labels among nonsmoking senior high school students in Leyte

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Abstract:

BACKGROUND: The Philippines implemented a law on the inclusion of graphic health warning (GHW) labels in cigarette packs to increase awareness about the health effects of smoking, to quit smoking, or to deter potential users from engaging in cigarettes. Investigating its impact on senior high school (SHS) students may provide insights into enhancing and reinforcing the law to achieve its purpose at the adolescent developmental stage.

OBJECTIVES: The objective of this study was to determine the perceived emotional and cognitive reactions as well as the perceived health risks of GHWs among nonsmoking SHS students in Leyte and their relationship to their level of exposure.

METHODOLOGY: A cross-sectional design was employed involving 247 students from public high schools in Pastrana, Leyte, who were selected through stratified random sampling. A self-report questionnaire was used to gather the data. Spearman's rho correlation coefficient was used to test the hypothesis.

RESULTS: The majority of the participants reported positive perceptions of GHW labels. Moreover, the majority of them have seen GHW at least once a week on cigarette packs and evoked variable agreement about the high arousal and low arousal negative emotion, but have positive cognitive reactions. They have a strong agreement on the perceived health risks posed by cigarette smoking through GHWs. There was a positive and significant correlation between the level of exposure and the perceived health risks of smoking through the GHWs.

CONCLUSION: Adolescent learners reported variable agreement on emotional reactions, but had positive cognitive reactions to tobacco GHW labels. They also have reported that GHWs in cigarette packs provide positive visual information on the health effects and other consequences of smoking. Those who have frequent exposure to the GHWs of the cigarette packs were more likely to report knowledge and information on the health risks of smoking. Thus, the GHWs on cigarette packs are still necessary to decrease the new smoker rate, especially among adolescents. Policy implications toward the continuous development of GHWS are offered.

Keywords:

Adolescent learners, cigarette smoking, graphic health warning, senior high school students

Introduction

Tobacco use is considered to be a significant threat to public health, contributing to over 8 million deaths around

the world, as reported by the World Health Organization.^[1] The effect of tobacco on the body is a well-studied topic that, according to the CDC,^[2] harms nearly all the organs in the body, leading to different diseases and

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disability. Despite its health effects, many are still into the consumption and use of tobacco through smoking and chewing. In 2020, an estimated 22.3% of the world's population used tobacco, with the majority being men (36.7%), whereas women accounted for 7.8%.^[1]

In the Philippines, 19.5% of adults aged 15 years and above and 12.5% of youths aged 13–15 years old are current tobacco users.^[3] Over 20% of deaths, which are caused by noncommunicable diseases, are due to tobacco use, totaling 112,000 deaths each year.^[4] Cigarette smoking is the most common form of tobacco use in the Philippines and around the world. It has been identified by the Philippine Heart Association and the World Health Organization as a leading risk factor in CVD, with ischemic heart disease as the leading cause of death in the country, according to the latest data on mortality rates.^[5,6] Different government agencies, in cooperation with international and local organizations, have been formulating policies and programs to combat the smoking-related problems in the country.

In 2003, the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) was developed in response to the global tobacco epidemic, wherein the Philippines was among the signatories.^[7] In 2005, the Philippines ratified the WHO FCTC, which provided the framework's validity as part of the national law. This has become the legal basis for the Philippines to enact a tax measure for health, increasing the price of cigarettes. In 2014, Republic Act 10643, or the Graphic Health Warnings Law, was passed and implemented in consideration with the obligations of the country to the WHO-FCTC, indicating that the government should inform every person of the health effects and other consequences of consumption of tobacco products and exposure to tobacco smoke.^[8] The law also noted that, based on empirical data available, graphic health warnings (GHWs) have been proven to be effective in communicating the facts about the risks of consumption and exposure to tobacco smoke.

The Republic Act 10643 requires the printing of GHW labels occupying 50% of the front and back panels located at the lower portions of the packages. GHWs are a type of warning label consisting of a photographic picture warning accompanied by a textual warning related to the picture, which covers no more than 20% of the entire GHW area. Health warning labels are among the most effective communication tools.^[9]

Numerous studies have shown the effectiveness of GHW labels in the cessation and noninitiation of smoking compared to text-only warnings.^[10-12] In a study in Nepal,^[9] GHWs showed a positive impact on the smoking behavior of current smokers, citing

that the implementation of GHWs had a favorable perception from most of their participants. In addition, pictorial GHWs deliver superior performance to text-only messages. These GHWs, prominent in cigarette packages (>50%), increase perceived health risks. It was identified that GHWs increase the perceived harm and quit intentions.^[13] On the contrary, a local study in the Philippines demonstrated that the current GHWs in the country are ineffective in instilling health consciousness among Filipinos and recommended that policymakers should consider larger GHWs and plain packaging of cigarettes to motivate smokers to quit and discourage people from smoking.^[14]

Aside from the GHWs and packaging itself, the impact of GHWs can also be influenced by the demographics of the receiver. A study in Turkey showed that gender heavily influences the perceptions of GHWs.^[15] Among the male participants, GHW depicting a couple with impotence problems was found to have increased effectiveness. While for the female participants, a GHW portraying unhealthy babies due to smoking during pregnancy provided increased effectiveness. Furthermore, their study provided that the effectiveness of GHWs decreases with increased frequency of smoking. Previous studies in Korea among nonsmokers showed that the GHWs have been proven to be effective in eliciting nonsmoking intentions.^[16,17] In addition, their study provided that both harm perception and nonsmoking intentions were higher among females, lower-grade students, and those with experience or who have participated in previous antismoking campaigns and have been exposed to antitobacco messages. In addition, a study in Colombia reported that GHWs have been proven to have effects on emotions, resulting in aversive affective states, low arousal, high levels of dominance, and low craving.^[18]

The health belief model, a theoretical framework of health behavior, posits that individuals change their behavior for good health in response to various internal and external factors.^[19] For instance, quitting smoking can be influenced by factors such as perceived susceptibility and severity of acquiring many diseases relevant to tobacco use, benefits and barriers of altering behaviors, and self-efficacy and cues to action in modifying these behaviors. As such, the GHWs that present the diseases and health risks of smoking may prompt nonsmokers not to engage in smoking and become an agent in reducing the new smoker rate, especially among adolescents.^[20]

There were studies in foreign settings and the Philippines that investigated the perceived effects of GHWs among smokers. For common understanding throughout this study, the researchers defined perceived effect as the way individuals interpret and understand GHWs in cigarette packs. However, to the extent of the researchers'

knowledge, there have been no studies on the impact of GHW among nonsmokers, especially adolescent students. Adolescence is a period in life where the discovery of oneself and identity formation occur. It is a period characterized by significant changes resulting in vulnerabilities.^[21] This is where individuals, in this stage, begin to explore, leading to vulnerabilities, including smoking and illegal drugs. While adolescents may be well equipped with knowledge regarding tobacco smoking and have a negative point of view toward it, factors such as peer pressure and the financial capacity to procure cigarettes have a significant impact on their decision-making regarding smoking.^[22] Accordingly, peers are directly attributed to the probability of smoking, increasing the risk of secondhand smoke from an increased number of smoking peers.

Furthermore, involving nonsmoking adolescents will give them insights and raise awareness of the risks of smoking and the dangers of secondhand smoke exposure. The findings of this study will provide data and insights to healthcare providers and government officials on how cigarette smoking significantly affects the adolescent population. It will be vital in strengthening antismoking policies and enhancing and reinforcing the law for GHWs.

Research aims

This study aims to determine the perceived emotional and cognitive reactions and health risks posed by cigarette smoking through GHWs on cigarette packs among nonsmoking senior high school (SHS) students in Leyte and their relationship to their level of exposure.

Hypothesis

The study tested the following null hypothesis:

- There is no significant relationship between the level of exposure to GHWs and their perceived emotional and cognitive reactions and health risks.

Methodology

Research design

The study employed an analytical cross-sectional design.

Participants and settings of the study

The study was conducted in the Municipality of Pastrana, a fifth-class and landlocked municipality in Leyte.^[23] Specifically, the study was conducted in its three (3) public high schools, namely: Juan Villablanca Memorial High School (JVMHS), Manaybanay National High School (MNHS), and Macalpi-ay National High School (McyNHS). The participants were the SHS students. They can be from any grade, strand, and track, must be nonsmokers, aged 16–19 years old, and without regard to gender, as long as participation is voluntary,

and they have signed the informed consent. Those who were smokers or who had a history of smoking, were sick or absent during the gathering period, were excluded from the study. The Raosoft online sample size calculator was used to determine the sample size. A total of 641 students were enrolled in the three public high schools: 429 students from JVMHS, 120 from MNHS, and 92 from McyNHS. At a 95% confidence level, with a 5% margin of error and a 50% response rate, 242 participants were required for the study. In proportion to the population of the respective high schools, 160 participants from JVMHS, 45 from MNHS, and 37 from McyNHS were drawn. The actual participants of the study were selected using the stratified random sampling technique.

Research instrument

A self-report questionnaire was used to collect the data. The first part was a checklist that determined the personal profile of the participants in terms of their age, sex, and year level, including the influences on their noninitiation of smoking. The second part assessed the perception of GHW labels using a nine-item dichotomous questionnaire adapted from a previous study.^[9] Participants were asked to indicate their perception of the inclusion of GHWs in cigarette packages by answering “yes” or “no” to each item. The third part is a one item-question that assessed the level of exposure of the participants to GHW labels: “On a scale of 1-4, wherein 1 (never) and 4 (every day or almost every day), for the last 4 weeks, how often do you see a graphic health warning label?” The last part assessed the perceived effects of tobacco GHW labels using a twelve-item questionnaire adopted from a previous study.^[24] It has four subscales: Five-item high arousal negative emotions; two-item low arousal negative emotions; three-item perceived health risks; and two-item cognitive reactions scales. Items were rated on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

All items in the questionnaire were translated into the Waray–Waray dialect. Moreover, to test and further refine the study procedure and the research instrument, a pilot study was conducted with 20 participants who qualified according to the criteria mentioned above.

Data collection process and analysis

Administrative clearance to conduct the study was secured from the principals of the respective high schools. Upon approval, coordination was made with the SHS advisers and coordinators to list the qualified population and select the target participants. The researchers personally approached the target participants to invite them to participate in the study. Written informed consent was obtained from each of the participants before the survey. This signifies that sufficient information about the study, its purposes,

potential benefits, risks, and potential harm, as well as how the data collection will be conducted, was provided to the participants. For participants below 18 years, assent forms were secured together with the informed consent from their parents before data collection. Upon signing, the survey was conducted in a private area in their school. The participants' privacy, confidentiality, and anonymity were maintained throughout the study. In addition, the participants completed the survey in a well-lit and well-ventilated area. Completing the survey form lasted for 15–20 min for each participant. After the survey, the researcher checked the survey form for completeness and accuracy of their response. Data were then tallied and entered into Microsoft Excel for analysis. The data collection period was conducted from January to March 2025.

All data were merged into one spreadsheet and entered into SPSS version 26 for statistical analysis. Descriptive statistics used include frequency counts, percentages, and weighted mean. Spearman's rank correlation coefficient was used to test the hypothesis. The significance level was set at $P < 0.05$.

Ethical considerations

Ethical clearance to conduct the study was secured from a registered regional ethics review board (EVHRDC-2024-026). Similarly, permission letters were secured from each school principal to conduct the study. Written informed consent was obtained from each participant. For participants below the legal age, informed consent was secured from their parents, and it is attached with an assent form. Thorough information was provided before they participated in the study. Voluntary participation was observed. Possible risks in the survey include breach of confidentiality and the consequences of such a breach. To prevent this, privacy, anonymity, and confidentiality were maintained. They were not paid or given tokens for their participation. A message of gratitude was extended to each participant upon completion of the survey. Raw data were kept secure by the researchers. The researchers declare no conflict of interest in the participants or the results and purposes of the study.

Results

A total of 247 SHS students participated in the study. Many of them were females ($n = 139$ or 56.28%), aged 18 years old ($n = 140$ or 56.68%), and belonging to Grade 12 ($n = 196$ or 79.35%). Their primary reason for not smoking is that 'smoking is bad for health' ($n = 230$, or 92.71%). Table 1 presents a summary of the personal characteristics of the participants.

Table 2 shows the participants' perceptions regarding cigarette packages' GHW labels. Most participants

Table 1: Personal characteristics of the participants ($n=247$)

Characteristic	Frequency (%)
Age (years old)	
16	27 (10.93)
17	54 (21.86)
18	140 (56.68)
19	26 (10.53)
Mean (SD)	17.68 (0.81)
Sex	
Male	108 (43.72)
Female	139 (56.28)
Grade level	
Grade 11	51 (20.65)
Grade 12	196 (79.35)
Reason for not smoking	
I perceived smoking as bad for health	230 (92.71)
I have a family member with a chronic disease caused by smoking	8 (3.24)
I have a family member who died because of smoking	12 (4.85)

SD: Standard deviation

agreed to eight of the nine items about their perception of GHW labels. The item with the highest response was "Graphic health warnings on cigarette packages are noticeable" ($n = 234$ or 94.73%), followed by "Graphic health warnings on cigarette packages are informative" ($n = 222$ or 89.88%). On the contrary, more than half of the participants did not agree that "Graphic health warnings make cigarette packages less attractive" ($n = 125$ or 50.61%).

As shown in Table 3, this study also delved into the participants' exposure to the GHWs. When asked about their level of exposure, the majority ($n = 89$ or 36.03%) reported that they only encounter GHWs at least once a week but not every day. Seventy-two of them (29.15%) claimed they were exposed to these GHWs at least once a month but not every week, whereas 70 (28.35%) said that they are exposed every day or almost every day. Finally, 16 (6.48%) of the participants said they were not able to see or have been exposed to tobacco GHWs for the past 30 days.

Table 4 presents the participants' net agreement rating (NAR) regarding the different effects of tobacco GHWs. These effects are grouped into categories/subscales: (a) High arousal Negative emotions; (b) Low arousal negative emotions; (c) Perceived health effects; and (d) Cognitive reactions.

High arousal negative emotions

The table shows that the participants strongly agreed that they felt scared and worried when they saw a GHW label. When asked about feeling disgusted, the participants responded with moderate agreement. Participants also

Table 2: Perceptions on graphic health warning labels

Perception	Agreement	
	Yes (%)	No (%)
Graphic health warnings on cigarette packages are noticeable	234 (94.73)	13 (5.27)
Graphic health warnings on cigarette packages are informative	222 (89.88)	25 (10.12)
Graphic health warnings on cigarette packages are believable	208 (84.21)	39 (15.79)
I feel that it is necessary to keep graphic health warnings in the packages of cigarettes	216 (87.45)	31 (12.55)
I gave a thought to what graphic health warnings have to say	216 (87.45)	31 (12.55)
Graphic health warnings have increased the awareness on health consequences of smoking	206 (83.40)	41 (16.60)
Graphic health warnings depict the health consequences of smoking	216 (87.45)	31 (12.55)
Graphic health warnings make cigarette packages less attractive	122 (49.39)	125 (50.61)
Graphic health warnings make smoking less attractive	150 (60.73)	97 (39.27)

Table 3: Level of exposure to graphic health warning labels

On a scale 1–4, wherein 1 being the lowest and 4 being the highest, for the last 4 weeks, how often do you see a graphic health warning label?	Frequency (%)
Never	16 (6.47)
At least once a month, but not every week	72 (29.15)
At least once a week, but not every day	89 (36.03)
Every day or almost every day	70 (28.35)
Total	247 (100.00)

indicated moderate disagreement when asked if they felt angry with the GHW label. However, when asked if they feel stressed whenever they see a GHW label, the participants indicate a strong disagreement.

Low arousal negative emotions

The study investigated whether tobacco GHWs evoke sadness and guilt in the respondents. The survey indicated that the participants had moderate agreement that they felt sad, and strong disagreement that they felt guilty whenever they saw a GHW label.

Perceived health risks

The participants were asked three questions regarding their perceived health risk due to tobacco smoking. The participants responded with strong agreement when asked if they see the harms posed by cigarette smoking through the GHWs and being concerned with their health and their families and friends' health being affected by smoking.

Cognitive reactions

When asked about their cognitive reactions regarding GHW labels, the participants responded with strong agreement for both questions. They strongly agree that the tobacco GHW labels made them think about the harms posed by cigarette smoking and think about not trying to smoke.

Table 5 presents the correlations between the level of exposure and the perceived effects of tobacco GHW labels. The subscale perceived health risk is

positively and significantly correlated with the level of exposure ($r_s = 0.208, P < 0.001$). Thus, the null hypothesis is rejected.

Discussion

The purpose of the study was to determine the perceived emotional and cognitive reactions and health risks of smoking through GHWs among nonsmoking SHS students in Leyte and their relationship to their level of exposure. This study focused on Filipino adolescents aged 16–19 who were SHS students in a rural and landlocked area. Literature demonstrated that adolescents are a significant population group for tobacco prevention messages and public health interventions against tobacco use.^[25] As the Philippines has been identified as “the strongest tobacco lobby in Asia,”^[26,27] the risk is high of exposing Filipino adolescents to the smoke from cigarettes as they interact in the social environment, including schools. Moreover, adolescence is a critical developmental period of enduring smoking-related behaviors.^[28]

The GHW labels in various cigarette packaging have been printed in the Philippines since the implementation of the GHW law in 2016.^[8] The current study showed that most participants agreed that the warnings are noticeable, available, and necessary, that they provide health information, and that they effectively relay information to smokers to help them quit smoking. This result is similar to previous studies, indicating the need to restrain consumers from buying cigarettes, as these have several ill effects, as reflected in the GHWs.^[9,29] GHWs call more attention and provide greater recall for the health consequences of smoking than text-only warnings.^[17] However, more than half of the participants claimed that GHWs make cigarette packages “not less attractive”. The GHWs must be emphasized in relaying significant information on the health consequences of smoking. On the other hand, the tobacco industry in the Philippines innovates various aggressive strategies to boost tobacco consumption, such as introducing flavored tobacco products.^[24,30] This could be a possible factor that

Table 4: Perceived emotional and cognitive reactions and health risks on smoking through tobacco graphic health warning labels

Subscale	Agreement	
	NAR (%)	Interpretation
High arousal negative emotions		
I feel scared whenever I see graphic health warning labels	56.3	Strong agreement
I feel worried whenever I see graphic health warning labels	61.5	Strong agreement
I feel angry when I see graphic health warning labels	-31.2	Moderate disagreement
I feel stressed whenever I see graphic health warning labels	-14.2	Strong disagreement
I feel disgusted or grossed out whenever I see graphic health warning labels	34.8	Moderate agreement
Low arousal negative emotions		
I feel sad whenever I see graphic health warning labels	33.6	Moderate agreement
I feel guilty whenever I see graphic health warning labels	-6.9	Strong disagreement
Perceived health risks		
I can see the harm posed by smoking through the graphic health warning labels	76.1	Strong agreement
I am concerned that smoking will affect my health	86.2	Strong agreement
I am concerned that smoking will affect the health of my family and friends	86.2	Strong agreement
Cognitive reactions		
The graphic health warning labels make me think about the risks of smoking cigarettes	85.0	Strong agreement
The graphic health warning labels make me think about not smoking	84.2	Strong agreement

NAR=Net agreement rating

Table 5: Correlations between the level of exposure and perceived effects of tobacco graphic health warning labels

Subscale	Spearman rho (r_s)	P
High arousal negative emotions	0.102	0.111
Low arousal negative emotions	0.123	0.053
Perceived health risks	0.208	<0.001***
Cognitive reactions	0.063	0.323

*** $P < 0.001$

entices people to still smoke despite the GHWs printed on the cigarette packaging.

Our study also showed that the majority of the participants had at least seen the GHWs in the past month, and more than half had at least seen them once a week. The frequency of exposing individuals to GHWs may increase their awareness about the health effects of smoking cigarettes, including those of secondhand smoke. Moreover, this could provide better insights that the GHW label is a deterrent factor for smoking initiation among adolescents.^[31] The frequency and duration of looking at GHWs in cigarette packs have been explored in previous studies in an attempt to determine their impact on the adolescents' cognitive processing and change their pattern of behaviors by quitting or not indulging their selves in smoking.^[32,33]

The current study has also investigated the perceived emotional and cognitive reactions to tobacco GHW labels among SHS students. Results showed that participants strongly agree that they feel scared and worried when they see a GHW label. When asked about feeling disgusted, the participants responded with moderate agreement. The agreement on fear, worry, and disgust

is consistent with previous literature, which states that the GHW can elicit these emotions more effectively than text-only warning labels.^[34] Moreover, most participants also indicated moderate disagreement when asked if they felt angry with the GHW label. However, when asked if they felt stressed when seeing a GHW label, they indicated a strong disagreement. The study also investigated whether tobacco GHWs evoke sadness and guilt in the participants. Participants reported a moderate agreement that they feel sad, but had a strong disagreement that they feel guilty whenever they see a GHW label. This low effect of GHW is consistent with previous literature, which states that, compared to negative emotions high in arousal activation, it is more effective than low arousal negative emotions in influencing behavioral intentions.^[24]

The participants were asked three questions regarding their perceived health risk due to tobacco smoking. The participants responded with strong agreement when asked if they see the harms posed by cigarette smoking through the GHWs and being concerned with their health and their families and friends' health being affected by smoking. This high agreement coincides with previous studies suggesting that the GHWs provide a clear message on the health effects of smoking.^[14,35] In addition, when asked about participants' cognitive reactions regarding GHW labels, they strongly agreed. They strongly agree that the tobacco GHW labels made them think about the harms posed by cigarette smoking and think about not trying to smoke. This provides a finding consistent with the studies mentioned above regarding perceived health effects of tobacco through GHWs.^[14,35]

Finally, our study showed a positive correlation between the level of exposure and perceived health risks through the GHWs. This indicates that the more the students are exposed to tobacco GHW labels, the more they tend to be aware and concerned with the potential health risks that smoking may cause to them, their friends, and their families. This positive correlational finding provides further evidence on the effectiveness of GHWs in conveying the health effects of cigarette smoking, similar to the previous studies.^[14,35,36]

Our study has significant implications for government health agencies, government agencies in basic education, and policymakers. The study findings showed a favorable perception and positive impact of the GHWs on the adolescent learners. As such, monitoring should be done regularly, especially to follow the standards of the GHWs in terms of their size, content, and visual information. Moreover, more emphasis should be placed on its warning purposes to evoke emotional and cognitive reactions in individuals, thereby encouraging them to refrain from smoking. Basic education and health agencies may design strategies and activities that will further educate a greater number of adolescent learners on the impact and benefits of introducing GHWs in cigarette packs.

Study limitations

This study recognizes some limitations. First, the data obtained from the survey may not reflect the actual behaviors and impact of the GHWs on adolescent learners. Second, the study design shows only relationships between the variables of interest and may not show causality. Third, the data were obtained from only a few high schools in one particular municipality, which could not generate generalizable findings for the entire population. Nevertheless, the study has significant findings for practical implications and may prompt a call for further studies.

Conclusions

Adolescent learners reported variable agreement on emotional reactions, but had positive cognitive reactions to tobacco GHW labels. They also have reported that GHWs in cigarette packs provide positive visual information on the health effects and other consequences of smoking. Emotional and cognitive reactions of the students were not statistically correlated with the level of exposure to tobacco GHW labels. Those who have frequent exposure to the GHWs of the cigarette packs were more likely to report knowledge and information on the health risks of smoking. Thus, the GHWs on cigarette packs are still necessary to decrease the new smoker rate, especially among adolescents. Policy implications toward the continuous development of GHWs are offered.

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Conflicts of interest

There are no conflicts of interest.

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