Assessing the Impact of Packaging with Health Warning Labels on Cigarette Consumption within Academic Communities

Joni Murti Mulyo Aji[1, a] and Bagas Yanuar Kafabi[1]

Author Affiliations
[1] *Agribusiness Department, Faculty of Agriculture, University of Jember, Indonesia.*

Author Emails
[a] *Corresponding author: joni.faperta@unej.ac.id*

Abstract. This study investigates the response of educated consumers within a university campus setting to health warning labels (HWLs) on cigarette packaging in Indo-nesia. The research aims to assess consumer perceptions of these labels and quantify changes in cigarette consumption before and after their implementation. The study was conducted at the University of Jember using purposive sampling. Descriptive analytics and the Wilcoxon signed-rank test were employed for data analysis, with a sample size of 120 participants determined using the Lameshow's formula. Findings indicate that most respondents approved of including HWLs but expressed reservations about their accuracy. Despite this, most considered these labels to be essential. The Wilcoxon signed-rank test revealed a significant reduction in cigarette consumption following the introduction of HWLs (p-value = 0.000). Notwithstanding, it is important to acknowledge that the elevated cost of cigarettes due to increasing taxation following the evolution of labelling may have played a role in this decline.

Keywords: Health warning labels, cigarette consumption reduction, wilcoxon signed-rank test

INTRODUCTION

Indonesia ranks as the sixth-largest tobacco producer and the third-largest tobacco consumer globally, following China and India. The country has seen a dramatic increase in tobacco consumption, skyrocketing from 30 billion cigarettes in 1970 to 360 billion in 2014. This twelvefold increase over 44 years has surpassed the projections set by the Tobacco Products Industry Road Map, which targeted cigarette pro-duction of 220 billion in 2006-2010, 240 billion in 2010-2015, and 260 billion in 2015-2020. Considering health aspects, the production is planned to be maintained at 260 billion beyond 2020 [1].

Indonesia, with a population of approximately 270 million, is the world's third most populous country and one of the largest tobacco-consuming nations. The Indonesia Central Statistics Agency (BPS) found that cigarettes have become a "basic necessity" for the population. In 2022, 28.26% of adults in Indonesia were smokers. Also, many Indonesians are trapped in poverty and nicotine addiction. According to WHO data, Indonesia has the highest percentage of adult smokers compared to other countries. About 75 million Indonesian smokers consume 225 billion cigarettes annually, costing the community around 100 trillion Rupiah. This figure implies that, on average, each smoker consumes at least 10 cigarettes per day [2].

The trend of cigarette consumption in Indonesia has been consistently rising. The cigarette product market has recently seen rapid growth. The Ministry of Industry and Trade has set a modest target for cigarette production growth at 3%-4% annually, aligning with the long-term plan to limit cigarette production. From 2012 to 2019, cigarette production in Indonesia increased by an average of 5.85% per year, contributing significantly to the country's tobacco excise revenue. According to the World Tobacco Atlas data since 2015, the combined profits of the six largest Indonesian cigarette producers account for 38% of the nation's budget. The average national excise revenue from cigarettes in Indonesia was approximately 137.5 trillion Rupiah, with an average annual increase of 40.3%. This substantial revenue from cigarette excise taxes has led the government to focus more intensively on the tobacco industry, encouraging its continued growth and development. However, the adverse health and environmental impacts of cigarette consumption pose significant costs. The government faces a dilemma in dealing with the tobacco industry, recognizing the eco-nomic and social losses from cigarette consumption, including healthcare costs, mortality, and lost productivity [3,4].

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The increasing trend of tobacco product consumption in Indonesia persists. Recently, the tobacco industry has faced intense pressure in the U.S., European, and Australian markets due to stringent tobacco control policies. Consequently, the tobacco market is shifting to countries with large market shares but weaker public health protections. In spite of being the world's fourth most populous country, Indonesia lacks a comprehensive tobacco control policy framework [1]. Regarding the risks of smoking, while the knowledge is widespread, it does not significantly deter people from smoking. Tobacco presents a unique health challenge; unlike viruses or bacteria, which people avoid, tobacco is actively sought by its consumers. The consumer base for tobacco has expanded from predominantly adult men to include teenagers and women, crossing gender boundaries [5].

The Indonesian government is striving to reduce cigarette consumption in the country. One approach involves implementing health warning labels (HWLs), including pictorial warnings, on cigarette packages. However, there have been violations of the government regulations regarding these warning labels, as outlined in the Director General of Drug and Food Control's Decision Number 02240/B/SK/VIII/1991 and Government Regulation Number 69 of 1999. These were later reinforced by Government Regulation Number 28 of 2013, mandating scary health warning images on cigarette packages to ultimately reduce national cigarette consumption.

Globally, recent studies have evaluated the effectiveness of HWLs on cigarette packaging in influencing smoking behaviours, particularly within academic settings. Research spanning various countries indicates that while HWLs can prompt some smokers to consider quitting, their efficacy varies greatly. In certain contexts, such as rural areas, there is a call for increased awareness and localization of these messages into regional languages [6]. Variability in response to HWLs is also seen across different demographics, with gender and smoking status influencing the impact of newly designed warning labels [7]. Barrientos-Gutierrez et al. [8] argue that more prominent HWLs and plain packaging have been associated with reduced attractiveness of cigarettes in adolescents. Meanwhile, White et al. [9] find that long-term exposure to large pictorial health warnings has been proven to affect young people's perceptions of cigarettes and brand differentiation. Pierce et al. [10], on the other hand, suggest that HWLs have been proven to elicit deliberate avoidance behaviour among smokers when displayed prominently on packaging. These findings generally reflect awareness and reaction to these warnings.

Furthermore, graphic HWLs serve as an effective tool for communicating the risks associated with smoking. These also offer a cost-effective method of hindering cigarette marketing [11,12]. Their impact ranges from affecting emotional reactions and enhancing the motivation to quit among young adult smokers [13] to counter cigarette promotion on social platforms, not only for the marketing of conventional but also electronic [14] Age-specific differences are evident, with teens showing a higher inclination towards quitting, whereas adults exhibit fewer changes in behaviour, except those with lower nicotine dependence [15,16]. Research in nations like India and Myanmar has emphasized the significance and motivational force of image-based warnings in cessation efforts [17,18], and in Pakistan, such warnings have encouraged quitting and prevented the initiation of smoking [19].

While previous studies affirm that HWLs are beneficial, their diverse effects highlight the need for more research to tailor these warnings more effectively for various populations and settings. This includes exploring their impact on other harmful products, like junk food and alcohol [20–22]. Such insights could pave the way for more impactful public health policies and a deeper understanding of the underlying associative mechanisms driving both implicit and explicit motivations for health-related behavioural changes.

Innovatively, this study ventures into uncharted territory compared to earlier Indonesian research on health warning images on cigarette packages. It seeks to unravel the specific reactions and changes in smoking behaviour among academics before and after the implementation of graphic health warnings. This diverges from earlier work, such as Huda's [5], which was more concentrated on smoker behaviour and awareness in relation to text-based health warnings and their effect on consumer behaviour. By focusing on this unique academic demographic, this research provides new, vital insights into the effectiveness of pictorial health warnings, marking a significant advancement in the field of public health and consumer behaviour studies. Sapiun's et al. [23] study aimed to identify characteristics, knowledge, and perceptions of non-smoking teenagers towards pictorial health warnings (PHWs) and their interrelations. This study, focusing on the academic community with higher educational backgrounds, is relatively novel and limited in Indonesian research.

Based on these issues, the study poses the following research questions: (1) What is the consumer response to the implementation of pictorial HWLs on cigarette packages? (2) Is there a difference in the amount of cigarette consumption before and after the implementation of pictorial HWLs? The objectives are to (1) describe the re-sponse of academic consumers to HWLs on cigarette packaging and (2) determine any differences in cigarette consumption among academic consumers before and after the implementation of pictorial HWLs on cigarette packages.

RESEARCH METHOD

The research site was purposively selected. Purposive is a method where the research location is chosen deliberately based on logical considerations [24–26]. The University of Jember campus was chosen due to its relatively uniform respondent characteristics and the diverse educational backgrounds of its academic community, making it an intriguing site for this study.
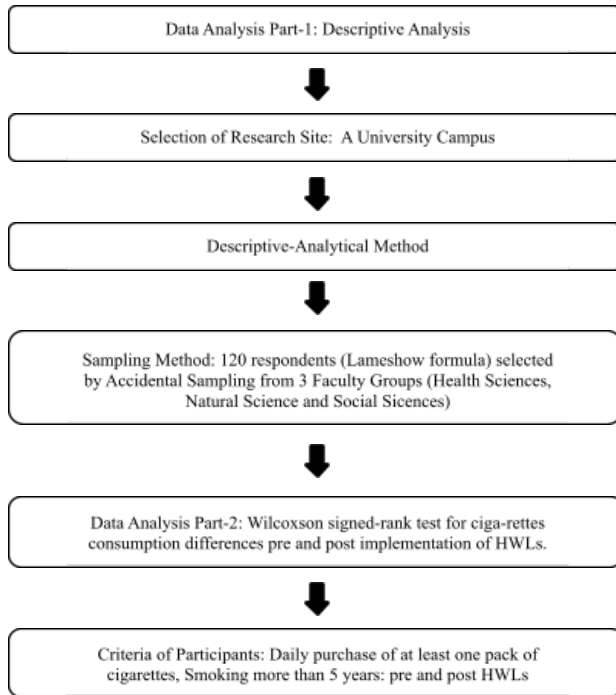
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│  Data Analysis Part-1: Descriptive Analysis  │
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│  Selection of Research Site: A University Campus │
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│  Descriptive-Analytical Method               │
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│  Sampling Method: 120 respondents (Lameshow formula) selected │
│  by Accidental Sampling from 3 Faculty Groups (Health Sciences, │
│  Natural Science and Social Sicences)        │
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│  Data Analysis Part-2: Wilcoxson signed-rank test for ciga-rettes │
│  consumption differences pre and post implementation of HWLs. │
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│  Criteria of Participants: Daily purchase of at least one pack of │
│  cigarettes, Smoking more than 5 years: pre and post HWLs │
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FIGURE 1. A figure caption is always placed below the illustration. Short captions are centered, while long ones are justified. The macro button chooses the correct format automatically.

The research employed a descriptive-analytical method. As explained by Nazir [24], this method is used to systematically, precisely, factually, and accurately depict facts, characteristics, and relationships among the phenomena being investigated. It involves collecting, organizing, and analysing data. The descriptive method was used to depict consumer responses to the pictorial HWLs on cigarette packaging. The analytical method was employed to examine differences in cigarette consumption before and after the implementation of these pictorial HWLs.

The sample was determined using accidental sampling, where respondents were chosen based on chance encounters with smokers willing to be interviewed. Initial questions were asked to ensure these smokers met the criteria established for the study: purchasing at least one pack of cigarettes daily for personal consumption, having smoked for more than five years, both before (pre-2013) and after (2014 to present) the implementation of HWLs. The sample size was calculated using the Lameshow formula, totaling 120 smoker respondents from the University of Jember, divided across three groups of faculties, i.e., Natural Sciences, Social Sciences, and Health Sciences. These faculties include various departments, ranging from agriculture and engineering to law and education.

Consumer responses to the pictorial HWLs on cigarette packages was analysed using descriptive analysis. This method systematically depicts the real-world phenomenon of smokers' responses to frightening health warning images on cigarette packages. It explores whether consumers agree with the use of such images to reduce national cigarette consumption, the appropriateness of these images, and their importance in decreasing smoking rates.

Furthermore, to examine whether there is a difference in cigarette consumption before and after the introduction of pictorial health warnings, was analysed using the Wilcoxon signed-rank test. This is a nonparametric test for measuring the significance of comparative hypotheses in two correlated samples with ordinal data [27–29].

$$Z = \frac{T - \mu T}{\sigma T} = \frac{T - \frac{n(n+1)}{4}}{\sqrt{\frac{n(n+1)(2n+1)}{24}}}$$

Notes:
T: Total of ranks/rankings
n: Number of data points

The decision criteria for hypothesis testing are as follows:
- H0 (null hypothesis): If the HWLs on cigarette packages do not significantly influence the reduction in cigarette consumption, H0 is accepted.
- H1 (alternative hypothesis): If the HWLs on cigarette packages significantly influence the reduction in cigarette consumption, H1 is accepted.

The hypothesis is tested with the smallest T value (from the calculation) compared to the critical T table value (Wilcoxon test critical values) or the significance t-value (alpha >= 0.05 for H0, alpha < 0.05 for H1).

RESULTS AND DISCUSSION

Results

Characteristics of the Respondents

In this study, the respondents were part of the academic community at the University of Jember. The respondents were divided based on their faculties and grouped according to their field of study, namely the Faculties of Natural Sciences, Social Sciences, and Health Sciences (Table 1).

The characteristics of the respondents showed that they were categorized into eight age groups. In the Faculty of Natural Sciences, the 20-23 age group was dominant, with 21 respondents, followed by the 24-26 age group, with 18 respondents, and other age groups, with fewer respondents. The Faculty of Social Sciences was dominated by the 24-26 age group with 29 respondents, and similar age group distributions were noted in the Faculty of Health Sciences. The dominant respondents in this study across all faculties were from the 20-23 and 24-26 age groups, mainly due to the ease of encountering students on campus.

TABLE 1. Characteristics of the respondents.

Characteristic	Faculty of Natural Sciences	Faculty of Social Sciences	Faculty of Health Sciences	Total
Age & Gender (Years)				
20-23 (M/F)	21 / -	24 / -	7 / -	52
24-26 (M/F)	18 / -	29 / -	8 / -	55
27-29 (M/F)	1 / -	- / -	- / -	1
30-32 (M/F)	- / -	3 / -	- / -	3
33-35 (M/F)	1 / -	1 / -	1 / -	3
36-38 (M/F)	- / -	- / -	- / -	-
39-41 (M/F)	- / -	2 / -	- / -	2
42-45 (M/F)	1 / -	- / -	- / -	1
Gender Distribution				
Male	40	58	17	115
Female	2	3	0	5

Education Level				
High School/Univ. Student	24	43	17	74
Bachelor's	17	17	10	44
Master's	1	1	0	2
Occupation				
Students	39	51	15	105
Employees	3	10	2	15
Income Level (Rp)				
2M-4M	41	59	15	115
5M-7M	1	1	2	4
8M-10M		1		1
Type of Cigarettes Consumed				
Kretek (local clove cigs)	10	7	2	19
Non-Kretek	32	54	15	101
Smoking Frequency Post-HWLs				
Reduced:	29	40	11	80
Same:	6	8	1	15
Increased:	7	13	5	25

Source: primary data processed

Male respondents were predominant cigarette consumers in Indonesia. There were 40 male and 2 female respondents in the Faculty of Natural Sciences. The Faculty of Social Sciences had 58 male and 3 female respondents, while the Faculty of Health Sciences had 17 male respondents and no female respondents. This male dominance in respondents was attributed to the more open smoking behavior among men and the existing societal stigma associating smoking with males.

The majority of respondents from the Faculty of Natural Sciences had a high school education, followed by those with bachelor's degrees. This pattern was also observed in the other faculties, with a majority holding high school diplomas.

The respondents' occupations were predominantly students, with 105 respondents being students, followed by 13 employees and 2 civil servants. This trend was consistent across all faculties, mainly because students were more readily available and willing to participate as respondents.

Income levels showed that most respondents, particularly students, fell within the Rp. 2,000,000 – Rp. 4,000,000 range, likely due to their reliance on allowances from parents rather than earnings from employment.

Regarding the type of cigarettes consumed, non-kretek (clove-free) cigarettes were more popular among respondents across all faculties. This preference was particularly noted among students and those in the 20-23 and 24-26 age groups, who perceived non-kretek cigarettes as having lower nicotine content and being lighter to smoke.

The smoking frequency of respondents indicated that 80 respondents reduced their consumption following the implementation of HWLs on cigarette packages. This reduction was observed across all faculties, with varying numbers. Conversely, some respondents increased or maintained their smoking levels post-labeling. Respondents were categorized into three smoking categories: light, moderate, and heavy smokers, based on their daily consumption. The majority fell into the moderate category, consuming one pack per day.

Characteristics of the Respondents

Responses to HWLs on cigarette packages revealed mixed opinions. While 76 respondents (63.3%) agreed with the labelling, 42 disagreed. The agreement or disagreement varied across faculties and seemed to influence smoking behaviour, with some reducing, increasing, or maintaining their consumption levels regardless of their stance on the labelling. In the Faculty of Natural Sciences, 28 respondents agreed with the pictorial health warnings, and 14 disagreed. In the Faculty of Social Sciences, 38 respondents were in favour, while 23 opposed the pictorial health warnings. In the Faculty of Health Sciences, 10 respondents supported the labelling, whereas 7 disagreed.

TABLE 2. Respondents' opinion on HWLs.

No.	Opinion	Faculty of Natural Sciences	Faculty of Social Sciences	Faculty of Health Sciences	Total (percent)
1	Agree	28	38	10	76 (63.3%)
2	Disagree	14	23	7	44 (36.7%)
	Total	42	61	17	120 (100%)

Respondents, however, had varied attitudes towards the pictorial health warnings on cigarette packaging. Of the 76 respondents who agreed with the labelling, 68 reported they had started to reduce their daily cigarette consumption, 7 indicated an increase in consumption, and 1 maintained their usual smoking level. Among the 44 respondents who disagreed with the labelling, 12 stated they were also gradually reducing their cigarette consumption, 18 increased their consumption, and 14 reported no change in their smoking habits.

TABLE 3. Respondents' opinion on HWLs and cigarette consumption post HWLs.

No.	Opinion	Reduced (Pre > Post)	Same (Pre = Post)	Increased (Pre < Post)	Total (percent)
1	Agree	68	1	7	76 (63.3%)
2	Disagree	12	14	18	44 (36.7%)
	Total	80	15	25	120 (100%)

Notwithstanding, most respondents felt that the implementation of HWLs on cigarette packages by companies was not yet adequate or accurate, citing reasons such as less intimidating images, limited image variation, and small image sizes that failed to effectively impact consumer behaviour. As many as 87 respondents (72.5 %) felt that companies were not accurate in their approach, while 33 believed they were (Table 4). In the Faculty of Natural Sciences, 30 respondents considered the company's approach as inadequate, and 12 viewed it as appropriate. In the Faculty of Social Sciences, 44 respondents felt the companies were not accurate, and 17 thought otherwise. In the Faculty of Health Sciences, 13 respondents viewed the companies' efforts as inadequate, whereas 4 believed they were adequate. Respondents varied in their opinions regarding the appropriateness of the companies' implementation of HWLs. Of the 87 who deemed the approach inadequate, 63 reported a reduction in their daily cigarette consumption, 15 an increase, and 9 no change. Among the 33 who believed the approach was adequate, 17 reported reducing their daily smoking, 10 increased their consumption, and 6 experienced no change.

TABLE 4. Respondents' assessment of companies in implementing HWLs.

No.	Opinion	Faculty of Natural Sciences	Faculty of Social Sciences	Faculty of Health Sciences	Total (percent)
1	Accurate	12	17	4	33 (27.5%)
2	Not Accurate	30	44	13	87 (72.5%)
	Total	42	61	17	120 (100%)

In assessing the importance of HWLs, a majority of respondents viewed them as crucial in supporting government efforts to reduce cigarette consumption in Indonesia. They believed that these labels played a significant role in discouraging smoking, despite some respondents perceiving them as less critical and continuing their smoking habits as usual. Based on respondents' assessment of the importance of HWLs on cigarette packaging, 74 respondents considered these labels important, while 46 did not find them significant (Table 5).

TABLE 5. Importance of Health Warning Labels (HWLs) on cigarette packaging.

No.	Opinion	Faculty of Natural Sciences	Faculty of Social Sciences	Faculty of Health Sciences	Total (percent)
1	Important	30	31	13	74 (61.7%)
2	Not Important	12	30	4	46 (38.3%)
	Total	42	61	17	120

Among the Faculty of Natural Sciences, 30 respondents acknowledged the importance of health warning label imagery, while 12 viewed them as unimportant. In the Faculty of Social Sciences, 31 respondents considered these labels important, whereas 30 did not. In the Faculty of Health Sciences, 13 respondents saw the importance of these labels, and 4 deemed them unimportant.

Differences in Cigarette Consumption due to Health Warning Labels (HWLs)

Our results further show a significant reduction in cigarette consumption among respondents following the implementation of pictorial HWLs on cigarette packaging (Table 4). The study revealed a decrease in average daily cigarette consumption from 19.05 to 14.43 cigarettes, indicating a 24.3% reduction. This change signifies the impact of HWLs in raising health risk awareness and altering smoking behaviours. Additionally, a decrease in the standard deviation from 5.730 to 3.714 post-HWLs suggests more uniform consumption patterns among respondents, aligning closer to the new lower average. The maximum daily consumption also dropped from 30 to 24 cigarettes, particularly notable among heavier smokers, while the minimum consumption remained unchanged at 10 cigarettes per day.

The Wilcoxon signed-rank test was applied to examine differences in cigarette consumption among 120 research samples, focusing on the impact of pictorial HWLs on cigarette packaging (Table 6). The analysis revealed that 80 respondents, indicated by negative ranks, reduced their cigarette consumption after the introduction of pictorial HWLs, with an average rank of 58.74 and a total negative ranking of 4699.00. Conversely, 25 respondents, represented by positive ranks, increased their consumption post-implementation, with an average rank of 34.64 and a total positive ranking of 866.00. Additionally, 15 respondents, categorized as ties, showed no difference in consumption before and after the introduction of HWLs.

TABLE 6. Difference in Cigarette Consumption Before and After Pictorial Health Warning Labels (HWLs) on Cigarette Packaging.

Description	Negative Ranks↓	Positive Ranks↓↓	Ties ∞	Total
N (Sample Size)	80	25	15	120
Mean Rank	58.74	34.64		
Sum of Ranks	4699.00	866.00		
Test Statistics (Z)	-6.206b			
Asymptotic significance (2-tailed)	0.000			

Note: ↓ (After < Before); ↓↓ (After > Before); ∞ (After = Before).

The Wilcoxon Signed Rank Test results displayed an asymptotic significance (2-tailed) value of 0.000, implying a probability alpha below 0.05 (0.00 < 0.05). Therefore, the null hypothesis (H0) is rejected, suggesting that the implementation of HWLs on cigarette packaging significantly reduces cigarette consumption.

Discussions

HWLs are now seen on almost every cigarette package in Indonesia. The Indonesian government has been implementing labelling on cigarette packaging since 1999, aiming to reduce and control cigarette consumption in the country. Initially, these labels were textual health warnings placed on the back of the packaging. Over time, they have undergone several revisions to make the message more impactful for smokers. In 2003, the government issued

Regulation No. 19 of 2003 on cigarette safety for health, detailing the rules to be followed by cigarette producers regarding the indicators necessary for a legal health warning label. However, many believe that just having a textual health warning on cigarette packages is insufficient to significantly reduce cigarette consumption in Indonesia. In response, the government released Regulation No. 109 of 2012 about the safety of substances containing addictive components, namely tobacco products, further strengthened by the Ministry of Health Regulation No. 28 of 2013 on health warnings and information on tobacco product packaging.

Our results show that most of our respondents (63.3%), who are part of the academic community, agreed with the government policy on the implementation of HWLs on cigarette packages. This agreement largely stemmed from their support of the government's efforts to reduce cigarette consumption in Indonesia. These respondents expressed that the labels had assisted those who had already intended to decrease or cease smoking but struggled to find effective methods. However, a significant number of respondents (36.7%) disagreed with the HWLs. Based on our interviews, they felt that the pictorial warnings were not an adequate approach if the government aimed to substantially reduce smoking rates in Indonesia. Alternative methods, such as increasing prices, limiting production, and implementing stricter regulations, were suggested as potentially more effective.

Along with the perception that the images used were not all sufficiently intimidating or even non-threatening, allowing consumers to disregard them when purchasing cigarettes, the limited variety of images resulted in consumers becoming desensitized, having become accustomed to the same pictures repeatedly. Another critical point raised by respondents was the small size of the images on cigarette packages, which they believed diminished the impact of the warnings, leading to a perception of trivialization or lack of importance. These findings reveal an overarching sentiment among the academic community that tobacco companies might not be fully aligning their HWL strategies with the intended public health objectives. This scepticism is crucial for policymakers and public health advocates, as it highlights the need for more stringent regulations and oversight on HWL implementation to ensure that these labels serve their intended purpose effectively.

Our findings also show that respondents varied in their views on the importance of HWLs on cigarette packages. The majority of the respondents, 74 people (61.6%), stated that HWLs on cigarette packaging were important. Among these 74 respondents who believed that HWLs were important, 60 reported reducing their daily cigarette consumption, 10 increased their consumption, and 4 maintained their usual consumption levels. Conversely, among the 46 respondents who considered HWLs unimportant, 20 still reduced their cigarette consumption, 15 increased it, and 11 reported no change in their smoking habits. This finding slightly contrasts with a study by Dewi et al. [30], a qualitative study involving 45 informants in Yogyakarta, Indonesia. The study found that Pictorial Health Warning Labels (PHWLs) on cigarette packages evoke negative emotions but do not significantly deter smokers due to addiction fears. Nevertheless, Dewi et al. argued that PHWLs positively impact smokers' perceptions and intentions to quit. Another study involving 401 public respondents from four large cities in Indonesia concluded that PHWLs have a cognitive impact, prompting respondents to quit smoking or reduce the number of cigarettes consumed. Students and non-professional workers are more influenced by PHWLs, compared to professional workers who are least affected by them.

Collectively, our findings reveal that the majority of respondents acknowledged the importance of HWLs on cigarette packages, emphasizing their influence on smoking behaviors among the academic community. This perspective primarily stemmed from widespread support for the government's efforts to reduce cigarette consumption in Indonesia. Thus, a significant portion of respondents valued the presence of HWLs on cigarette packages as a crucial measure in the broader campaign to curb cigarette consumption in the country. While there are variations in the degree of acknowledgment, with some faculties exhibiting more unanimous views than others, the general trend indicates an understanding of the critical role HWLs play in tobacco control and public health. This collective acknowledgment, particularly in an educated and informed community, reinforces the necessity and effectiveness of HWLs as a key component in smoking prevention and health education strategies.

The result of the Wilcoxon signed-rank analysis confirms that pictorial HWLs have a significant influence in decreasing cigarette consumption, as a portion of the respondents admitted to reducing their smoking due to the influence of these warning labels. Furthermore, some respondents reported that the HWLs assisted in their efforts to quit smoking, as they had been seeking effective methods to reduce consumption. These findings support the hypothesis that there is a significant difference in cigarette consumption before and after the introduction of pictorial HWLs on cigarette packaging.

Furthermore, out of all respondents in this study, males dominated with 115 participants, and there were only 5 female respondents. Our findings indicate that male respondents were more influenced by the pictorial HWLs compared to females. This difference is attributed to males being more open about smoking and more aware of issues related to smoking. In contrast, female respondents were less influenced, as their smoking was more associated with lifestyle choices. This observation aligns with Huda's [5] study conducted in the campus

environment of IPB University, Bogor, Indonesia, which found significant relationships between gender, age, and response to labeling. Males were more likely to be influenced by labeling than females.

CONCLUSIONS

This research focused on understanding the response of educated consumers, primarily within a university campus setting, to the introduction of health warning labels (HWLs) on cigarette packaging. Utilizing purposive sampling, descriptive analytics, and the Wilcoxon signed-rank test, the study analysed data from 120 participants, determined using Lameshow's formula.

The findings revealed that while most respondents acknowledged and approved the inclusion of HWLs on cigarette packaging, there were reservations regarding their effectiveness and design. Specifically, concerns were raised about the accuracy, size, and visual impact of these labels. Despite these reservations, a significant majority of the respondents recognized the importance of HWLs in conveying health risks associated with smoking and supporting government efforts to reduce cigarette consumption.

The study's statistical analysis, particularly through the Wilcoxon signed-rank test, indicated a notable reduction in cigarette consumption among the respondents post the introduction of HWLs, with a significant p-value of 0.000. This reduction in smoking behaviour was more pronounced among male respondents and those who were previously seeking effective methods to reduce or cease smoking. However, the study also acknowledged that external factors, such as increased taxation leading to higher cigarette costs, might have contributed to this decline in consumption.

Recommendations for stakeholders, including the Indonesian government, cigarette factories, consumers, and public health advocates, emerged from the study. For the government, the study suggests enhancing the design and implementation of HWLs while considering additional tobacco control measures. Cigarette manufacturers are encouraged to take the feedback from this study into account and improve the effectiveness of HWLs on their products. For consumers, especially those attempting to quit or reduce smoking, the study emphasizes the importance of understanding the health risks and the message conveyed by HWLs.

Future research could delve deeper into the differential impacts of HWLs across various demographics, assess long-term behavioural changes, and evaluate the effectiveness of different HWL designs. Additionally, exploring the synergy of HWLs with other tobacco control measures could provide a more comprehensive understanding of strategies to curb cigarette consumption effectively.

Overall, this study underscores the relevance and potential impact of HWLs in reducing cigarette consumption, while also highlighting the necessity for a multifaceted approach in tobacco control, considering diverse responses among different population segments.

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