

## Are Indonesian new pictorial health warnings more effective than the old ones?

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### ABSTRACT

Smoking remains as a nation-wide health problem in Indonesia. Several measures had been conducted to motivate smoking cessation, among those is the use of pictorial health warnings (PHWs). PHWs have been implemented since 2014, and some of the pictures were revised in 2018. However, there was no evaluation regarding the effectivity to this date. This study compared the effectivity of the old and new versions of PHWs in promoting smoking cessation. This was a cross-sectional study conducted in one of the sub-districts in East Java, Indonesia, in February 2020. Study population were local villagers aged at least 18 years who visited the sub-district's primary healthcare during the study period. Consecutive sampling was used as the sampling method. Respondents were interviewed using a pre-determined questionnaire. The old and new versions of PHWs were printed and showed to the respondent during the interview. Comparison between groups was analyzed using McNemar test. A total of 103 respondents participated in this study. More respondents agreed that the old version of PHWs was considered more effective to motivate smoking cessation as compared to the newer version (71.84% vs 64.08%), although the significance was marginal ( $p=0.077$ ). Our study showed that both versions of PHWs were considered effective to promote smoking cessation. However, more respondents agreed that the old version of PHWs were more effective than the new PHWs. We recommend policymaker to conduct a field study to test the effectivity of the proposed PHWs before revising the legal regulation in the future.

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## 1. INTRODUCTION

Smoking is a global health problem. It is estimated more than 1 billion people in the world smoked, where majority of them lived in the developing countries [1]. Indonesia is one of the developing countries with a significant contribution to the global smoking prevalence [2]. According to the national health survey conducted by the Indonesian Ministry of Health, smoking prevalence among population aged 10 years and

over is 28.8% [3]. Although the prevalence has decreased by 0.5% from the previous survey in 2013 [4], the prevalence is still high.

Several measures had been conducted by the Indonesian government to suppress smoking prevalence, including using pictorial health warnings (PHWs) on tobacco package. PHWs are known to be an effective method to prevent non-smokers to smoke and motivate smoking cessation among smokers [5], [6]. The first legal regulation of PHWs by Indonesian Ministry of Health was published in 2013 and takes effect in April 2014 [7]. In 2018, the regulation was revised, including the pictures of PHWs that must be printed in the tobacco package. However, this new regulation took effect in January 2019 [8]. Both old as shown in Figure 1 and new Figure 2 version of Indonesian PHWs contain a set of five pictures, of which two figures from the old version as shown in Figures 1(c) and 1(d) were used again in the new version as shown in Figures 2(b) and 2(e). Other than the difference about the pictures, the new warning text also includes a hotline number for smoking cessation.



Figure 1. Old pictorial health warnings in Indonesia (April 2014 – January 2019) [7] Picture with: (a) “smoking kills you” warning text, (b) “smoking causes oral cancer” warning text, (c) “smoking causes throat cancer” warning text, (d) “smoking causes lung cancer and chronic bronchitis” warning text, (e) “smoking close to infant will harm them” warning text



Figure 2. New pictorial health warnings in Indonesia (January 2019 onwards) [8] Picture with: (a) “smoking causes oral cancer” warning text, (b) “smoking causes lung cancer” warning text, (c) “I got throat cancer because of smoking” warning text, (d) “smoking take away my happiness one by one” warning text, (e) “smoking causes throat cancer” warning text

The effectiveness of PHWs should be analyzed meticulously in each country, since the sociocultural context and smoking characteristic are different [6]. However, evaluation study regarding effectivity of PHWs in Indonesia was still scarce to this date. To our knowledge, there were only three studies that evaluate the effectivity of PHW in Indonesia [9]–[11]. Nonetheless, those studies evaluated the old version of PHWs. Meanwhile, there was no published study that evaluates the effectivity of the new version of PHWs in motivating smoking cessation, and whether it is more effective than the previous version of PHWs. Therefore, this study aimed to evaluate the effectivity of three new pictorial health warnings in motivating smoking cessation, and to compare the effectivity between the new and the old version of those three different PHW.

## 2. RESEARCH METHOD

This study was a cross-sectional study conducted at Songgon sub-district, Banyuwangi district, East Java Region, Indonesia. Songgon sub-district lies among the border of Bondowoso and Jember district, which are dominated by Madurese, Javanese, and Osing (Banyuwangi natives) ethnicities. These three ethnics also represent the ethnicities of rural East Java, a province with the second largest population in Indonesia [12]. Respondents' recruitment and data collection were conducted in February 2020, and data analysis was conducted in May 2020. According to sample size calculation, the minimum sample required for this study was 85 respondents [13]. Sampling method in this study was consecutive sampling. Sampling was done for a

week until at least minimum required sample were achieved. If minimum samples were not achieved, then the study would be continued for another week. Inclusion criteria in this study were local villagers aged at least 18 years who visited Songgon primary healthcare during the study period and willing to participate in this study. Exclusion criteria were those who were not able to communicate in Indonesian language, had bad eyesight, or had mental impairment.

This study followed the principles of the Declaration of Helsinki and approved by the relevant Institutional Reviewer Board (Approval number: 52/EC/KEPK/FKUA/2020). This study also complies with strengthening the reporting of observational studies in epidemiology (STROBE) guidelines [14]. All respondents gave their informed consent prior to their inclusion in the study. Before signing the informed consent, information for informed consent were given. Details that might disclose the identity of the respondents under study were omitted.

Respondents were interviewed face-to-face by the authors with predetermined questionnaire. Collected data in this study consist of sociodemographic data, smoking behavior, and their perception regarding old and new PHW to motivate smoking cessation. Three different pictures of old as shown in Figures 1(a), 1(b), and 1(d) and new Figures 2(a), 2(c), and 2(d) PHW were printed and showed to the respondents during interview. Acquired data was analyzed using IBM SPSS Statistics for Windows version 25.0 (IBM Corp., Armonk, NY, USA). McNemar test was used for the statistical analysis. P-value < 0.05 was considered statistically significant.

### 3. RESULTS AND DISCUSSION

There were 103 respondents recruited in this study. The youngest respondent was 18 years old, oldest respondent was 70 years old, and the mean respondents' age were 44 years old. There were more male respondents than female respondents. Most of the respondents were married with at least one child. Sixty respondents were non-smoker, and 43 respondents were smoker. Among those respondents who were non-smoker, 71.7% were passive smoker. For respondents who were smoker, 53.5% started to smoke before 18 years old and 67.4% smoke cigarette for more than 10 years as shown in Table 1.

In general, there were more respondents who agreed that the old PHWs motivated smoking cessation better than the new PHWs (71.8% vs 64.1%) although the difference was not statistically significant ( $p=0.077$ ). We further analyzed the response toward PHW based on the demographic data. We observed that in the majority of sociodemographic categories, more respondents agreed that old PHWs were more effective to promote smoking cessation as compared to the new PHWs. However, the differences were not statistically significant (all  $p>0.05$ ) as shown in Table 1.

Figure 1(b) was the most voted old PHWs to motivate smoking cessation (62.1%), while Figure 2(a) was the most voted new PHWs to motivate smoking cessation (47.6%). Among smoker, Figure 1(a) was the most voted old PHWs and Figure 2(c) was the most voted new PHWs to motivate smoking cessation. Among non-smoker, Figure 1(a) was the most voted old PHWs and Figure 2(a) was the most voted new PHWs to motivate smoking cessation. The significant difference between smoker and non-smoker respondents was only regarding the effectivity of Figure 2(a) and Table 2.

In this study, we found that PHWs were still effective in motivating smoking cessation based on the perception of respondents at Songgon sub-district. However, the perception regarding the effectivity of old PHWs to motivate smoking cessation was higher than the new PHWs. In contrary, previous study in Jordan showed that new PHWs were more effective in motivating smoking cessation than old PHWs [15]. Published study in Indonesia regarding the effectivity of PHW were still scarce, and only evaluates the effectivity of old PHWs. Study among active smoker adults in rural area found that only 27.7% respondents were motivated by the old PHWs on cigarette package to stop smoking [11]. The difference between our finding and previous studies might be because of the difference of location in which the study was conducted, thus, the sociocultural context might be different.

More than half of smoker respondents agreed that PHWs were effective to motivate smoking cessation. Previous meta-analysis study has shown that PHWs are more effective than text-only warning in motivating active smoker to quit smoking [16]. Despite the high percentage, the number of smokers who agreed that PHWs were effective to motivate smoking cessation was lower than that of non-smoker (65.1% vs 76.7% for old PHWs and 55.8% vs 70% for new PHWs). Previous studies also showed the discrepancy in PHWs' effectivity between smoker and non-smoker, where PHWs were found to be more effective to refrain non-smoker from smoking rather than motivating smoker to quit smoking [10], [15], [17], [18]. A systematic review also concluded that PHWs were perceived as more effective among non-smokers [5]. Moreover, Dillard *et al.* found that non-smokers generally held a negative attitude towards smoker [19]. These perceptions among non-smoker may explain why they generally perceive PHWs are more effective as they already have a negative attitude towards the behavior.

Table 1. Sociodemographic characteristic and perception toward effectiveness of old and new PHW

| Sociodemographic characteristic | N=103<br>n (%) | Old PHW<br>n effective (%) | New PHW<br>n effective (%) | p     |
|---------------------------------|----------------|----------------------------|----------------------------|-------|
| <b>Age</b>                      |                |                            |                            |       |
| ≤ 25                            | 10 (9.7)       | 9 (90)                     | 7 (70)                     | 0.500 |
| 26-35                           | 19 (18.5)      | 14 (73.7)                  | 10 (52.6)                  | 0.125 |
| 3-45                            | 21 (20.4)      | 10 (47.6)                  | 13 (61.9)                  | 0.250 |
| 46-55                           | 30 (29.1)      | 25 (83.3)                  | 21 (70)                    | 0.125 |
| 56 and above                    | 23 (22.3)      | 16 (69.6)                  | 15 (65.2)                  | 1.000 |
| <b>Sex</b>                      |                |                            |                            |       |
| Male                            | 75 (72.8)      | 52 (69.3)                  | 46 (61.3)                  | 0.146 |
| Female                          | 28 (27.2)      | 22 (78.6)                  | 20 (71.4)                  | 0.625 |
| <b>Education level</b>          |                |                            |                            |       |
| Elementary graduates            | 33 (32)        | 23 (69.7)                  | 23 (69.7)                  | 1.000 |
| Secondary graduates             | 18 (17.5)      | 14 (77.8)                  | 12 (66.7)                  | 0.500 |
| Higher secondary graduates      | 42 (40.8)      | 29 (69.1)                  | 25 (59.5)                  | 0.289 |
| Diploma graduates               | 10 (9.7)       | 8 (80)                     | 6 (60)                     | 0.500 |
| <b>Marital status</b>           |                |                            |                            |       |
| Single/divorced                 | 13 (12.6)      | 8 (61.5)                   | 7 (53.9)                   | 1.000 |
| Married                         | 90 (87.4)      | 66 (73.3)                  | 59 (65.6)                  | 0.118 |
| <b>Children</b>                 |                |                            |                            |       |
| Have                            | 88 (85.4)      | 64 (72.7)                  | 58 (65.9)                  | 0.180 |
| Do not have                     | 15 (14.6)      | 10 (66.7)                  | 8 (53.3)                   | 0.500 |
| <b>Occupation</b>               |                |                            |                            |       |
| Employer                        | 28 (27.2)      | 21 (75)                    | 15 (53.6)                  | 0.070 |
| Employee                        | 31 (30.1)      | 21 (67.7)                  | 20 (64.5)                  | 1.000 |
| Farmer                          | 22 (21.3)      | 15 (68.2)                  | 16 (72.7)                  | 1.000 |
| Unemployed/housewife            | 18 (17.5)      | 13 (72.2)                  | 11 (61.1)                  | 0.625 |
| Students                        | 4 (3.9)        | 4 (100)                    | 4 (100)                    | 1.000 |
| <b>Religion</b>                 |                |                            |                            |       |
| Moslem                          | 100 (97.1)     | 71 (71)                    | 63 (63)                    | 0.077 |
| Christian                       | 3 (2.9)        | 3 (100)                    | 3 (100)                    | 1.000 |
| <b>Active smoker</b>            |                |                            |                            |       |
| Yes                             | 43 (41.8)      | 28 (65.1)                  | 24 (55.8)                  | 0.344 |
| No                              | 60 (58.2)      | 46 (76.7)                  | 42 (70)                    | 0.219 |

McNemar test was used. P-value<0.05 was considered statistically significant

Table 2. Smoker and non-smokers' perception on the effectiveness of old and new pictorial health warning to motivate smoking cessation

| Pictorial health warning    | All respondents<br>N=103<br>n (%) | Smoker<br>N=43<br>n (%) | Non-smoker<br>N=60<br>n (%) | p-value |
|-----------------------------|-----------------------------------|-------------------------|-----------------------------|---------|
| <b>Old PHW (in general)</b> |                                   |                         |                             | 0.199   |
| Effective                   | 74 (71.8)                         | 28 (65.1)               | 46 (76.7)                   |         |
| Not effective               | 29 (28.2)                         | 15 (34.9)               | 14 (23.3)                   |         |
| <b>Figure 1(a)</b>          |                                   |                         |                             | 0.479   |
| Effective                   | 64 (62.1)                         | 25 (58.1)               | 39 (65)                     |         |
| Not effective               | 39 (37.9)                         | 18 (41.9)               | 21 (35)                     |         |
| <b>Figure 1(b)</b>          |                                   |                         |                             | 0.091   |
| Effective                   | 36 (35)                           | 11 (25.6)               | 25 (41.7)                   |         |
| Not effective               | 67 (65)                           | 32 (74.4)               | 35 (58.3)                   |         |
| <b>Figure 1(d)</b>          |                                   |                         |                             | 0.271   |
| Effective                   | 35 (34)                           | 12 (27.9)               | 23 (38.3)                   |         |
| Not effective               | 68 (66)                           | 31 (72.1)               | 37 (61.7)                   |         |
| <b>New PHW (in general)</b> |                                   |                         |                             | 0.139   |
| Effective                   | 66 (64.1)                         | 24 (55.8)               | 42 (70)                     |         |
| Not effective               | 37 (35.9)                         | 19 (44.2)               | 18 (30)                     |         |
| <b>Figure 2(a)</b>          |                                   |                         |                             | 0.029   |
| Effective                   | 49 (47.6)                         | 15 (34.9)               | 34 (56.7)                   |         |
| Not effective               | 54 (52.4)                         | 28 (65.1)               | 26 (43.3)                   |         |
| <b>Figure 2(c)</b>          |                                   |                         |                             | 0.515   |
| Effective                   | 47 (45.6)                         | 18 (41.9)               | 29 (48.3)                   |         |
| Not effective               | 56 (54.4)                         | 25 (58.1)               | 31 (51.7)                   |         |
| <b>Figure 2(d)</b>          |                                   |                         |                             | 0.091   |
| Effective                   | 46 (44.7)                         | 15 (34.9)               | 31 (51.7)                   |         |
| Not effective               | 57 (55.3)                         | 28 (65.1)               | 29 (48.3)                   |         |

Pearson Chi-square test was used. P-value<0.05 was considered statistically significant

One of the factors which should be considered in PHWs implementation is the wear-out effect. A study involving 10 European countries spanning for four years found that new unfamiliar PHWs were more noticeable than old PHWs in general [20]. It is agreed that the periodical introduction of new PHWs are suggested to maintain its effectivity [5], [20]. Previous study found that the effectivity of the same PHWs were around one to two years, and it was suggested that wear-out effect was more likely because of less attention being paid to the same PHWs over a period of time rather than diminished effectivity [21]. Other than to avoid wear-out effect, revising the PHWs are also beneficial for strengthening the effect of PHWs, which is found to be an effective method to increase tobacco control [22]. In Indonesia, the regulation stated that the PHWs should be revised periodically once every 24 months at most [7]. However, Indonesian government revised the old with the new PHWs after more than four years of implementation. They decided to revise three out of five old pictures with the new one. Unfortunately, there is no published explanation by the government regarding the changes of PHWs.

Pictures used in PHWs could be categorized into three categories, which are: suffering, symbolic, and graphic [21]. Old version of Indonesian PHWs had graphic pictures as shown in Figures 1(b), 1(c), and 1(d) and symbolic pictures as shown in Figures 1(a) and 1(e). Meanwhile, the new version had graphic pictures as shown in Figures 2(a), 2(b), and 2(e) and suffering pictures as shown in Figures 2(c) and 2(d). In our study, the most voted old and new PHWs picture to motivate smoking cessation by respondents was the picture that depict oral cancer as shown in Figure 1(b) and Figure 2(a). This finding was similar to previous studies that showed that the most effective PHWs between those three figures was picture that depict oral cancer [9], [11]. Previous longitudinal study in Canada found that the symbolic PHWs are considered less effective than the graphic and suffering PHWs. Furthermore, while graphic and suffering PHWs are both found to be effective in influencing the smoker, each worked in the different pathway from one another [21]. Thus, it could be argued that the Indonesian government made a good decision for removing the symbolic PHWs in the new version.

The response to PHWs varies between countries because the effectiveness of PHWs are affected by biological and sociocultural aspect [6], [21]. One of the biological aspects is the nicotine dependence, since PHWs are less effective among smoker with heavier nicotine dependence [23]. In regard to sociocultural aspect, one of the sociocultural aspect in Indonesia regarding smoking is that cigarette is often consumed during social gathering both in urban and rural areas [24]. In that situation, PHWs appears to be not effective. Another sociocultural aspect is about the gender. In Indonesia, it is uncommon for women to smoke. In the latest national demographic survey, there are only 3.2% of women who smokes, whilst among men, 65% of them smokes [3]. In a recent mixed factorial experiment, it was found that PHWs that contains guilt message was more effective towards female smoker, especially in female with children [25]. Therefore, PHWs that contains guilt message may not be suitable to be implemented in Indonesia.

One of the things that could be improved regarding PHWs is that its total coverage area in the cigarette package. It is suggested that larger picture is needed to maintain the effectivity of PHWs [5]. In Indonesia, PHWs cover only 40% of the cigarette package. This is smaller than other countries, where the PHWs may cover as much as 50-82.5% of the cigarette package [6]. Recently, Dhani *et al.* studied the effect of PHWs on cognitive, affective, and smoking behavior in Indonesia. They found that 44% of their respondents were in favor for larger PHWs size [26]. Other than PHWs, the government could also consider implementing other policies such as increasing cigarette tax and establishing smoking-free area, which have been proven to be effective in other countries [27]–[30].

There were several limitations in this study. This study was conducted only in one sub-district in a rural area; thus, it may not represent rural areas in other provinces in Indonesia. Other than that, there was a limited time which restricted the sample size and method. However, regardless of the limitation, this is the first study to compare the effectiveness between old and new PHWs in motivating smoking cessation in Indonesia.

#### 4. CONCLUSION

Our study found that both old and new version of PHWs were considered effective in motivating smoking cessation. However, there were more respondents who agreed that old version of PHWs were more effective compared to the newer version. Based on our findings, we recommend policymaker to conduct a field study to test the effectivity of the proposed PHWs before revising the legal regulation in the future. Nevertheless, future study with larger samples and broader areas should be conducted to compare the effectivity between old and new PHWs, to scrutinize the effectivity difference in national level.

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