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INDIVIDUAL CHARACTERISTICS AND MEDIA EXPOSURE AS PREDICTORS OF SMOKING BEHAVIOR AMONG MARRIED MEN IN INDONESIA

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ABSTRACT: Men in Indonesia act as role models in the household. Male smokers influence other family members to behave in the same manner. The study aimed to analyze individual characteristics and media exposure as predictors of smoking behavior among married men in Indonesia. The study utilized the 2017 Indonesian Demographic Data Survey with 9,863 men. Besides smoking behavior, other variables analyzed included age, type of place, education, employment, wealth, health insurance, literacy, frequency of reading newspaper/magazine, frequency of listening to the radio, frequency of watching television, and frequency of using the internet. Determination using Binary Logistic Regression. Age was significantly proven as a determinant of smoking behavior among married men in Indonesia. Men with higher education were less likely than those with no education to have smoking behavior. The better the wealth status, the lower the chance for smoking behavior. Men who have health insurance were less likely to have smoking behavior. Married men who listened to the radio less than once a week were 1.175 times more likely than married men who didn't listen to the radio at all to have smoking behavior. Married men who watch television less than once a week have 1.797 times more chances than married men who don't watch television at all to have smoking behavior. It could concluded there were six variables were proven as predictors of smoking behavior, namely age, education, wealth, health insurance, frequency of listening to the radio, and frequency watching of television.

KEYWORDS: smoking behavior, tobacco control, health behavior, media exposure.

I. BACKGROUND

At the international level, much progress has been made in the tobacco control movement. Governments in various countries have made much progress in the war against the tobacco industry. The World Health Organization (WHO) notes that there are at least 5 billion people currently residing in countries that have introduced no-smoking zones, pictorial warnings on cigarette packages, and other effective tobacco control measures. WHO noted this development four times if we compare it to a decade ago. However, 2019 WHO report also notes that many governments in various countries have not implemented tobacco control policies adequately [1].

Nationally, the prevalence of smoking in Indonesia is 28.8%. The province with the highest smoking prevalence in Indonesia was West Java (32.0%), and the lowest was Bali (23.5%). Based on the 2018 Indonesian Basic Health Survey (Riskesdas) report, it is known that the prevalence of smoking in adolescents (10-18 years) has increased from 2013 by 7.2% to 9.1% in 2018. This figure is still below the planned target National Medium-Term Development in 2019 of 5.4%. Data of male smokers in Indonesia > 15 years old in 2018 is still at 62.9%. This number is still and remains the highest prevalence of male smokers in the world [2]. Tobacco consumption through cigarettes is still a big problem in Indonesia, but not yet a priority of the government.

In the Indonesian context, dominated by tribes who have male values in the social structure of society have a position considered higher than women [3], [4]. Men act as role models in the household, as husband and father. Male behavior, including smoking, can influence other family members to behave in the same manner, especially children [5]–[7].

 The high prevalence of smokers in men can also cause risk factors in children as second-hand smoke. The child can suffer from respiratory complaints and other illnesses including stunting. Spending household needs used to buy cigarettes can indirectly result in a lack of nutrient intake in infants [8], [9]. Smoking can also reduce the nutritional status of children through lower respiratory tract infections. Abnormalities of leukocyte function are found in children whose parents smoke. The nicotine in cigarettes will react with chondrocytes (cartilage cells)

through special nicotine receptors so that it results in stunted bone growth [10]–[12]. Smoking can increase the risk of chromosomal instability, cytotoxicity, and induced cell divisions in cervical mucosa cells of pre- and post-menopausal women. The effects were more pronounced in post-menopausal women indicating a higher risk for diseases [13].

Throughout the world, the tobacco industry has used the media aggressively in communication strategies to make people want to buy more of their products. Despite restrictions on the use of advertising, the industry has found ways to circumvent the law by adopting the use of sponsorship and public relations programs. These examples can be found in the methods used to target young people or how the concept of tolerance is promoted in hotels and restaurants [14].

Strategies and tactics that have worked in western markets are now used in developing countries in Asia, Central America and Eastern Europe, Africa, and Latin America. Developing countries that will be responsible for 70% of the estimated 10 million tobacco-related deaths by 2030 need to be the focus of the Global Tobacco Control Movement. Therefore, the harmful practices of tobacco companies need to be inhibited by morally binding international instruments such as the proposed Framework Convention on Tobacco Control (FCTC) by WHO. The WHO FCTC adoption process and related protocols will mobilize and accelerate support from national and global perspectives on tobacco [15]. Unfortunately, Indonesia did not participate in these activities.

There is plenty of evidence in many countries that the media can make a significant contribution to the prevention of the tobacco epidemic. The key to this is the imposition of a comprehensive advertising ban that can cover all media. Studies in various countries conclude that advertising prohibitions result in a 4-9% reduction in consumption. In addition to the imposition of a ban, the media must be mobilized to advocate for public health and economic arguments against tobacco. Therefore, the challenge is to make the media partners and supporters of the tobacco control program [15]. On the other hand, transnational tobacco companies use social media such as Twitter to launch their propaganda. Transnational tobacco companies oppose tobacco control policies. They shape public identity by promoting corporate social responsibility initiatives that violate the WHO FCTC on Tobacco Control [16].

The media is a powerful weapon that can be used by international organizations such as WHO, national governments and the public health community to uncover, expose, inhibit and delegitimize not only tobacco consumption but also the tobacco industry [17]. Based on this background, this study aimed to analyze individual characteristics and media exposure as predictors of smoking behavior among married men in Indonesia.

II. METHODS

2.1. Data Source
The analysis in this study utilizes secondary data from the 2017 Indonesian Demographic Data Survey (IDHS). The study uses the married men as an analysis unit. By using stratification and multistage random sampling methods, respondents were 9,863 men.

2.2. Procedure
The 2017 IDHS has received ethical clearance from the Ethics Commission in the Indonesia Ministry of Health. The respondents' identities have all been deleted from the dataset. Respondents have provided written approval for their involvement in the study. The researcher has obtained permission to use the data for this study through the website: https://dhsprogram.com/data/new-user-registration.cfm

2.3. Data Analysis
The dependent variable in this study was smoking behavior. Smoking behavior was the respondent's acknowledgment of cigarette consumption at the time of the interview. The independent variables analyzed included individual characteristics and media exposure. Individual characteristics include age, type of place of residence, education level, employment status, wealth status, health insurance ownership, and literacy. Media exposure includes a frequency of reading newspaper/magazine, frequency of listening to the radio, frequency of watching television, and frequency of using the internet.

In the initial stage, collinearity tests were carried out to ensure there is no collinearity between variables. Next, the researchers used the Chi-square test to select dichotomous variables, while the continuous variables used T-tests. This test was to see the relationship between the independent variable and smoking behavior as the dependent variable. Because of the nature of the dependent variable, Binary Logistic Regression was used for the final test to determine predictors. All stages of statistical analysis were carried out with the help of SPSS 22 software.

III. RESULTS

Table 1 is the result of the co-linearity test between smoking behavior as the dependent variable and all independent variables. Table 1 shows that the tolerance value of all variables is greater than 0.10. While the VIF value for all variables is less than 10.00. Then referring to the basis of decision making in the multicollinearity test it can be concluded that there were no symptoms of multicollinearity in the regression model.

Table 1.   Result of Collinearity Test of Smoking Behavior among Married Men in Indonesia (n=9,863)

Variables	Tolerance	VIF
Age	0.834	1.199
Type of place of residence	0.765	1.307
Education level	0.565	1.769
Employment status	0.993	1.007
Wealth status	0.565	1.769
Health insurance ownership	0.944	1.059
Literacy	0.762	1.312
Freq. of reading newspaper/magazines	0.723	1.383
Freq. of listening to the radio	0.891	1.122
Freq. of watching television	0.919	1.088
Freq. of using internet	0.570	1.755

Dependent Variable: Smoking Behavior

Table 2 is a display of descriptive statistics of married men in Indonesia. Table 2 informs that married men who have smoking behavior have an average younger age than those who do not have smoking behavior.

Table 2 informs that in the type of place of residence category, married men who have smoking behavior are dominated by those who live in rural areas. Those who do not have smoking behavior are dominated by those who live in urban areas. Based on the education level category, the two categories of married men who have smoking behavior or those who do not, are dominated by those who have a secondary education level. While in the employment status category, both married men who have smoking behavior or those who do not, are dominated by those employed.

Table 2 informs that in the wealth status category, married men who have smoking behavior are dominated by those who have middle wealth status. While those who do not have smoking behavior are dominated by those who have the richest wealth status. Based on the category of health insurance ownership, the two categories of married men who have smoking behavior or those who do not, are dominated by those who have health insurance. Based on the literacy category, the two categories of married men who have smoking behavior or those who do not, are dominated by those who can read the whole sentence.

Table 2. Statistics Descriptive of Respondents Characteristics (n=9,863)

Predictors	Smoking Behavior				P
	No		Yes		
	n	%	n	%	
Age (mean)	2286	40.99	7037	39.05	***<0.001
Type of place of residence					***<0.001
• Urban	1613	57.1%	3386	48.1%	
• Rural	1213	42.9%	3651	51.9%	
Education level					***<0.001
• No education	57	2.0%	141	2.0%	
• Primary	657	23.2%	2362	33.6%	
• Secondary	1433	50.7%	3787	53.8%	
• Higher	679	24.0%	747	10.6%	
Employment status					0.540
• Not employed	60	2.1%	136	1.9%	
• Employed	2766	97.9%	6901	98.1%	
Wealth status					***<0.001
• Poorest	425	15.0%	1766	25.1%	
• Poorer	464	16.4%	1485	21.1%	
• Middle	542	19.2%	1406	20.0%	
• Richer	579	20.5%	1298	18.4%	

• Richest	816	28.9%	1082	15.4%	
Health insurance ownership					***<0.001
• No	939	33.2%	2960	42.1%	
• Yes	1887	66.8%	4077	57.9%	
Literacy					**0.001
• Cannot read at all	104	3.7%	350	5.0%	
• Able to read-only part of a sentence	93	3.3%	312	4.4%	
• Able to read whole sentence	2629	93.0%	6375	90.6%	

Note: Chi-Square test was used for dichotomous variables, and T-test for continuous variables;
∗p < 0.05; ∗∗p < 0.01; ∗∗∗p < 0.001.

Table 3 displays descriptive statistics of media exposure. Table 3 informs that based on the frequency of reading newspaper/magazine categories, both married men who have smoking behavior or not, are dominated by those who are not at all reading newspapers/magazines.

Table 3 informs that based on the frequency of listening to radio category, both married men who have smoking behavior or not, are dominated by those who are not at all listening to the radio. Based on the frequency of watching television category, the two categories of married men who have smoking behavior or those who do not, are dominated by those who at least once a week watching television. Based on the frequency of using the internet category, the two categories of married men who have smoking behavior or those who do not, are dominated by those who are not at all using the internet.

Table 4 displays the results of binary logistic regression of smoking behavior among married men in Indonesia. Table 4 informs that age is significantly proven as one of the predictors of smoking behavior among married men in Indonesia.

Table 4 shows that married men with higher education are 0.625 times more likely than married men with no education to have smoking behavior (OR 0.625; 95% CI 0.411-0.950). The results of the study inform that having a higher education is lower than those with no education to have smoking behavior. Partial education level is one of the predictors of smoking behavior among married men in Indonesia.

Table 3. Statistics Descriptive of Media Exposure (n=9,863)

Predictors	Smoking Behavior				P
	No		Yes		
	n	%	n	%	
Freq. of reading newspaper/magazines					***<0.001
• Not at all	1242	43.9%	3607	51.3%	
• Less than one a week	952	33.7%	2436	34.6%	
• At least once a week	632	22.4%	994	14.1%	
Freq. of listening to the radio					**0.005
• Not at all	1413	50.0%	3540	50.3%	
• Less than one a week	928	32.8%	2463	35.0%	
• At least once a week	485	17.2%	1034	14.7%	
Freq. of watching television					**0.001
• Not at all	102	3.6%	243	3.5%	
• Less than one a week	295	10.4%	924	13.1%	
• At least once a week	2429	86.0%	5870	83.4%	
Freq. of using internet					***<0.001
• Not at all	1550	54.8%	4590	65.2%	
• Less than one a week	51	1.8%	172	2.4%	
• At least once a week	1225	43.3%	2275	32.3%	

Note: ∗ p < 0.05; ∗∗ p < 0.01; ∗∗∗p < 0.001.

Table 4. Result of Binary Logistic Regression of Smoking Behavior among Married Men in Indonesia (n=9,863)

Predictors	Sig.	Smoking Behavior		
		OR	LB	UB
Age	***<0.001	0.972	0.966	0.977
Type of place of residence: Urban	0.982	1.001	0.903	1.110
Type of place of residence: Rural	-	-	-	-

Education level: No education	-	-	-	-
Education level: Primary	0.058	1.450	0.987	2.130
Education level: Secondary	0.427	1.176	0.788	1.755
Education level: Higher	*0.028	0.625	0.411	0.950
Wealth status: Poorest	-	-	-	-
Wealth status: Poorer	**0.001	0.756	0.645	0.886
Wealth status: Middle	***<0.001	0.640	0.544	0.752
Wealth status: Richer	***<0.001	0.627	0.529	0.744
Wealth status: Richest	***<0.001	0.480	0.399	0.577
Health insurance ownership: No	-	-	-	-
Health insurance ownership: Yes	***<0.001	0.839	0.761	0.924
Literacy: Cannot read at all	-	-	-	-
Literacy: Able to read only part of sentence	0.552	0.899	0.632	1.278
Literacy: Able to read whole sentence	0.425	0.887	0.661	1.191
Freq. of reading newspaper/magazines: Not at all	-	-	-	-
Freq. of reading newspaper: Less than once a week	0.937	1.005	0.897	1.125
Freq. of reading newspaper: At least once a week	0.170	0.904	0.784	1.044
Freq. of listening to the radio: Not at all	-	-	-	-
Freq. of listening to the radio: Less than once a week	**0.004	1.175	1.054	1.309
Freq. of listening to the radio: At least once a week	0.623	1.034	0.904	1.183
Freq. of watching television: Not at all	-	-	-	-
Freq. of watching television: Less than once a week	***<0.001	1.797	1.355	2.384
Freq. of watching television: At least once a week	**0.001	1.559	1.204	2.020
Freq. of using the internet: Not at all	-	-	-	-
Freq. of using the internet: Less than once a week	0.266	1.207	0.866	1.682
Freq. of using internet: At least once a week	0.299	0.935	0.825	1.061

Note: $* p < 0.05$; $** p < 0.01$; $*** p < 0.001$.

Table 4 informs that married men who have wealth status in the poorer category are 0.756 times more likely than the poorest men to have smoking behavior (OR 0.756; 95% CI 0.645-0.0.886). Married men with wealth status in the middle category are 0.640 times more likely than the poorest men to have smoking behavior (OR 0.640; 95% CI 0.544-0.752). Married men with wealth status in the richer category had 0.627 times more likely than the poorest men to have smoking behavior (OR 0.627; 95% CI 0.529-0.744). Married men with wealth status of the richest category have the possibility of 0.480 times compared to the poorest men to have smoking behavior (OR 0.480; 95% CI 0.399-0.577). These results inform that the better the wealth status, the lower the probability of smoking behavior. Poverty is a risk factor for having smoking behavior.

Table 4 shows that married men who have health insurance are 0.839 times more likely than married men who do not have health insurance to have smoking behavior (OR 0.839; 95% CI 0.761-924). The results of the study inform that having health insurance has a lower possibility than those without health insurance to have smoking behavior.

Table 4 informs that literacy is not one of the determinants of smoking behavior among married men in Indonesia. While media exposure which proved to be significant as a determinant of smoking behavior was the frequency of listening to radio and frequency of watching television. Married men who listened to the radio less than once a week were 1.175 times more likely than married men who did not listen to the radio at all to have smoking behavior (OR 1.175; 95% CI 1.054-1.309). Married men who are listening to the radio are more likely to have smoking behavior. Table 4 shows that married men who watch television less than once a week are 1.797 times more likely than married men who don't watch television at all to have smoking behavior (OR 1.797; 95% CI 1.355-2.384). Married men who watch television at least once a week are 1.559 times more likely than married men who don't watch television at all to have smoking behavior (OR 1.559; 95% CI 1.204-2.020). Married men who watch television have a higher chance of smoking behavior. The results of this study inform that media exposure (listening to the radio and watching television), is a risk factor for married men to have smoking behavior.

IV. DISCUSSION

The results found that age is one of the predictors of smoking behavior in men. Several studies inform concordant results. Older people are informed that they have a higher chance of smoking [18]–[21].

Education was found as one of the predictors of smoking behaviors among married men in Indonesia. This information is in line with various studies in several countries. Among them in Germany, the USA, and several

countries in Europe [20]–[22]. Education is one of the variables most often found as a predictor that gives a positive influence on the achievement of health indicators [23], [24]. Someone who has a better education is informed to have a lower probability of smoking behavior. Low education is also associated as a barrier to the achievement of health programs [25], [26].

The results of the analysis inform that wealth status is a strong predictor for the likelihood of a man smoking. The lower the wealth status, the higher the chance to have smoking behavior. The same information was also found in other studies in Indonesia and Brazil [27]–[29]. This information is in line with policies released at the world level by WHO by increasing tax rates for the tobacco industry. The high price of cigarettes is believed to be an effective step to reduce the epidemic of tobacco use for cigarettes [1]. The results of studies that focus on the elasticity of cigarette demand based on the price of cigarettes in several countries prove that this tax increase policy strategy is quite successful. A decrease in cigarette demand [30]–[32].

The results found that men who are not covered by health insurance have a higher likelihood of smoking behavior. This information indicates an increasingly double risk. Risk of smoking behavior and the risk of health insurance not covered. Governments in countries that subsidize the health insurance of their citizens often require greater costs in this group. Groups of the poor and uneducated, who then smoke, further increasing the risk of degenerative diseases which undermine the allocation of state health financing [33], [34].

The results of the analysis inform that in the Indonesian context media exposure is a risk factor for married men to have smoking behavior. Results Information contained in the results of the analysis states that media exposure from radio and television is determinant which can increase men's risk of smoking behavior. These results are following several studies on the effect of the media on smoking behavior, both to initiate smoking behavior, and to continue smoking behavior [35]–[37], especially in adolescent boys [38], [39]. Another study in Indonesia informs us that media exposure in the form of cigarette advertisements increases the likelihood of teens to smoke behavior 4.9 times compared to adolescents who are not exposed to cigarette advertisements [40].

Television has a stronger impact than radio. This information explains that the interactive media by involving the senses of hearing and visual influence is stronger than the media that rely on sound or images alone [41], [42]. The results of this study are in line with the results of previous studies that conducted a content analysis on the YouTube platform about smoking behavior discourse. The results inform that the pro-smoking group can beat the video message delivered by the tobacco control group. The message conveyed in the pro-smoking group video is more interesting. Pro-smoking groups can display smoking as a symbol of virility and a symbol of social solidarity. Pro-smoking group videos have been proven to get more views and comments on the YouTube platform [14].

Mass media, both traditional and digital media, are neutral instruments in the pros and cons of tobacco control. Pro-smoking groups have made very good use of media instruments. It's time for tobacco control activists to make the media a more effective instrument. Funding can be done in collaboration with industries that favor tobacco control through the Corporate Social Responsibility mechanism [17].

V. CONCLUSION

Based on the results of the study it could be concluded that the characteristics of individuals who are proven to be predictors of smoking behavior were age, education level, wealth status, and health insurance ownership. While media exposure which was proven as a predictor of smoking behavior was the frequency of listening to the radio and the frequency of watching television.

Declaration of Conflicting Interests
The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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