Variables Affecting Eligible Women in Poor Households to Smoke in Indonesia 2017

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Abstract. Smoking is one of public health threats. Cigarette consumption does not only impact on a person's declining health but also social behavior. Smoking behavior in women, especially eligible women (15-49 years old) threatens women's reproductive health and the condition of the fetus in the womb during pregnant, which may get worse in poor households. Aside from that, cigarette consumption in Indonesia occupies the second position in food consumption with a portion of 12.17 percent. Therefore, the purpose of this study is to examine the variables that affect eligible women in poor households to smoke in Indonesia. The sources of the research data are the 2017 Indonesia Demographic and Health Survey (2017 IDHS) with the Household and Eligible women questionnaires. The method of analysis used descriptive analysis and inferential analysis with binary logistic regression method in rare event with the firthlogit model. The results of the study show that eligible women in poor households in Indonesia would have a tendency to smoke when they live in urban areas, are more mature in age, their highest educational level is lower than junior high school, work, never access mass media, have partner who do not work and have a big number of household members.

1. Introduction

Smoking has become a common thing for people and has become one of the world's public health threats. The impact of smoking from any angle is detrimental, both for the smokers and those around. According to WHO (2020), more than 8 million people die annually due to tobacco use, of which 7 million more deaths are active smokers and the rest are non-smokers who are exposed to secondhand smoke (passive smoking) [1]. It is also reported that approximately 80 percent of the 1.3 billion tobacco users worldwide live in low- and middle-income countries, where the burden of tobacco-related disease and death is heaviest [1]. In addition, the growing trend of smoking does not discriminate against age or gender. According to WHO (2010), about 200 million of the world's one billion smokers are women and 1.5 million women die each year due to tobacco use, of which most (75 percent) of these women live in low- and middle-income countries [2].

In a systematic review and meta-analysis conducted by Jafari et al. (2021), the prevalence of current and former smoker among women in the world was 17 percent and 28 percent, respectively. The prevalence of former smokers among adolescent girls/school students, adult women, pregnant women, and women with the disease is 23 percent, 27 percent, 32 percent, and 38 percent, respectively. Meanwhile, the prevalence of current smokers among adolescent girls/school students, adult women, pregnant women, and women with the disease is 15 percent, 13 percent, 21 percent, and 25 percent. The prevalence of current women smokers in Oceania, Asia, Europe, America, and Africa is 21 percent, 22 percent, 18 percent, 0.8 percent, and 12 percent, respectively.[3]

Indonesia, as one of the developing countries in Asia, in 2018 became the country with the fourth highest prevalence of smokers in the South and East Asia region, behind Myanmar, Bangladesh and East Timor [4]. It is also reported that around 225,700 people annually die in Indonesia due to smoking or other tobacco-related diseases [5]. The percentage of women smoking in Indonesia in 2017 was 2 percent [6].

The smoking rate among women is influenced by promotions carried out by tobacco companies in developed and developing countries that are increasingly aggressively in targeting the women market. Barraclough (1999) concluded that there was some evidence of tobacco advertising directly targeting women [7]. This shifts the negative stigma of women smoking, and increases the rate of smoking women [8].

The shift in the stigma of smoking on women is one of the things that has been pushing the number of smoking women to increase. Nevertheless, smoking behavior in women bears a high risk of infertility, late pregnancy, and cervical cancer [2]. Furthermore, if a woman smokes during pregnancy, it can increase the risk of preterm labor, stillbirth, neonatal, and reduced milk production. In addition, smoking is associated with respiratory tract diseases, such as asthma, pneumonia, ARI, and tuberculosis, and degenerative diseases such as heart disease, hypertension, stroke, cataracts, tumors/cancer [9].

However, in the economic aspect, cigarettes are the second commodity in monthly per capita expenditure according to food groups in Indonesia, which amounted 12.17 percent, with 10.96 cigarette consumption in urban households and 14.17 percent cigarette consumption in rural households [10]. This issue should raise concern because the consumption of cigarettes in the household can affect the expenditure of household needs and is more severe in poor households.

Tobacco use contributes to poverty by diverting household expenditures such as food and housing to tobacco [5]. Supriadi and Rusyiana (2018) in their research also found that poor households prioritized cigarette consumption over rice consumption [11]. The percentage of monthly per capita expenditure according to food commodity groups in March 2020 showed that cigarette and tobacco commodity expenditures were included in the low expenditure group, namely quintiles 1 and 2, are 10.56 percent and 12.91 percent [12].

Based on the description above, smoking behavior among women, especially in poor households, cannot be underestimated. Although the number of smoking women is less than that of men, smoking behavior in women requires attention, seeing that smoking women affects their reproductive health and are dangerous for women who smoke while pregnant because it can cause harms to the baby they are carrying. So, this study aims to provide an overview of the smoking status of eligible women in poor households, analyze the variables that affect the smoking status of eligible women in poor households, and analyze the trend of the variables that affect the smoking status of eligible women in poor households in Indonesia.

2. Methodology

2.1. Theoretical basis

Smoking is an activity to suck tobacco leaves that have been chopped, either burned and smoked at one end and allowed to smolder so that the smoke can be inhaled through the mouth at the other end [6]. A cigarette contains 4000 types of chemical compounds, 400 harmful substances, and 43 cancer-causing (carcinogenic) substances [6]. Therefore, cigarettes can be said to have more negative impacts than positive impacts where long-term cigarette consumption can cause serious problems for the health of the human body [13].

Hidayati et al. (2008) concluded that smoking, both in terms of time spent smoking and the number of cigarettes consumed per day, had a significant correlation with the probability of suffering from chronic kidney failure [14]. Smoking also had a significant correlation to the incidence of coronary heart disease [15]. Suraioka (2012) also mentioned that smoking habits can cause heart disease, lung disease, cancer, stroke, and physical disorders such as eye and nose irritation, headache, hoarseness, cough, respiratory illnesses [16].

Smoking behavior is influenced by several aspects. Sarafino and Smith (2011) stated that smoking behavior can be influenced by knowledge, gender, socio-cultural background, and social environment

[18]. Based on consumer behavior, Hawkins and Mothersbaugh (2016), the influence of a person consuming cigarettes could be both internal or external [19]. Internal influences include perception, learning process, memory, motivation, personality, emotions and attitudes. External influences include culture, subculture, demographics, social status, reference group, family and marketing activities.

The related study referred to are as follows. Smith et al. (2012) in their study concluded that smoking status in women was significantly related to race/ethnicity, age, education, place of residence, health status, depression status, regular visits to the doctor, consumption of fast food, and alcohol consumption [20]. Afifi et al. (2010) revealed that socio-economic and demographic, social capital and women's autonomy variables were connected with smoking behavior [21]. Mitchell et al. (2016) found that economic, environmental, and social factors were associated with smoking patterns in women [22]. Timban et al. (2018) conclude that smoking behavior was related to age, gender, education level, marital status, and wealth level [23]. Sari and Seftarita (2018) stated in their study that the cigarette price, education, age, number of family members, and smoking environment variables affect smoking women [24].

2.2. Scope

This study covers all regions in Indonesia. The unit of analysis in this study is eligible women in poor households, namely women aged 15-49 years who have wealth index in the poor and very poor groups. Based on the results of the 2017 Indonesian Demographic and Health Survey (IDHS) data processing, there were 8446 women aged 15-49 years old in poor households in Indonesia. The sample used in this study was 8008 due to the unavailability of data.

This study used a dichotomous dependent variable, namely smoking status or not. While the independent variables that affect the dependent variable are the area of residence, age, education, working status, exposure to mass media, partner's education level, partner's working status, the number of household members and the number of children 5 and under in the household.

2.3. Analysis method

The analytical method used in this study is descriptive and inferential analysis. The descriptive analysis is used to provide an overview of the smoking status of eligible women in poor households in Indonesia. The inferential analysis uses binary logistic regression on rare events with the Penalized Maximum Likelihood (Firthlogit) method on parameter estimation to determine the variables that affect smoking status of eligible women in poor households in Indonesia.

Imbalanced data or rare events is when the probability of success (Y=1) as a minority group on the dependent variable is less than 5 percent [25]. This can result in the opportunity of the minority group being underestimated and causing the chance of failure (Y=0) as the majority group to be overestimated. This will cause minority groups to have a very small possibility of predicting its existence and even tend to be misclassified, which will turn the minority group as the majority group.

In this study, to solve the bias problem, the Firthlogit method recommended by Firth (1993) was used. The maximum likelihood penalized function is as follows:

$$L_{PML}(\boldsymbol{\beta}) = L_{ML}(\boldsymbol{\beta})|I(\boldsymbol{\beta})|^{1/2} \quad (1)$$

As for in the form of the equation of the log-likelihood function as follows:

$$log\ L_{PML}(\boldsymbol{\beta}) = log\ L_{ML}(\boldsymbol{\beta}) + \frac{1}{2} log[|I(\boldsymbol{\beta})|] \quad (2)$$

description:

$L_{PML}(\boldsymbol{\beta})$: penalized likelihood function of firthlogit
$L_{ML}(\boldsymbol{\beta})$: likelihood function of the maximum likelihood method
$|I(\boldsymbol{\beta})|^{1/2}$: Jeffrey's Invariant Prior

The firthlogit method aims to reduce the bias in parameter estimation by including a small bias in the score function $U(\beta)$ [26]. The score function $U(\beta)$ is the gradient obtained from the first derivative

of MLE and $I(\beta)$ is the second derivative. The estimation of the Penalized Maximum Likelihood is obtained by dividing or selecting the number of observations *i* into two new observations that have a response value of y_i and $1-y_i$ with a weighting of $1+\frac{h_i}{2}$ and $\frac{h_i}{2}$ [27], so it will form the following equation.

$$U(\beta_r)^* = \sum_{i=1}^{n}\left\{\left(y_i-\pi(x_i)\right)\left(1+\frac{h_i}{2}\right)+\left(1-y_i-\pi(x_i)\right)\frac{h_i}{2}\right\}x_{ir} \quad (3)$$

$$U(\beta_r)^* = \sum_{i=1}^{n}\left\{y_i-\pi(x_i)+h_i\left(\frac{1}{2}-\pi(x_i)\right)\right\}x_{ir}=0 \quad (4)$$

Where i =1,2,,…,n dan r =1,2,3,…,*p*. It is known $U(\beta_r) = \sum_{i=1}^{n}\left(y_i-\pi(x_i)\right)x_{ir}=0$, so that equation (4) is obtained. While h_i is the ke-i diagonal element of the matrix as follows.

$$\boldsymbol{H} = \boldsymbol{W}^{\frac{1}{2}}\boldsymbol{X}(\boldsymbol{X}^T\boldsymbol{W}\boldsymbol{X})^{-1}\boldsymbol{X}^T\boldsymbol{W}^{\frac{1}{2}} \quad (5)$$

Where $\boldsymbol{W} = diag\{\left(1-\pi(x_i)\right)\}$. In the *Penalized maximum likelihood* (PMLE) method, the estimation $\hat{\beta}$ can be obtained by an iterative process until it coverages as follows [27]:

$$\beta^{(s+1)} = \beta^{(s)} + I^{-1}\left(\beta^{(s)}\right)^* \quad (6)$$

Where s is the number of iterations which in this study was completed with software R 4.1.0 to estimate the parameters. The steps in performing a binary logistic regression analysis on rare events are as follows.

1) Model formation

The binary logistic regression model on rare events that is formed and will be tested for significance is as follows:

$$\hat{g} = \hat{\beta}_0+\hat{\beta}_1D_1+\hat{\beta}_2X_2+\hat{\beta}_3D_3+\hat{\beta}_4D_4+\hat{\beta}_5D_5+\hat{\beta}_6D_6+\hat{\beta}_7D_7+\hat{\beta}_8X_8+\hat{\beta}_9X_9 \quad (7)$$

Description:

$\hat{g}$: Variable smoking status
D_1 : *Dummy* variable area of residence
X_2 : Age
D_3 : *Dummy* variable education
D_4 : *Dummy* variable working status
D_5 : *Dummy* variable mass media exposure
D_6 : *Dummy* variable the partner's education
D_7 : *Dummy* variable the partner's working status
X_8 : Number of household members
X_9 : Number of children 5 and under in household

2) The Goodness of Fit Test

Hosmer Lemeshow test was conducted to see whether the model used was appropriate to explain the dependent variable. The statistic of Hosmer Lemeshow test C is calculated by the formula $C = \sum_{k=1}^{g}\frac{(O_k-n'_k\pi_k)}{n'_k\pi_k(1-\pi_k)}$, where g the numbers of groups, n'_k the numbers of observations of the k group , π_k the average estimated probability of the k group.The decision rejects H_0 when $C > \chi^2_{(0.05;g-2)}$ or *p-value* < 0.05. The desired decision is to fail to reject H_0, so it can conclude that the model that has been formed is suitable or fit to explain the dependent variable.

3) Simultaneous test

Simultaneous testing uses the Likelihood Ratio Test (LR-Test) or the G test statistic to see the joint effect of the independent variables on the dependent variable [28]. The comparison of the likelihood

function values without the independent variable L_0 and with the independent variable L_1will result in a decision reject H_0 when $G = -2ln\left[\frac{L_0}{L_1}\right] > \chi^2_{p;0.05}$ or *p-value* < 0.05. Where is p the degree of freedom for chisquare. This means that with a significance level of 5 percent, it can be concluded that there is sufficient evidence to state that there is at least one independent variable that affects the smoking status of eligible women in poor households in Indonesia.

4) Partial test

The partial test using the Wald test aims to determine which independent variables affect the smoking status of eligible women in poor households. The decision rejects H_0 when $W_j = \left(\frac{\hat{\beta}_j}{SE(\hat{\beta}_j)}\right)^2 > \chi^2_{1;0.05}$ or *p-value* < 0.05. This means that with a significance level of 5 percent, it can be concluded that the independent variable $\hat{\beta}_j$ significantly affects the smoking status of eligible women in poor households.

5) Classification table

The classification table is a method used to determine the predictive power of the model [28]. The classification table aims to map the data to the predicted class so that it can be seen whether the resulting model already reflects the data. Generally, the cut point uses 0.5 [28], but this value is not appropriate for unbalanced data. However, this value can be approximated by the optimum cut point of the ROC curve. According to Agresti (2019) the ROC curve can summarize the predictive power for all possible cut points so that it is more informative [29]. According to Pandey and Jain (2016) the ROC curve is able to identify the optimum cut point, evaluate the performance comparison of several diagnostic tests, and evaluated the performance comparison of diagnostic tests on several population samples [30]. The optimum cut point obtained from the ROC curve is the value that has the smallest distance to the point (1-specificity, sensitivity) = (0,1). In addition, several measures are used to determine whether the classification is correct, namely accuracy, sensitivity, and specificity.

6) Odds Ratio

The odds ratio in the logistic regression method is used to estimate the tendency of the association between the independent variable and the dependent variable. The greater the value of e^{β_j}, the greater the tendency of eligible women in poor households in a category in the j-variable to smoke compared to the reference category.

$$\hat{\theta} = e^{\hat{\beta}_j} \tag{8}$$

3. Result

Based on the results of the 2017 IDHS data processing, the percentage of eligible women who smoke in poor households with smoking status in Indonesia is 2.24 percent. This percentage showed that 2 to 3 out of 100 eligible women in poor households were active smokers. In line with the study conducted by Ng et al. (2014) which stated that the prevalence of women smoking in developing countries is less than 5 percent, in contrast to developed countries where the prevalence of women smoking exceeded 20 percent [31]. However, this small percentage requires attention in order to prevent an increase. This is because according to a report by the ASH Organization (Action on Smoking and Health) (2019) in the UK there was evidence that women in developing countries are being targeted by tobacco companies [32].

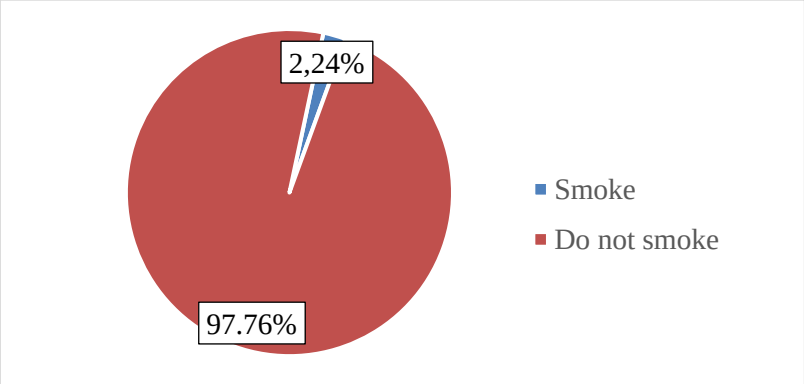

Figure 1. Percentage of eligible women in poor households in Indonesia 2017
Source: IDHS 2017

This study used independent variables that are categorical and numerical. According to the categorical independent variables, eligible women who smoke in poor households are commonly found in the characteristics of living in urban areas, the highest education level is lower than junior high school, working, never exposed to mass media, having a partner with the highest education level is lower than junior high school, and the partner does not work.

Table 1. Percentage of eligible women in poor households based on smoking status and categorical independent variables.

Variable	Smoking status (%)	
	Smoke	Do not smoke
Residential area		
Rural	1.96	98.04
Urban	3.00	97.00
Education		
Junior high school and more	1.75	98.25
Lower than junior high school	2.94	97.06
Working status		
Not working	1.70	98.30
Working	2.80	97.20
Mass media exposure (newspaper/ magazine, radio, tv, internet)		
Never access	3.12	96.88
Access	1.96	98.04
Partner's education		
Junior high school and more	2.11	97.89
Lower than junior high school	2.40	97.60
Partner's working status		
Working	2.19	97.81
Not working	6.25	93.75

Source: IDHS 2017

The numerical independent variables in this study are age, number of household members and number of children 5 and under in the household. Eligible women in poor households are 30 to 31 years old on average. Based on smoking status, eligible women in poor households who do not smoke were

on average 30 to 31 years old, while eligible women in poor households who smoke were on average 32 to 33 years.

The number of household members in eligible women in poor households ranged from 1 to 24 members. The average number of household members in eligible women poor households is 5 to 6 members. Based on smoking status, eligible women of poor households who smoke had 2 to 19 household members with an average of 6 to 7 household members. Meanwhile, eligible women poor households who do not smoke had 1 to 24 household members with an average of 5 to 6 household members.

Based on the presence of children 5 and under in the household, most of the eligible women in poor households had children 5 and under in the household. Based on smoking status, eligible women in poor households who smoke or do not smoke on average there are 1 to 2 children 5 and under in the household.

3.1. Goodness of Fit

The model suitability test was conducted to see whether the model used was appropriate to explain the eligible women smoking status variable of poor households. The suitability test of the model used is the Hosmer-Lemeshow-Test.

Table 2. Output Hosmer Lemeshow test

Chi-Square	Df	Sig.
5.772	8	0.672

Source: IDHS 2017

Based on the results of table 2, it can be seen that the p-value > 0.05, failed to reject $\boldsymbol{H_0}$. Therefore, it can be concluded that at the 5 percent significance level, the model used is suitable to explain the smoking status of eligible women in poor households in Indonesia.

3.2. Simultaneous Test

Simultaneous test is used to see the effect of all independent variables on the dependent variable. The test used is the G^2 test statistic. The results of the simultaneous test are as follows:

Table 3. Output simultant test

Chi-Square	Df	P-value
64.491	9	0.000

Source: IDHS 2017

Based on the simultaneous test the value of G^2 is 64,491> $X^2_{9,0.05}$ and if viewed from the p-value = 0.000 < α = 0.05, so the simultaneous test rejects H_0. Therefore, it can be concluded that at the 5 percent significance level, the model formed is statistically significant, there is at least one independent variable that affects the smoking status of eligible women in poor households.

3.3. Partial Test

After the simultaneous test which was showed which the results of H_0 rejection continued with the partial test. The partial test was conducted to find out more specifically which independent variables had a significant effect on the smoking status of eligible women in poor households. The partial test uses the Wald test statistic and then to determine it, it is seen the p-value, the results are as follows:

Tabel 4. Output partial test

Variable	Estimate ($\hat{\beta}$)	P-value	Exp ($\hat{\beta}$)
Intercept	-5.691	0.000	0.003
Residential area			
Rural (*reference*)			
Urban	0.598	0.000*	1.819
Age	0.033	0.002*	1.034
Education			
Junior high school and more (*reference*)			
Lower than junior high school	0.420	0.013*	1.522
Working status			
Not working (*reference*)			
Working	0.427	0.006*	1.533
Mass media exposure (newspaper/magazine, radio, TV, internet)			
Never access (*reference*)			
Access	-0.388	0.021*	0.677
Partner's education			
Junior high school and more (*reference*)			
Lower than junior high school	-0.078	0.635	0.924
Partner's working status			
Working (*reference*)			
Not working	0.932	0.042*	2.540
Number of household member	0.076	0.010*	1.079
Number of children 5 and under in household	0.079	0.417	1.083

*) significant
Source: IDHS 2017

Based on the partial test results in table 4, it can be concluded that there are 7 variables out of 9 independent variables that have been shown to significantly (*) affect the smoking status of eligible women in poor households in Indonesia, which has a p-value <0.05, namely the area of residence (p-value = 0.000), age (p-value = 0.002), the highest education level (p-value = 0.013), working status (p-value = 0.006), exposure to mass media (p-value = 0.021), partner's working status (p-value = 0.042) and the number of household members (p-value = 0.010). While the independent variables that proved not affect smoking status were partner's the education (p-value = 0.635) and the number of children 5 and under in the household (p-value = 0.417).

The highest education level by the partner variable is found to have no significant effect on the smoking status of eligible women in poor households. In the study of Takagi et al. (2014), men's education was not effective in influencing the smoking status of partners (women) if the education of both partners was not high [33]. In addition, it can be related to women's internal conditions such as women's psychology, Aini (2013) stated that women's smoking status was influenced by internal psychological factors which included habits, positive emotional reactions, emotional reactions, addiction. In addition, external psychological factors was social reasons [34].

Women's external factors are not only from their partners. According to Putri (2016) the influence of peers, family can encourage women to smoke. Environments such as smoking peers, smoking mothers and smoking brothers and the absence of smoking bans in the vicinity encourage women to smoke [35]. Dacosta (2018) in a study of women smoke due to their parents' smoking behavior which arouses curiosity and encourages them to try smoking. Encouragement of friends influences women to smoke and turn it into a habit [36].

The variable number of children under five in the household is also known to have no significant effect on the smoking status of poor households. In Karini and Padmawati's study (2018), it was found that women still smoked even when they are were near children, this was due to the minimal knowledge related the dangers of smoking and female smokers feeld healthy and did not feel the effects of smoking [37]. Women believed that smoking did not put others a risk.

The firthlogit model for eligible women status in poor households that is formed based on the parameter values in table 4 is as follows:

$$\hat{g} = -5.691 + 0.598{D_1}^* + 0.033{X_2}^* + 0.420{D_3}^* + 0.427{D_4}^* - 0.388{D_5}^* - 0.078{D_6}^* + 0.932D_7 + 0.076{X_8}^* + 0.079X_9 \quad (8)$$

Description: *) significant on α = 0.05

D_1 : *Dummy* variable area of residence
X_2 : Age
D_3 : *Dummy* variable education
D_4 : *Dummy* variable working status
D_5 : *Dummy* variable mass media exposure
D_6 : *Dummy* variable the partner's education
D_7 : *Dummy* variable the partner's working status
X_8 : number of household members
X_9 : number of children 5 and under in the household

3.4. Classification Table

The classification table is used to see the accuracy of the model in predicting the smoking status of eligible women in poor households where the higher the value of accuracy, sensitivity, and specificity, the better. The cut point determination for classification is based on the cut point value which has the minimum distance with the point (1-specificity, sensitivity) = (0,1) on the ROC curve. The following are the results of the classification with the optimum cut point value of 0.02299958.

Table 5. Classification table of a binary logistic regression model with firthlogit

Observation	Prediction		Percentage Correct
	Do not smoke $\hat{Y}$=0	Smoke $\hat{Y}$=1	
Do not smoke (Y=0)	4947	2882	63.18%
Smoke (Y=1)	71	108	60.33%
Overall Percentage			63.12%

Source: IDHS 2017

The classification results shows that there are 108 out of 179 observations that are correctly predicted on the incidence of smoking status in eligible women in poor households in Indonesia 2017. Meanwhile, there are 4947 out of 7829 that are correctly predicted non-smoking eligible women in poor households in Indonesia in 2017.

In addition, the results of the logistic regression analysis on rare events show that the model used is able to correctly classify the smoking status of eligible women in poor households. This is indicated by the accuracy value of 63.12 percent. This means that the model has succeeded in classifying 63.12 percent of the incidence of smoking status in eligible women in poor households in Indonesia. For imbalance data, there is no criterion limit for the accuracy value. According to Tharwat (2018) the accuracy value can be ignored because the accuracy value becomes sensitive to the imbalance data [38]. Furthermore, the sensitivity value is 60.33 percent, which means that as many as 60.33 percent of eligible women in poor households are correctly predicted to have smoking status. Meanwhile, the specificity value is 63,18 percent, which means that as many as 63,18 percent of eligible women in poor households have been correctly predicted to have non-smoking status.

4. Discussion

From our analysis, the odds of the independent variable to the dependent variable can be seen from the odds ratio value in table 4 column 4. The intercept value ($\widehat{\beta_0}$) is 0.003. This value indicates that when eligible women in poor households have the following characteristics, living in rural areas, getting younger, the highest education level is from junior high school and above, does not work, never been exposed to mass media, having a working partner and having a small number of household members, then the probability of smoking is 0.33 percent.

4.1. Residential Area

The tendency to smoke eligible women in poor households who live in urban areas is 1.819 times greater than those who live in rural areas. These results are in line with the research conducted by Völzke et al. (2006) that living in urban areas (20,000-500,000 inhabitants) especially metropolitans (more than 500,000 inhabitants) can influence individuals to smoke. Women who live in urban areas tend to smoke 1.25 times more than those who live in rural areas. Women who live in metropolitan areas tend to smoke 1.76 times more than those who live in rural areas.[39]

4.2. Age

The tendency to smoke eligible women in poor households increased by 1.034 times for each additional year of age. This is supported by the research of Sugiharti et al. (2015) that the older the individual, the greater the chance of becoming a smoker [40]. Timban et al. (2018) research also adds that adults are more likely to smoke because most of them already have jobs and incomes. This can increase the purchasing power of cigarettes [23].

4.3. Education

The smoking tendency of eligible women in poor households with the highest education level lower than junior high school or equivalent is 1.522 times greater than that of eligible women with the highest education of junior high school and above. This is in line with the research of Kandel et al. (2009) which states that the lower the education level of women, the greater the risk of becoming active smokers [41]. Likewise in the research of Jawad et al. (2015) concluded that low levels of education can increase the likelihood of smoking in women because education is a protector for women from smoking behavior [42].

4.4. Working Status

The tendency to smoke eligible women in poor households who work tends to smoke 1.533 times greater than eligible women who do not work. These results are in line with research by Flandorfer et al. (2010) which states that there is a relationship between working status and smoking status in women, where women aged 30 to 39 years who work have a 1.58 times tendency to smoke compared to those who do not work and women aged 40. up to 49 years who worked had a 1.66 tendency to smoke compared to those who did not work [43]. This is because work can cause stress in women which will influence the woman to seek peace by smoking [44].

4.5. Mass Media Exposure

The odds ratio value of the mass media exposure variable is 0.677. This means that eligible women in poor households who have accessed mass media at least once a week tend to not smoke 1.475 times compared to those who have never. These results can be attributed to the government's cigarette advertising regulations. Several regulations governing cigarette advertising on TV, radio and newspapers and supervision by the Indonesian Broadcasting Commission (KPI) can affect women's smoking status. The following are some regulations regarding cigarette advertising, namely Law no. 32 of 2002 concerning Broadcasting (Broadcasting Law) Article 46 paragraph (3) prohibits commercial advertisements from promoting cigarettes that demonstrate the form of cigarettes, SPS Article 58 paragraph (4) prohibits the promotion of cigarettes that demonstrate the form of cigarettes; Broadcasting Code of Conduct and Broadcasting Program Standards (P3 and SPS) of the Indonesian Broadcasting Commission in 2012; Etika Pariwara Indonesia, point 2.2.2, advertisements for cigarettes and tobacco

products do not display or depict people smoking, or refer to people who are smoking; and Government Regulation number 50 of 2005, cigarette advertisements in radio and television broadcasting institutions can only be broadcast at 21.30-05.00 local time. In addition, there is a Regulation of the Minister of Health of the Republic of Indonesia No. 28 of 2013 concerning the Inclusion of Health Warnings and Health Information on Tobacco Product Packaging (Permenkes).

4.6. Partner's Working Status

The tendency to smoke eligible women in poor households that have a partner who does not work is 2.540 times greater than that of working partners. These results are in line with the research of Everding and Marcus (2020) which concluded that unemployed spouses could influence smoking behavior both themselves and their partners. Furthermore, for couples who are smoker, the intensity of smoking individually and in partners.[45]

4.7. *Number of Household Members*

Each increase in 1 unit of household members in eligible women will increase the smoking tendency of eligible women by 1.079 times. This is in line with the research conducted by Sari and Seftarita (2018), in their research the number of household members had a positive effect on cigarette consumption [24]. Firdaus and Suryaningsih (2011) added that adult household members in the household greatly affected the cigarette consumption in poor households, where every addition of one adult household member would increase the cigarette consumption [46].

5. Conclusion

Based on the results of the analysis and discussion that has been carried out in the previous chapter, it can be concluded as follows:

1. Eligible women in poor households who smoked in Indonesia in 2017 were found to be more characteristic of living in urban areas, the highest education level was lower than junior high school, working, never accessing mass media, the highest completed level of education by partner is lower than junior high school and partner does not work. Aside from that, eligible women in poor households who smoke had an average age of 32 to 33 years, had an average of 6 to 7 household members, and had an average of 1 to 2 children 5 and under in the household.
2. The variables that affect the smoking status of eligible women in poor households include the area of residence, age, highest educational level, working status, exposure to mass media, partner's working status and the number of household members. While the variables that do not affect the smoking status of eligible women in poor households include the highest educational level by the partner's and the number of children 5 and under in the household.
3. Eligible women in poor households will have a tendency to have smoking status with characteristics of living in urban areas, getting older in age, having lower than junior high school level completed education, working, never accessing mass media, having a partner who does not work and living with a big number of household members.

6. Recommendation

Based on the results and discussion as well as the conclusions above, the suggestions that can be provided are as follows:

1. The government should be more assertive and sanctions the violators of regulations prohibition the advertising, promotion and sponsorship of cigarette products.
2. The government should strictly monitor the implementation of the 12 (twelve) year compulsory education because women who smoke in poor households are more likely to have lower than junior high school.
3. Furture study can examine the interaction between independent variables that are suspected to have a correlation, such as education and work status. In addition, the relationship between women's smoking status and the smoking status of their partners and other family members can be investigated more. Furthermore, in using the exposure to mass media variable, individuals who

have accessed mass media can be categorized into individuals who access mass media almost every day.

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