

# The Determinant of Smoking Behaviour Among Female Worker in Southeast Asia: A Case Study Among The Philippines and Indonesian

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## Research Article

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# Abstract

## Background

The prevalence of tobacco use in Southeast Asia communities is 56% which 15% of them are female active smokers. Several studies explain that working status, neighborhood, marital status, and education are factors that cause smoking behavior in women. A scientific study is needed to obtain valid assumptions regarding the relationship of these determinants. This study aimed to analyze the determinant of smoking behavior among female workers in the Philippines and Indonesia.

## Methods

The data is processed from 2017 PDHS and use female workers in the Philippines and Indonesia as the study population. The sample size is 11,375 female workers in the Philippines and 26,712 female workers in Indonesia. Apart from smoking behavior as the dependent variable, other variables analyzed were the place of residence, age, marital, education, parity, currently pregnant, and wealth status. The analysis in the final stage uses binary logistic regression.

## Results

The results show that female workers in both countries from urban areas have a higher likelihood of becoming smokers than those who live in rural areas. Age group is finding as one of the smoking behavior determinants among female workers in both countries. Female workers with long-distance marriage and married / living with a partner have a lower probability of becoming a smoker than those who have marital status in the widowed/divorced category. Education level and parity are also finding as one of the smoking behavior determinants among them. Meanwhile, pregnancy found to be a protective factor for them to become a smoker. Finally, the multivariate test results found that wealth status is also a determinant of smoking behavior for female workers in both countries.

## Conclusions

It was concluded that the seven variables analyzed are the determinants of smoking behavior among female workers in the Philippines and Indonesia. The seven variables are type of place, age, marital, education, parity, pregnancy, and wealth status.

## Introduction

The increasing of smoking prevalence is still a public health problem, especially among women <sup>1,2</sup>. Data from the World Health Organization (WHO) states that tobacco is one of the biggest public health threats in the world, which causes more than 8 million deaths every year. More than seven million of these deaths

are due to smoking behavior and around 1.2 million due to exposure to secondhand smoke, with 8% of smokers is a group of young women in 2014 <sup>2</sup>.

Globally, around 10 million women died from the use of tobacco products (cigarettes) between 1950 and 2000. However, The estimate to tobacco-related deaths among women in the world have the potential to more than double by 2030 <sup>3</sup>. In the Southeast Asia region, as the representative developing countries (Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and others) cigarette is still a major health issue <sup>4</sup>. The prevalence of tobacco use in people in the Southeast Asian region is 56%, and 15% of them are women who are active smokers <sup>2</sup>.

The nicotine content in cigarettes has a more dangerous effect on women than men <sup>5</sup>. Female smokers are ten times more at risk of lung cancer, cervical cancer, and blockage of blood vessels than women who do not smoke. In addition, infertility, menstrual cycle disorders are some other health problems faced by female smokers <sup>6,7</sup>. Demographic, socio-economic, and environmental factors are other factors of smoking behavior among women <sup>6,8</sup>. Another study states that the group of pregnant women who experienced attention deficit hyperactivity disorder tended to have longer-lasting smoking behavior <sup>9</sup>.

Several determinants that affect smoking behavior in people in developing countries such as the Gender, education level, income per capita, ownership of health insurance, and occupational factors are several determinants of smoking behavior among people in developing countries such as the Philippines <sup>10</sup>. We also know that smoking behavior is because of social pressure at work, physical activity disorders, sleeping difficulties <sup>10,11</sup>. A study on smoking behavior in Indonesian women as a risk factor for breast cancer has been conducted by <sup>12</sup>. It shows, there is a statistical relationship between the smoking histories of more than 12 months with the incidence of breast cancer. Research conducted by <sup>6,13</sup>, also explains that smoking habits has a close relationship with the level of health literacy, marital status, age, and employment. This research is supported by the previous study conducted in other developing countries (South India), which shows people in remote rural areas with low literacy levels and employment status are the main factors in smoking behavior <sup>14</sup>.

Smoking behavior among women in urban areas has a statistically significant relationship with women's age, education level, type of work, and marital status <sup>15</sup>. It is known that there is a tendency for women who have a low per capita income to have a higher level of consumption, so that the tendency of women to also participate in seeking additional income through other informal jobs <sup>13,15</sup>. Based on the Maternal and Child Health Profile (2020), the number of working mothers or women in urban and rural areas do not have a big difference, namely working mothers have higher health complaints (29.62%) than mothers who do not work (27, 32%) <sup>16</sup>. This is supported by previous research, which explains the type of work level and the level of knowledge of women in Indonesia have a statistical correlation in smoking families, especially in rural areas <sup>14,17</sup>.

The increase of smoking habits in younger women and girls as an implication of the poor lifestyle patterns and smoking behavior prevention treatment can affect the level of smoking prevalence on women in the future<sup>11</sup>. Various studies have been conducted in analyzing smoking behavior on women, however, the specific content regarding the determinants of smoking behavior on women who work in developing countries such as the Philippines and Indonesia is still limited. A deeper study is needed to obtain valid and accurate statistical assumptions to provide comprehensive information to describe the social determinants of smoking behavior on women working in the two countries.

## **Methods**

### **Aim of study**

Based on the background description, this study aims to analyze the determinant of smoking behavior among female workers in the Philippines and Indonesia.

### **Data Source**

The data analyzed in this study are sourced from the 2017 Philippine Demographic Data Survey (PDHS) and the 2017 Indonesian Demographic Data Survey (IDHS). The PDHS and the IDHS was part of the international Demographic and Health Survey (DHS) program conducted by the Inner City Fund (ICF). The study population is all female workers in the Philippines and Indonesia. DHS samples were taken through stratification and multistage random sampling methods. The unit of analysis in this study was female workers aged 15–49 years old. With the criteria for the unit of analysis, the weighted sample is 11,375 female workers in the Philippines and 26,712 female workers in Indonesia.

### **Data Analysis**

Smoking behavior is the dependent variable in this study. Smoking activity is the identification of smoking habits by the respondent during the interview. There are two types of smoking activity, which are non-smoking and smoking.

The independent variables examined in this research are type of place of residence, age group, marital status, level of education, parity, current pregnancy, and status of wealth. The category of place of residence is classified into urban and rural. This categorization applies to figures for the Philippines and Indonesia. The five-year age group is divided into 7 groups, namely 15–19, 20–24, 25–29, 30–34, 35–39, and 40–45. Marital status is classified into three classifications: long-distance marriage, married/partner-living, and widowed/divorced. Education standard is the acknowledgment of the last certificate they have by the respondent. The degree of education is classified into 4 classifications, i.e. no education, basic, secondary and higher. Parity is the number of babies born who are alive. There are three types of parity, namely prim parous (< 1), multiparous (2–4) and grand multiparous (> 4). Pregnancy is classified into two categories, namely not pregnant at present (No) and pregnant at present (Yes).

The wealth status was based on a household-owned quintile of wealth. Households were scored on the basis of the numbers and types of things they had, from televisions to bicycles or vehicles, and the characteristics of accommodation, such as drinking water, toilets and key construction materials for the floor of the house. This score was determined using the key component analysis. National wealth quintiles were arranged on the basis of household scores for each household person and then divided into the same five groups, each accounting for 20% of the population. The wealthiest classes, namely lowest, poorest, middle, richer and richest, were divided into 5 groups.

The dependent variable being studied is a dichotomous variable, so the chi-square is used for bivariate regression at the initial level. Binary logistic regression is used in the last step to examine the determinative smoking habits of female workers in the Philippines and Indonesia because of the existence of the reliance component. The whole method of research uses the program IBM SPSS 21.

## Ethical Approval

The 2017 PDHS and the 2017 IDHS have obtained ethical clearance from the National Ethics Committee in the Philippines and Indonesia. 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 2017 IDHS data and the 2017 PDHS through the website: <https://dhsprogram.com/data/new-user-registration.cfm> for the purposes of this study.

## Results

### *Descriptive Analysis*

Table 1 shows descriptive statistics of female workers in the Philippines and Indonesia. Based on the type of place of residence, it can be seen that in both countries, neither smoking nor smoking are dominated by female workers who live in urban areas. Based on the age group, smoker female workers in the Philippines are dominated by the 20-24 age group, while Indonesia is dominated by the 35-39 age group.

Based on marital status, female workers in both countries are dominated by those who are married/living with partners. Meanwhile, based on education level, smoker female workers in both countries are dominated by female workers with secondary education. Based on parity, the smoker female worker in the Philippines is dominated by prim parous women, meanwhile in Indonesia dominated by multiparous women.

Based on currently pregnant status, female workers in both countries are dominated by those who are not pregnant. Finally, based on wealth status, female workers in the Philippines are dominated by women with wealth status in a richer category, meanwhile in Indonesia dominated by women with wealth status in the poorer category.

### *Multivariate Analysis*

Table 2 displays the results of binary logistic regression of smoking behavior among female workers in the Philippines and Indonesia. Female workers in urban Philippines are 1,299 times more likely to become smokers than female workers in rural Philippines (AOR 1,299; 95% CI 1,299-1,299). On the other hand, female workers in urban Indonesia are 1,503 times more likely to become smokers than female workers in rural Indonesia (AOR 1.503; 95% CI 1.502-1.503).

Based on age group, female workers in all age group in Philippine have a higher likelihood of becoming a smoker than the 45-49 age group. Meanwhile, in Indonesia shows a more random AOR than the 45-49 age group.

Based on marital status, female workers with marital status never in union and married / living with a partner have a lower likelihood of becoming a smoker than those who have marital status in the widowed/divorced category. This condition applies to both countries, although in Indonesia the chances of female workers with a marital status of never in union and married / living with partners to become a smoker are even smaller. Education level is also found as a determinant of smoking behavior among female workers in both countries. Education level in the Philippines seems to have the possibility to become a smoker with a random pattern. Meanwhile in Indonesia, shows a tendency that the better the level of education, the less likely a female worker is to become a smoker. Based on parity, female workers in all category in Philippines and Indonesia have a lower chance of becoming a smoker than grand multiparous female workers.

Female workers who are not currently pregnant in the Philippines are 2,774 times more likely to become a smoker than female workers currently pregnant (AOR 2,774; 95% CI 2,772- 2,776). On the other hand, female workers who are not currently pregnant in Indonesia have 1,430 times more chances of becoming a smoker than female workers who are currently pregnant (AOR 1,430; 95% CI 1,429-1,431). This information shows that currently pregnant is a protective factor for female workers in both countries to become a smoker.

Table 2 informs that wealth status is also a determinant of smoking behavior for female workers in both countries. Wealth status in the Philippines seems to have the possibility to be a smoker with random patterns. Meanwhile, in Indonesia, there is a tendency that the better the wealth status is, the less likely it is for a female worker to become a smoker.

## Discussion

The results of the analysis inform that female workers in urban areas in both countries have a higher probability of becoming smokers than those living in rural areas. The urban area is defined by <sup>19</sup> as an area that can be seen from several aspects, including population, infrastructure, and public facilities. Thus, with various kinds of facilities in the urban area and easy access to these existing facilities, female workers have the potential to become smokers. This is in line with research conducted in Indonesia by <sup>20</sup>

which states that the female respondents of the study in Surabaya (one of the major cities in Indonesia) smoked 13 cigarettes a day in a day.

Other studies show similar findings from this study, such as research conducted by <sup>21</sup> in Shanghai, stated that there are a small proportion of migrant workers in Shanghai who are female smokers. Another study in Indonesia, also shows that women living in Yogyakarta (another big city in Indonesia) compensate for their stress feelings by smoking <sup>22</sup>. Studies in China regarding female students who smoke with urban and rural backgrounds state that the prevalence of smoking students in urban settings is higher than that of smoking students in rural settings <sup>23</sup>.

The results of the study found that the age group is one of the determinants of smoking behavior among female workers in the Philippines and Indonesia. The age group of 45-49, have a smaller risk of smoking than other age groups. Human age can be divided into several periods, according to <sup>24</sup>, there are at least 8 age periods, and the 45-49 age group is an age group known as middle adulthood. At the age of 45-49, people feel in good condition, so that the relative problem does not become a psychological burden, so that the risk of smoking becomes small. This is different from the age group below which psychologically still sees a problem as a burden, so that it has the potential to engage in smoking as a coping mechanism.

Research conducted by <sup>25</sup> supports the above statement, that there are some young women in China's Shandong Province who smoke, either with the classification of "ever smoked" or "frequently smoked" in 30 last day. Study conducted in the America by <sup>26</sup> is in line with what was found from this study, namely that the number of female smokers is dominated by the 26-44 year age group. However, a different situation exists in Australia, <sup>27</sup> stated that the age group categorized as middle age has a smoking prevalence rate that is quite high compared to the age groups below it.

The binary logistic regression results found that marital status is one of the determinants for female workers in the Philippines and Indonesia to become a smoker. Female workers with marital status never in union and married / living with a partner have a lower probability of becoming a smoker than those who have marital status in the widowed/divorced category. The problems faced by widowed women are increasingly complex and varied, including violence, nutritional status, and reproductive health <sup>28</sup>. The complexity of these problems can be categorized as stressful life events <sup>29</sup> of a window which can then trigger smoking as a coping strategy <sup>30</sup>.

Research conducted in the Netherlands, widows' groups also smoke, not only conventional cigarettes, but also using electronic cigarettes <sup>31</sup>. Another study by <sup>32</sup> which aims to shed light on one side of the contentious debate just outlined by investigating whether e-cig advertising on television and in magazines encourages adult smokers to quit. From this study, one of the findings that are in line with the research findings is that the widow group also does smoking activities. Other findings from existing research are from <sup>33</sup>, stated that the group of widows who smoke in Korea makes up nearly 10% of the research respondents.

The analysis also reveals that the level of education is found to be one of the determinants of smoking behavior among female workers in the Philippines and Indonesia. A phenomenon that illustrates that a person's education level can influence his decision to smoke or not. Research conducted by <sup>34</sup> stated that there are several aspects in the context of the level of education that affect a person's smoking behavior. Research conducted in Italy <sup>35</sup> found that the prevalence of smoking in the group with a high level of education (university graduation) was lower than in other groups.

The phenomenon of the prevalence of female smokers with a low level of education was also found in studies in China. The study found that education level was significantly related to smoking behavior <sup>36</sup>. Another study conducted in Japan found a similar pattern, namely that in the group of female smokers, the level of education was significantly associated with current smoking behavior <sup>37</sup>. Also, research conducted by (Justus, SantAnna, Davanzo, & Moreira, 2020) in Brazil found a similar pattern to the above research, namely that higher education levels are associated with lower smoking probability and lower daily consumption intensity.

Moreover, parity is informed as a determinant for female workers to become smokers in the two countries. This study found that female workers who were grand multiparous had a lower risk of smoking compared to other age groups. The reason the multiparous group has a low risk of smoking, among others, is because they have a strong desire and commitment not to become pregnant while pregnant, this is related in several studies, including <sup>39</sup>, <sup>40</sup> and <sup>41</sup>.

Research in other countries shows more or less the same pattern, including research conducted in Ireland which found that smoking rates in the grand multiparous group were quite low compared to other groups <sup>42</sup>. The same research results were also found by <sup>43</sup>, that multiparous women are less likely to quit on their own. Meanwhile, research conducted in Greece by <sup>44</sup>, found different things, namely that the multiparous group was less likely to quit smoking when pregnant.

The analysis result found that currently pregnant is a protective factor for female workers in the Philippine and Indonesia to become a smoker. This reinforces the concept that pregnant women who smoke have a health risk, both for the mother and for the fetus/womb. <sup>45</sup> states that smoking during pregnancy increases the risk of health problems for developing babies, including preterm birth, low birth weight, and birth defects of the mouth and lip. Smoking during and after pregnancy also increases the risk of sudden infant death syndrome (SIDS) <sup>46</sup> stated that the harm from cigarette smoking is primarily from carbon monoxide and tar, which contribute to the complications seen during pregnancy. Nicotine alters fetal brain development and contributes to behavioral disorders in the offspring of smokers.

Research on pregnancy and smoking behavior shows some interesting things to explore. Research conducted by <sup>47</sup> identifies the prevalence of smoking during pregnancy, and the general result is that globally the figure is relatively small, namely 1.7%. Meanwhile, the highest prevalence of smoking during pregnancy was in the European Region (8.1%, 4.0–12.2), and the lowest prevalence of smoking during pregnancy was in the African Region (0.8%, 0.0 – 2.2). Meanwhile, in China, research conducted by <sup>48</sup>



stated that based on their research results there are about 82.9% of smoking women quit smoking after they were pregnant, and the prevalence of smoking among pregnant women was 3.8%.

The multivariate test results found that wealth status was also a determinant of smoking behavior for female workers in both countries. The poor cannot be separated from their dependence on cigarettes for several reasons, including stress relievers, cheap free time, compensation for loneliness, separation, or termination of employment <sup>49</sup>. The Truth Initiative, one of the NGOs engaged in tobacco control, states that the causes of the poor are still caused by the programs developed by the cigarette industry, including the proliferation of cigarette sales places, massive cigarette advertisements, and cheap cigarette prices <sup>50</sup>.

Research conducted by <sup>51</sup> stated that living in a poorer environment presents a unique risk for smoking among adults aged 30 to 39 years and over. Other studies in China also produced the same findings, <sup>52</sup> stating that the lower the socio-economic conditions of the respondents, the higher the prevalence of smoking. Research by comparing several countries conducted by <sup>53</sup> also shows a pattern, namely that the lower the socioeconomic level of a group, the higher the smoking behavior level of that group.

## Conclusions

Based on the research results, it can be concluded that the 7 variables analyzed were determinants of smoking behavior among female workers in Philippine and Indonesia. The seven variables are type of place of residence, age group, marital status, education level, parity, currently pregnant, and wealth status.

## Declarations

**Ethics approval and consent to participate:** Not applicable

**Consent for publication:** Not applicable

**Availability of data and materials:** All data generated or analyzed during this study are included in this published article

**Competing interests:** The authors declare that they have no competing interests

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**Authors' contributions:** HM and ADL conceived of the presented idea. ADL developed the theory and performed the computations. HM and RHI verified the analytical methods. ADL and RHI interpreted the data. HM and ADL drafted the manuscript and substantively revise it. All authors discussed the results and contributed to the final manuscript.

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## Tables

Table 1  
Descriptive statistics of female workers in Philippine and Indonesia in 2017

Variables	Philippine (n = 11,375)			Indonesia (n = 26,712)		
	Smoking Behaviour			Smoking Behaviour		
	No	Yes	p	No	Yes	p
Type of place of residence	***0.000			***0.000		
• Urban	51.8%	57.8%		52.8%	54.2%	
• Rural	48.2%	42.2%		47.2%	45.8%	
Age group	***0.000			***0.000		
• 15–19	4.8%	4.6%		6.7%	1.8%	
• 20–24	15.4%	19.3%		12.4%	8.3%	
• 25–29	15.7%	14.7%		13.5%	9.0%	
• 30–34	14.3%	17.3%		15.0%	14.6%	
• 35–39	18.0%	16.7%		17.9%	23.8%	
• 40–44	15.6%	13.8%		17.6%	19.7%	
• 45–49	16.1%	13.7%		16.9%	22.8%	
Marital status	***0.000			***0.000		
• Never in union	28.4%	34.0%		18.0%	10.4%	
• Married/Living with partner	65.3%	56.4%		75.4%	68.8%	
• Widowed/Divorced	6.3%	9.6%		6.6%	20.7%	
Education Level	***0.000			***0.000		
• No education	0.8%	0.4%		1.9%	8.4%	
• Primary	12.8%	16.4%		29.0%	35.1%	
• Secondary	39.5%	44.3%		49.4%	45.8%	
• Higher	46.8%	38.9%		19.6%	10.7%	
Parity	***0.000			***0.000		
• Prim parous	47.6%	46.5%		43.4%	34.8%	

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

Variables	Philippine (n = 11,375)			Indonesia (n = 26,712)		
	Smoking Behaviour			Smoking Behaviour		
	No	Yes	p	No	Yes	p
• Multiparous	40.9%	38.2%		51.3%	51.1%	
• Grand multiparous	11.5%	15.2%		5.3%	14.1%	
Currently pregnant						***0.000
• No	97.4%	99.1%		97.0%	98.4%	
• Yes	2.6%	0.9%		3.0%	1.6%	
Wealth status			***0.000			***0.000
• Poorest	13.4%	14.4%		16.4%	26.1%	
• Poorer	16.4%	16.9%		17.2%	19.6%	
• Middle	19.1%	19.4%		19.6%	18.6%	
• Richer	22.7%	26.3%		22.0%	18.6%	
• Richest	28.5%	23.0%		24.8%	17.1%	
Note: *p < 0.05; **p < 0.01; ***p < 0.001.						

Table 2

The result of binary logistic regression of smoking behaviour among female workers in Philippine and Indonesia in 2017

Predictors	Smoking Behaviour					
	Philippine (n = 11,375)			Indonesia (n = 26,712)		
	AOR	LB	UB	AOR	LB	UB
Type of place of residence: Urban	***1.299	1.299	1.299	***1.503	1.502	1.503
Type of place of residence: Rural	-	-	-	-	-	-
Age group: 15–19	***1.105	1.105	1.106	***0.251	0.251	0.251
Age group: 20–24	***1.809	1.808	1.810	***0.684	0.683	0.684
Age group: 25–29	***1.425	1.424	1.425	***0.731	0.731	0.731
Age group: 30–34	***1.823	1.822	1.823	***1.039	1.039	1.039
Age group: 35–39	***1.305	1.305	1.306	***1.306	1.305	1.306
Age group: 40–44	***1.113	1.113	1.113	***0.968	0.968	0.968
Age group: 45–49	-	-	-	-	-	-
Marital: Never in union	***0.989	0.989	0.990	***0.378	0.378	0.378
Marital: Married/Living with partner	***0.568	0.568	0.568	***0.320	0.320	0.320
Marital: Widowed/Divorced	-	-	-	-	-	-
Education: No education	***0.640	0.639	0.641	***4.576	4.574	4.578
Education: Primary	***1.686	1.685	1.686	***1.526	1.526	1.526
Education: Secondary	***1.400	1.400	1.400	***1.515	1.514	1.515
Education: Higher	-	-	-	-	-	-
Parity: Prim parous	***0.493	0.493	0.493	***0.530	0.529	0.530
Parity: Multiparous	***0.675	0.675	0.675	***0.481	0.481	0.481
Parity: Grand multiparous	-	-	-	-	-	-
Currently pregnant: No	***2.774	2.772	2.776	***1.430	1.429	1.431
Currently pregnant: Yes	-	-	-	-	-	-
Wealth: Poorest	***1.106	1.106	1.106	***1.906	1.905	1.906

Note: 95% Confidence Interval; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.



Predictors	Smoking Behaviour					
	Philippine			Indonesia		
	(n = 11,375)			(n = 26,712)		
	AOR	LB	UB	AOR	LB	UB
Wealth: Poorer	***1.118	1.118	1.118	***1.586	1.586	1.587
Wealth: Middle	***1.129	1.129	1.129	***1.311	1.311	1.312
Wealth: Richer	***1.388	1.387	1.388	***1.145	1.145	1.145
Wealth: Richest	-	-	-	-	-	-
Note: 95% Confidence Interval; *p < 0.05; **p < 0.01; ***p < 0.001.						