Tobacco Farmer's Willingness to Pay for *Green Tobacco Sickness* Risk Mitigation

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Abstract

Tobacco farmers are at risk for disease due to work directly related to pesticide exposure and the absorption of wet leaf tobacco nicotine that is Green Tobacco Sickness (GTS). This study aimed to determine the value of Willingness to Pay (WTP) of tobacco farmers in the Jember Regency for health insurance because they are at risk of exposure to GTS disease. The method used in this research is a contingent valuation method (CVM). The sample of 394 respondents have interviewed. By binary logistic regression, it is showed that 64% of respondents are willing to pay health insurance, income, education level, and green tobacco sickness significantly influence the WTP, while age variable, family, and periods of work has no effect on WTP. The results of this study are expected to provide input to policy makers in the framework of providing health insurance for tobacco farmers of many regions in Indonesia.

Keywords: willingness to pay; contingent valuation method; Green Tobacco Sickness; health insurance.

1. Introduction

Farmers are very vulnerable to various aspects of life, especially health problems. Tobacco farmers are at risk of contracting Green Tobacco Sickness (GTS), a disease caused by pesticide exposure and tobacco leaf nicotine absorbed through the skin (Fotedar & Fotedar, 2017). The research has shown that the incidence of green tobacco disease (GTS) in tobacco farmers is 64% where new picker farmers are at greater risk than old picker farmers (Suprapto & Pradono, 2003). Sixty-six percent of tobacco farmers in Jember reported symptoms of GTS with symptoms found to be dizziness, nausea, and tiredness, with the percentage of avoidance not well below 65% (Rokhmah, 2013)

Indonesia is the fifth largest tobacco commodity-producing country in the world after China, Brazil, India, and the United States. Tobacco plantations in Indonesia are concentrated in three provinces, namely East Java (108,000 ha), Central Java (44,000 ha), and West Nusa Tenggara (22,000 ha). The highest proportion of tobacco farmers in Indonesia in 2016 was the province of East Java at 62.61% of 561,586 farmers (Direktorat Jenderal Perkebunan, 2016). One of the biggest contributors to tobacco production in East Java is Jember. The total of 24,616 tobacco farmers spread across 24 sub-districts, Jember was able to produce 18,552 tons of tobacco covering an area of 10.009 ha in 2015. Tobacco farming is a sector that plays an important role in increasing

the Local Revenue (PAD) of Jember due to the large domestic and foreign market demand for tobacco commodities. Jember Regency's tobacco commodity exports reached USD 39,289,667.35 or 71.25% of all sectors in Jember in 2004. For contributing to Local Revenue (PAD), tobacco farming reducing the number of unemployment. The target of the total production of tobacco commodities highly depends on the level of productivity of tobacco farmers. But the level of productivity of individual tobacco farmers is influenced by many factors one of them is health status.

Health status is one indicator of a good life because every job has risks that can affect the health of its workers, as well as the risks faced by tobacco farmers. The health level of tobacco farmers certainly needs to be maintained properly, because poor health conditions will reduce the level of productivity of workers in tobacco farming which then has an impact on overall tobacco production. Regarding the health risks faced by tobacco farmers, every worker in tobacco farming has different preferences and treatments. Different individual health insurance choices are caused by differences in risk preferences (Friedman, 1974) . So that the difference in preference will further influence an individual's decision to purchase health insurance and the amount of willingness to pay an insurance premium.

Several previous studies have found that blood pressure and blood sugar have a significant effect on subjective health status which in turn influences the value of WTP and individual decisions in health insurance ownership (Restiatun & Sugiyanto, 2014), besides the ability to pay, and the existence of savings for health care costs has a significant effect with WTP (Handayani et al., 2013). Income influences the willingness to pay for health insurance (Ahmed et al., 2016; Aryani & Muqorrobin, 2013; Babatunde et al., 2016; Bärnighausen et al., 2007; Khatiwada et al., 2017; Lofgren et al., 2008; Santosa, 2016), as well as the level of education that has a significant effect on the WTP (Ahmed et al., 2016; Aryani & Muqorrobin, 2013; Khatiwada et al., 2017; Lofgren et al., 2008). The age and number of family members showed a negative relationship with WTP (Aryani & Muqorrobin, 2013; Santosa, 2016). Sunarjito and Wibowo (2014) suggested that the duration of the project had a significant effect on health insurance WTP. However, a study conducted regarding the willingness to pay for health insurance states that education, age, number of family members, gender, income, and the quality of health services do not significantly influence willingness to pay (Nguyen & Hoang, 2017). There have been limited studies concerned on WTP tobacco farmers for health insurance. Therefore, this study intends to find out how much willingness to pay and what factors affect the willingness to pay of tobacco farmers in Jember to pay for health insurance with the contingent valuation method.

2. Methods
2.1 Study site

This research was conducted in Jember. The research was conducted in three districts namely Silo, Mayang, and Balung. The three districts are one of the tobacco-producing areas in Jember. The data is collected by survey. The subjects in this study refer to tobacco farmers in Jember. One of the biggest contributors to tobacco production in East Java is Jember Regency. The number of tobacco farmers was 24,616 in 2015, spread in 24 districts. Jember Regency produces 18,552 tons of tobacco in tobacco fields covering an area of 10.009 Ha. Central Statistics Agency of Jember reported that Jember Regency's tobacco commodity exports reached USD 39,289,667.35 or 71.25% of all sectors in Jember in 2004. The tobacco farmers referred to by respondents are farmers who work and deal directly with tobacco leaves, which are then classified according to the type of work, namely: farmers who own land, farm laborers, and factory workers. The survey conducted in august until October, 2017.

2.3 Survey design and administration

Willingness to pay in this study is the willingness to pay respondents to health insurance for the risk of exposure to green tobacco sickness. To formulate the value of willingness to pay, researchers first conducted a Focus Discussion Group (FGD) for 12 tobacco farmers and 3 workers in tobacco warehouses to determine initial bids. Starting by determining the initial bid value of IDR25,500, the value was taken from the BPJS class III health tariff, then the researcher increased the offer by IDR3,500. From the FDG, the average value is then calculated, which is then used as the amount of willingness to pay with the dichotomous model. The average yield is IDR26,400. This amount used as a dependent variable was 1 if respondents agree to pay IDR26,400 for health insurance premium; 0 if otherwise.

Data collection techniques used in this study were direct interviews through questionnaires given to the respondents. The questionnaire consisted of 3 parts, part A described the characteristics of the respondents (gender, age, occupation, marital status, education, income, length of work, land area). Part B is the willingness to pay (WTP health insurance, BPJS participants or other health insurance), and Part C questions health status (knowledge of GTS, symptoms of GTS, visits to clinics in the past month, health care costs).

The sampling technique in this study is based on a purposive sampling technique, where the determination of the sample is done intentionally and only on the consideration of the researcher who considers the desired elements already exist in the sample members taken. The number of samples in this study was determined based on the Slovin formula with the desired percentage of error of 5%. The population in this study is based on the number of tobacco farmers in Jember. Obtained a sample of 394 respondents.

2.4 Data analysis

Research using the Contingent Valuation Method (CVM) has been widely carried out and used to estimate the average or the value of willingness to pay. The advantage of using the contingent valuation method is that when used appropriately this technique is the most appropriate method for estimating the economic value of a public good (Saptutyningsih, 2007). . This research was measured using the Contingent Valuation Method (CVM). To determine the amount of Willingness to Pay (WTP) in research researchers used the single-bounded dichotomous choice method. Where the respondent's answer regarding willingness to pay there is only two possibilities namely "Yes" or "No". The dichotomous choice method is very suitable to be used in the Contingent Valuation Method (CVM) approach compared to other methods, this is because in the use of the dichotomous choice method is closer to market behavior where consumers have a choice of buying or not at the price offered (Bateman et al., 2002) .

Primary data processing is done by the SPSS program using binary logistic regression analysis. Binary logistic regression analysis is an analysis tool used when the dependent variable of a study is a dummy variable, so binary logistic regression can be used in calculating the value of willingness to pay with the dichotomous method. In binary logistic regression, a heteroscedasticity test is also not necessary, because in the binary logistic regression, the homoscedasticity test on the dependent variable is not necessary for each independent variable (Gujarati, 2009). The model that will be estimated in this study is shown by the following function:

$$\text{Log}_e\left[\frac{\{p(y=1)|X_1 \ldots X_p\}}{\{1 - p(y=1|X_1 \ldots X_p\}}\right] = \text{Log}_e\left[\frac{\pi}{1-\pi}\right] =$$

$$\alpha + \beta_1 x_1 + \cdots \beta_1 x_{p1} = \alpha + \sum_{j=1}^p \beta_j x_j \qquad (1)$$

Table 1. The definition of operational variables

Categories	Variables
Willingness to pay	Willingness to pay is the maximum amount that respondents would like to pay Rp26,400 (1: yes, 0: no)
Occupation	The average monthly income of respondents from tobacco farming activities (rupiah)
Education	Based on the last level of formal education that has been taken
Age	Age of the respondents. Calculated on a continuous scale in units of years from the respondent's birth year
Number of family size	The amount of family size to meet the accrued needs
Length of work	The length of time that respondents worked as tobacco farmers (years)
Symptoms of green tobacco sickness	Symptoms of green tobacco sickness experienced by respondents (1: yes experienced, 0: did not experience)

Table 2. Regression Result

Variables	Odds ratio	Stand. error
Occupation	1.000**	0.000
Education	1.132***	0.042
Age	1.014	0.012
Number of family size	1.185	0.108
Length of work	0.992	0.010
Symptoms of *green tobacco sickness*	0.516***	0.226
Nagelkerke R^2	0.130	
Constant	0.473	0.671

Why was the age and number of family size chosen as the determining variable for the WTP? Is there any underlying research?

3. Results and Discussion

From the results of direct interviews with researchers of 394 respondents, it showed that 94% of respondents did not know about green tobacco sickness, while 6% of them knew about the disease. There are 55% of respondents who have experienced symptoms of green tobacco sickness with symptoms experienced are itching of the skin, small black spots until red spots appearing on sensitive skin, nausea, no appetite when inhaling tobacco leaves that smelled thick, and often feel dizzy to cough, and shortness of breath when working, and the remaining 45% of respondents claimed to have never experienced these symptoms. It is known that the percentage of respondents at 57% do not yet have or are registered as BPJS or other health insurance participants. Most of them generally claim to be too heavy if they have to pay health contributions every month with insufficient income. In addition, their knowledge about BPJS is still low, this was seen when conducting direct interviews and asking for their participation in BPJS, most were not aware of BPJS. Respondents who have become BPJS participants are 43%. Based on the results of research conducted on 394 respondents, 64% were willing to pay for health insurance because they were at risk of exposure to green tobacco sickness, while 36% of respondents were not willing to pay for health insurance.

This study found that income has a positive and significant effect on tobacco farmers' willingness to pay due to exposure to green tobacco sickness where when there is an increase in income

the respondent will increase the willingness to pay for health insurance. This result is supported by previous studies related to willingness to pay for health insurance in Nepal stating that income variables have a positive effect on willingness to pay (Khatiwada et al., 2017).

Education has a positive and significant relationship with willingness to pay for health insurance, so the higher the level of education taken by respondents, the higher the willingness to pay for health insurance. That is because a person's knowledge of awareness to maintain health and prepare for the possibility of falling ill over the risk of exposure to green tobacco sickness is increases. Ahmed et al (2016) mentioned that education variables have a positive influence on willingness to pay.

Dependent Variable: willingness to pay of health insurance
*Significant at α = 0,1; **Significant at α = 0,05; ***Significant at α = 0,01

Age does not have an influence on willingness to pay, or there is not enough evidence that the age variable influences the probability of respondents to pay for health insurance. The number of family size has no effect on a person's tendency to pay for health insurance. This is because in actual conditions at the place of the study, respondents who work as tobacco workers, both factory workers, and farm laborers, are mostly women who are not heads of households, the results they get from working are generally used to meet kitchen needs. In addition to paying for health insurance such as BPJS is based on the number of family members, so the more the number of members covered the more the amount must be paid, which is then considered burdensome and reduces the tendency to pay for health insurance. Robby (2017) states that the variable number of family size does not influence on willingness to pay.

The length of the work variable does not have a significant effect on respondents' willingness to pay (WTP) for health insurance. Because most of the respondents have worked for years so that most of those who have long worked in the tobacco environment already know how to deal with the initial symptoms of green tobacco sickness, besides that along with their long-time working, it will be easy to adapt to the symptoms of green tobacco sickness experienced and become accustomed.

Symptoms of green tobacco sickness (GTS) have a positive and significant effect on willingness to pay through health insurance. When there is an increase in the symptoms of Green Tobacco Sickness (GTS) in respondents, it will increase the tendency to pay for health insurance. Fifty-five percent of respondents have experienced symptoms of green tobacco sickness. A history of illness or symptoms experienced by a person will increase the willingness to pay for health insurance contributions (Sihaloho, 2015). Several empirical studies have found that the insurance demand was influenced by the health status of respondents (Kerssens & Groenewegen, 2005; Machnes, 2006).

4. Conclusions

This study examines the willingness to pay for tobacco farmers' health insurance in Jember Regency because they are at risk of green tobacco sickness. The results showed that the willingness to pay tobacco farmers for health insurance amounted to 0.64% of the 394 respondents who were dominated by respondents who were willing to pay. The occupational risks experienced by tobacco farmers certainly need special attention. As one of the preventive actions from exposure to green tobacco sickness, given the health status of tobacco farmers also affects the level of productivity in their work so that the ownership of health insurance for tobacco farmers will better guarantee their health status in the future. This situation shows that both the government, stakeholders and health insurance providers need to expand access to health insurance that is affordable for tobacco farmers. In addition, the socialization and counseling about green tobacco sickness to tobacco farmers and the introduction

of health insurance can help spread prevention information especially for those with low levels of education.

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