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Research

Application Theory of Planned Behavior: Determinants of Behavior to Use Personal Protective Equipment among Tobacco Farmers in Temanggung, Central Java: A Multilevel Analysis

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ABSTRACT

Background: Tobacco farmers has the risk of being exposed by wet nicotine during harvesting tobacco leaves or is often called as Green Tobacco Sickness (GTS). GTS prevention can be conducted by using Personal Protective Equipment (PPE) before farmers harvesting tobacco leaves. Behavior in using PPE among farmers is affected by sex types, education, attitude, subjective norm, intention, and perceived behavioral control. The study aims to analyze the determinant of behavior to use PPE among tobacco farmers in Temanggung Regency, Central Java.
Subjects and Method: It was a cross sectional study, conducted in 25 villages in Temanggung Regency, August – October 2019. The sample was a total of 200 tobacco farmers. The sampling technique used was simple random sampling. Dependent variable of the study was behavior to use PPE among tobacco farmers. Independent variables of the study were sex types, education, attitude, subjective norm, intention, and perceived behavioral control. The data collection used was questionnaires and processed by using multilevel multiple logistic regression with Stata 13.
Results: The use of PPE among tobacco farmers during harvesting tobacco leaves was increased by male (b= 2.52; 95% CI= 1.39 up to 3.66; p<0.001), education ≥ High School (b= 2.15; 95% CI= 1.10 up to 3.19; p<0.001), strong famers' intention (b= 1.82; 95% CI= 0.13 up to 2.22; p= 0.027), positive farmers' attitude (b= 1.63; 95% CI= 0.58 up to 2.68; p= 0.002), supporting subjective norm (b= 1.74; 95% CI= 0.67 up to 2.81; p= 0.001), and strong perceived behavioral control (b= 1.53; 95% CI= 0.52 up to 2.54; p= 0.003).
Conclusion: Behavior to use PPE among tobacco farmers is affected by sex types, education, attitude, subjective norm, and perceived behavioral control.

Keywords: behavior to use PPE, farmers, theory of planned behavior

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BACKGROUND

Indonesia ranks the fifth as the producer of world tobacco with tobacco production of 135,678 tons or about 1.9% of world total tobacco production after China, Brazil, India, and USA. In 2012 Indonesia ranked the fifth with a total production of 226,704 tons or about 3.0% of the world total tobacco production (IAKMI, 2014). In national level, Indonesia has three provinces as the biggest tobacco suppliers namely East Java, West Nusa Tenggara, and Central Java. In 2010 tobacco production of the three provinces reached 118 thousand tons or 87% of national

tobacco production. Temanggung Regency is the biggest tobacco producer in Central Java with land area of 19,209 hectares and 64,030 farmers (Ditjen Perkebunan, 2016).

Tobacco is an annual crop in dry land with average planting period is 4 months in a year. The working life of the farm workers is 16.8 years in average and 7 hours a day (TSCS IAKMI, 2015). Tobacco farmers face the risk of being exposed by wet nicotine during harvesting tobacco or is often called as Green Tobacco Sickness (GTS).

Incidence level of GTS reaches 63.7% among harvesters of tobacco leaves. The symptoms of intoxication by wet nicotine are such as headache, nausea, vomiting, asphyxiation, and physical fatigue until unable to move body parts. Symptoms are appeared 3 – 17 hours after contact with tobacco for 1 – 3 days. Symptoms appear while being exposed to tobacco leaves. GTS symptoms may get reduced when tobacco leaves exposure is ceased (Ministry of Health, 2018).

Nicotine and dehydration are relatively harmful health threats in tobacco plantation area. Methods to reduce nicotine exposure are by giving education and information about the danger of GTS (wet nicotine intoxication) and also by training of diseases prevention. GTS prevention can be conducted by putting on Personal Protective Equipment (PPE) before farmers making contact with the plant. In addition of wearing PPE, the farmers are also enlightened about how to recognized GTS symptoms (OSHA, 2015).

Occupational Health and Safety is one of the important aspects because Occupational Health and Safety is closely related with the life of the farmers. All working areas actually possess danger potential. This danger potential that may lead to occupational accidents and dangers that may threaten the workers' life. In order to ensure the workers can work well, it requires accident prevention, counter measure, and management in working environment (Redjeki, 2016).

One of the health behavioral theories that can improve the effectiveness of personal protective equipment use among tobacco farmers is Theory of Planned Behavior (TPB), which is a behavioral theory that is often used to study various health behaviors. Theory of Planned Behavior elaborates that human behavior in general does not occur in sudden or unexpectedly instead it happens in planned manner through a construct that is called intention and is influenced by behavioral belief, behavioral control belief, and perceived behavioral control. Theory of Planned Behavior reveals that human makes rational decision to act.

Majority of tobacco farmers do not yet wear personal protective equipment during harvest therefore it requires further action. Theory of Planned Behavior approach is used to analyze the effort for improving behavior in using PPE among tobacco farmers. Therefore, the researchers were interested to conduct a study entitled "Theory of Planned Behavior: Determinants of Behavior to Use Personal Protective Equipment among Tobacco Farmers in Temanggung Regency".

SUBJECTS AND METHOD

1. Study Design

This was a cross-sectional study conducted in Temanggung Regency, Central Java Province.

2. Population and Sample

Population of the study was all tobacco farmers in Temanggung Regency during the month of August – October 2019. A total of 200 study subjects was selected for this study.

3. Study Variables

Dependent variable of the study was behavior to use PPE during harvesting tobacco leaves. Independent variables of the study were sex types, education, behavior, intention, subjective norm, and perceived behavioral control.

4. Operational Definition of Variables

Sex types was one's physical condition based on anatomy and physiology differences divided into male or female. The measuring instrument used was questionnaires. Categorical data scale coded 0 (female), 1 (male).

Education was the last formal education taken until getting a diploma. The measuring instrument used was questionnaires. Categorical data scale coded 0 (< High School), 1 (≥ High School).

Attitude was an effect of individual positive or negative feeling in conducting an action. The measuring instrument used was questionnaires. The continuous data scale was modified into dichotomous to facilitate data analysis coded 0 (not supporting), 1 (supporting).

Subjective norm was one's perception toward social pressure to conduct or not to conduct certain behavior to use PPE. The measuring instrument used was questionnaires. The continuous data scale was modified into dichotomous to facilitate data analysis coded 0 (not supporting), 1 (supporting).

Intention was respondents' seriousness to conduct change or behavior to use PPE. The measuring instrument used was questionnaires. The continuous data scale was modified into dichotomous to facilitate data analysis coded 0 (week), 1 (strong).

Perceived behavioral control was a perception that describe self-efficacy in conducting a behavior to use PPE. The measuring instrument used was questionnaires. The continuous data scale was modified into dichotomous to facilitate data analysis coded 0 (week), 1 (strong).

The use of PPE was the use of personal protection equipment among tobacco farmers during harvests time. The measuring instrument used was questionnaires. The continuous data scale was modified into dichotomous to facilitate data analysis coded 0 (incomplete PPE), 1 (complete PPE).

5. Data Analysis

Univariate analysis was used to generally describe each variable being studied including sex types, education, attitude, subjective norm, intention, perceived behavioral control.

Bivariate analysis was used to discover the effect of respective independent variable (sex types, education, attitude, subjective norm, intention, and perceived behavioral control) toward dependent variable (behavior to use PPE). Analysis data is conducted by Chi-square statistical test and odds ratio (OR) calculation with confident interval (CI) 95%.

Multilevel analysis was used to describe the effect of more than one independent variable namely sex types, education, attitude, subjective norm, intention, and perceived behavioral control. Variable in level one was individual, in this study was tobacco farmers. Variable in second level to be studied was village stratum.

6. Research Ethic

The study was conducted based on ethical approval. It was obtained from Health Research Ethics Committee of Dr. Moewardi Regional Hospital, Surakarta, Indonesia, Number 1,038/VIII/HREC/2019.

RESULTS

1. Univariate analysis

Univariate analysis was divided into two namely continuous data and categorical data. Frequency distribution of study variables in univariate manner described the general description of variables including sex types, education, attitude, subjective norm, intention, and perceived behavioral control. The test result of univariate analysis in Table 1 indicates that the average intention of tobacco farmers toward PPE use was 12.18.

The result of univariate analysis in Table 2 indicates that majority of respondents with a total of 101 were male (50.5%) and had low education level or under High

School with a total of 133 persons (66.5%). The majority of the farmers with a total of 111 (55.5%) had negative attitude. The majority of the farmers with a total of 106 persons (53.0%) had subjective norm which was not supporting. The majority of the farmers with a total of 108 (54.0%) had week intention. The majority of the farmers with a total of 130 (65%) had weak perceived behavioral control.

Table 1. Univariate analysis of study subjects' characteristics with continuous data

Variables	n	Mean	SD	Min.	Max.
Intention	200	12.18	3.28	7.00	18.00
Attitude	200	12.29	3.50	8.00	20.00
Subjective Norm	200	12.53	3.45	8.00	20.00
Perceived Behavioral Control	200	11.81	3.39	6.00	18.00

Table 2. Univariate analysis of study subjects' characteristics with categorical data

Variables	Frequency	Percentage (%)
Sex types		
Female	99	49.5
Male	101	50.5
Education		
<High School	133	66.5
≥ High School	67	33.5
Intention		
Weak (<12)	108	54.0
Strong(≥12)	92	46.0
Attitude		
Negative (<12)	111	55.5
Positive(≥12)	89	44.5
Subjective Norm		
Not Supporting (<13)	106	53.0
Supporting (≥13)	94	47.0
Perceived Behavioral Control		
Weak (<12)	130	65.0
Strong (≥12)	70	35.0

2. Bivariate Analysis

Table 3 indicates sex types (OR= 13.02; p<0.001), education (OR= 12.74; p<0.001, attitude (OR=4.73; p<0.001), subjective norm (OR=.05; p<0.001), perceived behavioral control (OR=10.00; p<0.001), intention (OR= 7.27; p<0.001).

Table 3. Bivariate Analysis by using chi-square of determinants of behavior to use PPE among tobacco farmers

Variables	The use of PPE				OR	p
	Not Using		Using			
	N	%	N	%		
Sex types						
Female	89	89.9	10	10.1	13.02	<0.001
Male	41	40.6	60	59.4		
Education						
<High School	111	83.5	22	15.7	12.74	<0.001
≥ High School	19	42.4	48	57.6		
Intention						
Weak	91	84.3	17	15.7	7.27	<0.001
Strong	39	42.4	53	57.6		
Attitude						
Negative	89	80.2	22	19.8	4.73	<0.001
Positive	41	46.1	48	53.9		
Subjective Norm						
Not supporting	88	83.0	18	17.0	6.05	<0.001
Supporting	42	44.7	52	55.3		
Perceived Behavioral Control					10.0	<0.001
Weak	104	83.9	20	16.1		
Strong	26	34.2	50	65.8		

3. The result of multilevel multiple logistic regression

Multivariate analysis in this study was conducted by using multilevel multiple logistic regression. Table 4 indicates there were the effects of sex types, education, attitude, subjective norm, intention, and perceived behavioral control toward the behavior to use PPE among tobacco farmers.

The use of PPE among tobacco farmers during harvesting tobacco leaves was increased with male (OR=13.02; p<0.001), education ≥ High School (OR=12.74; p<0.001), farmers' strong intension (OR=7.27; p=0.027), farmers' positive attitude (OR=4.73; p= 0.002), supporting subjective norm (OR= 6.05; p= 0.001), and strong perceived behavioral control (OR=10.00; p=0.003).

In the result of multilevel analysis in Table 4, village stratum did not have ecology effect toward behavior to use PPE among tobacco farmers with ICC < 0.001 %.

Table 4. Multilevel multiple logistic regression analysis about behavior to use PPE among tobacco farmers

Independent Variables	Regression Coefficient (b)	CI 95%		p
		Lower Limit	Upper Limit	
Fixed Effect				
- Sex types	2.52	1.39	3.66	<0.001
- Education	2.15	1.10	3.19	<0.001
- Intention	1.82	0.13	2.22	0.027
- Attitude	1.63	0.58	2.68	0.002
- Subjective norm	1.74	0.67	2.81	0.001
- Perceived Behavioral Control	1.53	0.52	2.54	0.003
Random effect				
- Village				
- Variables (constant)	< 0.001		.	
- N observation	200			
- Log likelihood	-5.84			
- LR test vs. Logistic regression test	p < 0.001			
- ICC	<0.001 %			

DISCUSSION

1. The effect of sex types toward behavior to use PPE among tobacco farmers

Sex types had a significant effect toward the behavior to use PPE among tobacco farmers. Male farmers increased the possibility to use PPE by 2.52 units higher than female farmers. Male farmers are more likely to use PPE because they are influenced by their surrounding since the majority of tobacco farmers are male. Males have better experience than females hence they are more compliant to use personal protective equipment during harvesting tobacco leaves. Sex types in theory of planned behavior is one's background to conduct certain behavior.

2. The effect of education toward behavior to use PPE among tobacco farmers

Education had significant effect toward the behavior to use PPE among tobacco farmers. Tobacco farmers whose education ≥ High School increased the possibility to use PPE by 2.15 units higher than farmers whose education < high school.

Farmers with sufficient knowledge about PPE will use PPE each time they conduct crop spraying. Level of education influences one's level of knowledge. A person with high level of education will strive to find information toward certain matter being conducted hence it increase knowledge and behavior to use PPE (Wismaningsih, 2015).

A study by Ediana (2017) stated that there is a respondent who have negative attitude, however he uses PPE because of sufficient level of knowledge about PPE and decent level of education.

3. The effect of intention toward behavior to use PPE among tobacco farmers

Education had significant effect toward the behavior to use PPE among tobacco farmers. Farmers with strong intention increased the possibility to use PPE by 1.82 units higher than farmers with weak intention. Eng and Parker (2002) stated that intention is a reason that directly precede behavior. Intention is determined by how far an individual has positive attitude on certain behavior and obtains support from other people who are influential in one's life (Sulaeman, 2016).

Intention is a component within an individual that refers to the desire to conduct certain behavior. Intention is defined as dimension of individual subjective probability in a relation with oneself and behavior. Intention is a determination to conduct certain activity or generate certain condition in the future. Intention is determined by attitude and subjective norm. The first component refers to an attitude toward behavior (Ajzen, 2005).

4. The effect of attitude toward behavior to use PPE among tobacco farmers.

Attitude had significant effect toward the behavior to use PPE among tobacco farmers. Positive attitude increased the possibility to use PPE by 1.63 units higher than farmers with negative attitude.

Attitude toward behavior is assessment in the form of positive and negative which is determined from behavioral belief conducted by individual (Ajzen, 2005). One's attitude is related to perception, personality, and motivation which arise as the reaction for the obtained experience or knowledge. Knowledge is closely related to education, the higher the education, hence the higher the knowledge (Endah, 2015). Some farmers feel comfortable in wearing PPE whereas some others do not feel comfortable. Farmers who do not feel comfortable consider that it is not necessary to wear PPE since it will disrupt and drag out the working process. Farmers should spare time to put on all equipment and wear the entire PPE (Adiana, 2017).

According to a study by Prakosa (2017) positive attitude will lead to low incidence of occupational accident. For example in a company where there are some regulations, they will have discipline and always comply with the company regulations. Having thinking pattern in which by being positive in attitude toward behaviour to use PPE during working, the workers will become secure and safe.

Workers' attitude is a positive assessment and evaluation on object of safety program policy and K3L (Health, Safety, Security and Environment) and compliance with the use of PPE. If behavior to use PPE is seen from the sides of comfort, benefits, and habit which are experienced, it is likely to be good and gives positive impact on compliance intention in using PPE (Hartoni, 2015).

The better and the more positive workers' attitude perspective toward the use of PPE hence the workers will be more intentional to comply with the use of PPE. If the workers experience the use of PPE which is getting more comfortable, beneficial, and becoming relatively accustomed to use it without complaining, hence the workers will be more intentional to comply with K3L policy in the form the use of PPE (Hartoni, 2015).

5. The effect of subjective norm toward behavior to use PPE among tobacco farmers

Subjective norm had significant effect toward the behavior to use PPE among tobacco farmers. Subjective norm increased the possibility to use PPE by 1.74 units higher compared to farmers who did not support subjective norm.

Subjective norm is one's perception to conduct or not to conduct behavior which is affected by social pressure toward behavior (Ajzen, 2005). However, there are findings that show a positive relationship between subjective norms and intentions when controlling attitudes (that is, benefits and obstacles). This might be due to different subjective norms (Fajriah, 2019).

The subjective norms can be measured through the influence of social groups that is a farmer who used the PPE in front of other farmers. Farmers who do not use PPE will feel uncomfortable in front of other farmers who use PPE. In measuring subjective norms through the family; a farmer who does not use PPE will be reprimand by another family member who uses PPE when harvesting tobacco leaves (Sulaiman, 2016). In addition,

social support also influences a person's behavior using PPE (Sari, 2019). In addition, social support also influences a person's behavior using PPE (Sari, 2019).

Subjective norms play a role as an individual's social control and order to comply under social pressure (Murti, 2018). Farmers will use PPE if the degree of influence of behavior from social control is strong.

Encouragement from the work place environments such as coworkers and superiors will influence or not affect the workforce in carrying out safety behavior intentions. The more that affects the individual, the more influential to behavior changes (Jogiyanto, 2007 in Prakosa, 2017).

6. The effect of perceived behavioral control toward behavior to use PPE among tobacco farmers

Perceived behavioral control had significant effect toward the behavior to use PPE among tobacco farmers. Farmers with strong perceived behavioral control increased the possibility to use PPE by 1.53 units higher than farmers with weak perceived behavioral control.

A person has control to conduct behavior. The person will conduct a behavior after conducting evaluation positively, the occurrence of social pressure, having a belief that the person is able to conduct a behavior and there is an opportunity to conduct behavior (Sulaeman, 2016). Perceived behavioral control is a self-belief within a worker's self in changing his/her behavior which is affected by the level of difficulty and easiness, experience, information, and how big the opportunity is given to the worker (Prakosa, 2017).

Fishbein and Azjen stated that perceived behavioral control represents self-efficacy or individual capability in conducting certain behavior. The control possessed by an individual is related to a certain behavior. Perceived behavioral control is a belief on whether factors which facilitate or obstruct individual to conduct a certain behavior, do exist or not (Sulaeman, 2016). In addition according to Setyowati (2019), behavior is indirectly affected by attitude, subjective norm, perceived behavioral control, and normative beliefs, and behavioral control.

It is in line with a study by Andriany (2019) which indicated the existence of significant correlation between perception and behavior to use PPE. Perceived benefit of a behavior is a positive mental representation or a consequence that motivate a behavior. An individual expects to get involved in a certain behavior to get the expected benefits (Andriany, 2019).

The higher the perceived behavioral control which is sensed, characterized by the existence of capability to use PPE and the existence of facility PPE, hence the intention to conduct compliance with the use of PPE will be increased. Therefore, the behavioral control of the workers is getting higher and will be able to improve workers' intention to comply with occupational safety programs (Hartoni, 2015).

AUTHOR CONTRIBUTION

Yovita Eka Ratna Kumala conducted the study, formulated study article, and conducted data processing. Setyo Sri Rahardja contributed in study method and discussion. Endang Sutisna Sulaeman contributed in formulating research thinking framework.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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