Universitas Ahmad Dahlan Public Health Conference (UPHEC)
https://seminar.uad.ac.id/index.php/uphec/index
Volume Maret 2025

An Overview of Hygiene and Sanitation, Education, Household Income, and Child Nutrition Among Tobacco Farmers at Risk of Exposure To Green Tobacco Sickness In Tobacco Plantations in Jember Regency

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ARTICLE INFO

Article history:
Received Sept 16, 2024
Revised Sept 30, 2024
Accepted Oct 01, 2024

Keywords
Children;
Farmers;
Green tobacco sickness;

ABSTRACT

Background: The lives of tobacco farmers are highly vulnerable to health aspects and are at risk of occupational diseases related to pesticide exposure and nicotine absorption of wet tobacco leaves. In Indonesia, 63.7% of Indonesian tobacco farmers experience symptoms of green tobacco sickness (GTS) and 86.5% of them lack prevention of GTS.
Method: This study used a quantitative correlational research method aiming to examine the correlation between the variables of hygiene sanitation status, children's consumption patterns, farmers' education level, and family income on the nutritional status of children of tobacco farmers who are at high risk of exposure to GTS. Data collection in this study was carried out through interviews with food recall questionnaire accompanied by the calculation of body mass index (BMI).
Results: The results showed that the risk factors for green tobacco sickness in children are the quality of sanitary hygiene, children's consumption patterns, farmers' education level, family income and nutritional status of tobacco farmers' children.
Conclusion: Further research needs to be done whether there is a significant relationship between some of these factors and the incidence of GTS in children of tobacco farmers.

1. Introduction

GTS is caused by nicotine absorption through the skin when tobacco farmers work in wet fields without using personal protective equipment, tobacco leaf moisture from dew can contain 9 mg of dissolved nicotine per 100 ml of dew, contact exposure, and long time between the skin and tobacco plants (1). Diagnosis is based on abnormal cotinine levels, previous tobacco exposure, and supported by the appearance of symptoms of intoxication for up to 72 hours (2). The symptoms that will be caused by GTS are almost similar to the symptoms of pesticide poisoning, and can even be more severe, such as shortness of breath, blood pressure and pulse instability, fatigue from work until they cannot move their bodies (3). The risk of this disease can be experienced by anyone who can come into contact with tobacco leaves, including pregnant women, nursing mothers, and children (4).

Tobacco contains harmful chemicals that can affect farmers' health conditions. Hazardous chemicals that have been widely known are nicotine and carbon monoxide, while those that are still not

widely known are essential oils, pectic compounds, polyphenols, flavonoids, paraffin, and carotenoids (5,6). One of the harmful substances that needs to be considered is nicotine (C10H14N2). This is because nicotine can cause health problems, including abnormal respiratory responses (hypoxia, increased systole and diastole blood pressure, and increased heart rate) which cause cardiovascular changes; decreased respiratory pathways in infants and children, asthma in school-age children, and reduced lung function in children which has an effect on immune function, respiratory pathway characteristics, and lung development (7).

On the other hand, based on the 2021 Indonesian Nutrition Status Survey (SSGI) data, the incidence of stunting in Jember is still relatively high, with a prevalence of stunted toddlers of 23.9% of the total stunted cases in East Java of 23.5% and a prevalence of underweight toddlers of 19.8 of the total underweight cases in East Java of 16.1% (8). One of the direct causes of stunting is the health status of ARI and diarrhea infectious diseases (9,10). However, until now, there has been no detailed study of the relationship between stunting, specifically with infection from GTS disease. Thus, there is a need for further assessment of the factors of the high incidence of stunting in Jember Regency with direct infection factors involving GTS in Tobacco Farmers. The study results are expected to provide information for relevant agencies as a reference in policy formation and the need for preventive action related to stunting, as well as planning programs to increase public awareness of stunting and using personal protective equipment in tobacco farmers.

2. Method

This research uses a quantitative descriptive approach where descriptive research does not aim to test a particular hypothesis but only to describe the variables as a whole. This study aims to describe the frequency distribution between the independent variables, namely hygienic sanitation status, children's consumption patterns, farmers' education level, family income, on the dependent variable, namely and the nutritional status of children from tobacco farmers who are at high risk of being exposed to Green Tobacco Sickness.

The population in this study were wet tobacco farmers with children under five in Anjung Village, Jember Regency. The research technique used is non-probability sampling, which selects samples using purposive sampling. Based on the journal written by Heri Retnawati, the purposive sampling technique was used with consideration and objectives of the research (Heri Retnawati, 2017). The inclusion criteria in the sample selection were tobacco farmers in the wet tobacco section with children under five. The exclusion criteria are tobacco farmers who do not work in the damp tobacco section and tobacco farmers who do not have children under five

Data collection in this research was conducted through interviews with a food recall questionnaire instrument accompanied by body mass index (BMI) measurements in height and weight. This interview was aimed at mothers with toddlers who fit the sample criteria for this study because mothers, as the first caregivers, are considered to understand more about children's consumption patterns. Data obtained through interviews and BMI measurements were then processed using Nutri Survey 2007 software to determine the nutritional status of children. The child's nutritional status results are then analyzed concerning Minister of Health Regulation No. 2 of 2020 concerning Children's Anthropometric Standards (11). Apart from that, data was also obtained on the sanitary cleanliness status of families through a questionnaire on technical guidelines for assessing healthy homes according to the Indonesian Ministry of Health standards, as well as observations made during data collection. Data on the mother's education level was also obtained through questionnaires and interviews. The processed data is then analyzed using a univariate analysis method to get a frequency distribution function and a multivariate analysis method using a multiple logistic regression test to identify the strength of the relationship between the independent and dependent variables. This research has obtained a research ethics permit from the Universitas Negeri Malang ethics commission with registration number 6.4.2/UN32.14.2.8/LT/2024.

3. Result

Based on Table 1, the family income with the most responses is 13 respondents (37.1%) getting an income of Rp. 500,000 - Rp. 1,000,000, and the respondents with the least amount are getting an income of Rp.1,500,000 - Rp. 2,000,000.

Table 1. Frequency Distribution of Respondents Based on Family Income

Family Income	Frequency (n)	Percentage (%)
0 – Rp. 500.000	7	23,33
Rp. 500.000 – Rp. 1.000.000	12	40,00
Rp. 1.000.000 – Rp. 1.500.000	4	13,33
Rp. 1.500.000 – Rp. 2.000.000	2	6,67
Rp. ≥ 2.000.000	5	16,67
Total	30	100,0

The level of education referred to in this study is the last formal taken by the respondent (Table 2). Based on the results of the interview, the following data were obtained: 1 respondent (3%) did not attend school, 7 respondents (23%) had a elementary school, 11 respondents (37%) had a junior high school education and 11 respondents (37%) had a senior high school education.

Table 2. Frequency Distribution of Respondents Based on Education Level

Level Education	Frequency (n)	Percentage (%)
Not attend school	1	3
Elementary School	7	23
Junior High School	11	37
Senior High School	11	37
Total	30	100

Based on Table 3, the consumption patterns of children of tobacco farmers with the category of consumption patterns classified as good were 12 respondents (60%) and consumption patterns classified as unfavorable were 18 respondents (14%). Interpretation of the score results is based on the average value of food consumption scores in the population by determining the median value of the population. If the respondent gets a score above the median then the food consumption pattern score is good while the respondent gets a score below the median then the food consumption pattern score is not good. The average population value obtained from the results of all respondent questionnaires in this study is 361. If the respondent gets a score value below the average, the respondent's consumption pattern score is categorized as poor.

Table 3. Distribution of Results on Consumption Patterns of Farmers' Children

Pattern Consumption	Amount	Percentage (%)
Good	12	40
Poor	18	60
Total	30	100

Based on the results of the study, data on the knowledge of respondents as homeowners who are tobacco farmers are as follows: 5 respondents (16.6%) have knowledge of healthy homes with high criteria and meet the requirements, while the remaining 25 respondents (83.3%) have knowledge of healthy homes with low criteria and do not meet the requirements (Table 4).

Table 4. Distribution of Tobacco Farmers' Home Sanitation Hygiene Results

Sanitation	Frequency (n)	Percentage (%)
Qualified	5	16,6
Less qualified	25	83,3
Total	30	100

Based on the results of measurements of body weight and height carried out on children of tobacco farmers (Table 5), nutritional status was obtained in the category of good nutrition as many as 20 respondents (66.67%), undernutrition as many as 8 respondents (26.67%), obesity as many as 1 respondent (3.33%), and malnutrition as many as 1 respondent (3.33%).

Table 5. Distribution of Child Nutrition Status Results Based on BB/U

Child Nutrition (BB/U)	Frequency (N)	Percentage (%)
Good Nutrition	20	66,67
Undernutrition	8	26,67
Obesity	1	3,33
Malnutrition	1	3,33
Total	30	100

4. Discussion

The tobacco production process does not require any special skills in the work, so workers from any level of education can do it. However, education level certainly plays an important role in shaping consumption patterns and sanitation practices within the family. A person who reaches a higher level of education generally has a deeper understanding of the importance of sanitation and the implementation of sanitation practices in daily life. This fact is supported by research showing that higher education has the potential to form better awareness and knowledge of health and environmental issues, including awareness of how important it is to maintain personal hygiene and the surrounding environment (12).

In line with this, the results of a study of tobacco farmers in Jember, East Java, showed that the average percentage of knowledge of healthy homes and the application of sanitation hygiene were low. Sanitation hygiene data in this study is based on the Minister of Health Decree No. 829/Menkes/VII/1999 on health provisions in housing which includes components of home sanitation, sanitation facilities owned and also the behavior of residents towards awareness of the application of sanitation hygiene. Most of the respondents' houses have basic components even though the conditions do not entirely meet the requirements of a clean and healthy house. Houses that do not meet hygiene standards can certainly have a negative impact on health, including the risk of stunting in children (13). When a dwelling does not have a clean roof or permanent walls, the potential risk of exposure to diseases caused by pests and harmful microorganisms increases. This situation can pose a threat to the health of children under five and hinder the smooth absorption of optimal nutrition (14). Other components such as floors that do not meet quality standards or are not covered with ceramic tiles also have the potential to become a place of development for microorganisms such as germs, bacteria and parasites. The presence of these contaminates can increase the likelihood of infection and illness, which in turn can stunt a child's growth (15). In addition to the roof and floor, the lack of adequate ventilation also has the potential to cause poor indoor air quality. Less fresh air and limited air circulation can have an impact on children's health and can result in respiratory problems that play a role in the onset of stunting risk (16). Another important component is kitchen smoke holes and lighting, exposure to smoke and inadequate lighting can affect the nutritional intake and overall health of toddlers, poor lighting can disrupt children's eating, sleeping, and physical activity patterns (17).

Diet or food consumption patterns are one of the factors that greatly affect human health and productivity. Many people pay little attention to the food they eat to fulfill their nutritional needs. Consumption of diverse foodstuffs is necessary. This is very good because there is no single type of

food that contains all types of nutrients. Therefore, children really need to eat a variety of foods, if there is a lack of one particular nutrient in one type of food, it will be found in other types of food. Eating a variety of foods will ensure the fulfillment of balanced nutrition (18). From the results of table 3 Consumption Patterns of Tobacco Farmers' Children in Jember Regency, 21 respondents (60%) had good consumption patterns and 14 respondents (40%) had poor consumption patterns. From these results it is known that the difference in the number of respondents with good consumption patterns and unfavorable consumption patterns is not too much difference in number.

Based on a number of previous research studies, it was found that community food consumption is still relatively low, which is below 50%. The low consumption in the community is partly due to environmental sanitation hygiene problems where people live (19). Based on research in the Sumbersari Jember District Campus area, as long as sanitation in the area is still poor, people will be increasingly distrustful of the cleanliness / hygiene of food sold by street vendors so that it can affect food consumption patterns in the community, especially in the campus area where street vendors sell (19). In addition, the application of environmental sanitation hygiene can also be influenced by family income. The results of Suryani's 2021 research state that a person with a high income is not necessarily used to fulfill and support the application of sanitary hygiene, most of it is used in meeting daily needs and to survive so that it is far from their minds to fulfill the facilities and infrastructure to implement sanitary hygiene (20).

Family income is the amount of money generated and the amount of money to be spent to finance household needs for one month (21). Family income can be interpreted as the total real income of all household members used to meet joint and individual needs in the household. Households definitely need costs to meet their daily needs. These costs are obtained from the income of all family members (22). According to the Central Bureau of Statistics in 2018, there are several income levels in Indonesia, namely low income groups <Rp 1,500,000 per month, medium income groups Rp 1,500,000 - Rp 2,500,000 per month, high income groups Rp 2,500,000 - Rp 3,500,000 per month, and very high income groups > Rp 3,500,000 per month (23). Based on the results of table 2 Frequency Distribution of Family Income Levels, it was found that as many as 26 respondents of tobacco farming families were included in the low income group and 9 other respondents were included in the medium income group.

The limited income of the family down determines the quality of food that is managed every day both in terms of quality and quantity of food. Poverty that lasts for a long time can result in households being unable to meet food needs which can lead to inadequate nutrition for child growth (21). The level of family income affects the adequacy and quality of food for children, so that high income will improve the quality of food and nutritional status of family members. High economic status can make it easier for mothers to access caregivers and regulate children's diets, and also children who are entrusted to grandmothers or other family members are more likely to meet nutritional needs. The socioeconomic status of the family, such as low income from the head of the family and low knowledge about nutrition coupled with culture in the family, including eating habits and customs, will influence the process of selecting and processing food by the mother, because good food processing will affect children's consumption patterns (24).

In Desi Atika's research in 2016 stated the result that the amount of family income has a significant effect on consumption patterns (25). Household income will determine household consumption expenditure and welfare levels. Income will affect the amount of goods consumed. In fact, it is often seen that as income increases, not only the goods consumed increase, but their quality is also a concern (26,27). Family income greatly affects whether or not children's primary and secondary needs, parental attention and affection are sufficient (28). In people with low economic levels, their need for food tends to be less than the food needs that should be so that in people with low economic levels, the diet is limited and tends to be the same food consumed and repeated every day, in the sense that it does not vary (29). Poor eating habits and poor nutritional status of children are caused by parents who educate their children to eat according to their parents' diet, prioritizing energy sources from carbohydrates, while in children at the age of growth and development the energy needed is greater (30). In Sari's research in 2022 stated that the consumption pattern of a toddler is closely related to the right or wrong parenting of the mother to the child (31). Parental education also affects parenting and eating habits

towards the health of toddlers, because there are still many toddlers who suffer from malnutrition and overeating. Not knowing how to feed infants and young children is a habit that is detrimental to health, directly and indirectly becoming a major cause of malnutrition in children, especially children under 2 years old. Lack of knowledge about nutrition or lack of ability to apply nutrition information in daily life is an important cause of nutritional disorders.

Some research results show that the level of education has a significant positive effect partially on the variable consumption of lower middleclass households, meaning that the higher the level of education, the level of household consumption will also increase. This is supported by the cause of poverty, which is poverty caused by genetic factors. Parents with low education will not be able to send their children to college, this occurs due to lack of awareness of the importance of education and lack of capital due to perceptions of low income. In fact, higher education can generate higher income, so that consumption of basic needs can be fulfilled (27,29).

5. Conclusion

In previous studies, there have been many studies on the factors that influence GTS disease. However, there is still no specific study that discusses the relationship between GTS and stunting in the area systematically, broadly and in depth. In fact, therefore, by using a quantitative correlational research method that examines the correlation between the variables of hygine sanitation status, children's consumption patterns, farmers' education level, and family income on the nutritional status of children of tobacco farmers who are at high risk of exposure to Green Tobacco Sickness. The results of the study are expected to provide information for relevant agencies, as a reference in policy formation and the need for preventive action related to stunting, as well as planning programs to increase public awareness of stunting and the use of PPE in tobacco farmers.

Acknowledgment

The author would like to thank all those who have supported the implementation of this research including Universitas Negeri Malang, PTPN X (Ajong Gayasan Tobacco Farm Jember). This research received a grant from the Research and Community Service Institute (LPPM) Universitas Negeri Malang.

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