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Work Accident at Sugar Farmers in Banyumas Regency

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Abstract

A work accident is an accidental event in the employment relationship, including diseases of the working relationship, the accident that happened on the way go to work, and coming home in the usual way. Work accidents can be experienced by sugar farmers. In Banyumas Regency, there are about 26.580 Sugar farmers. Based on Kesra Setda Banyumas Regency, from 2017 to November 2019 there were 323 cases of sugar farmers accidents, with 236 disabilities and 87 deaths. The purpose is to analyze the risk factors of work accidents consisting of behavioral and environmental factors. The method is an analytical survey with a cross-sectional approach. The sample was 200 people in Cilongok Districts. Data analysis includes univariate, bivariate, and multivariate. The results show that behavioral factors significantly associated with work accidents are breakfast status (p = 0,010) and unhealthy conditions (p = 0,002). Environmental factors significant to work accidents are past medical history (p = 0.000) and protein adequacy (p = 0,000). Recommendations for this research are socialization about the importance of breakfast and paying attention to the body condition before climbing, also training energy consumption diet of protein corresponding to the workload.

Introduction

A work accident is an undesirable event that can cause loss and occurs during working hours and in the workplace. A work accident is an accidental event related to the employment relationship, including diseases that arise because of the working relationship. Similarly, accidents that occur on the way out of the house to go to work and come home to the house through the street an ordinary or reasonable passed and the disease caused by the workplace. There are many working conditions we don't realize are hazardous. These include working very quickly, operating defective, unfamiliar equipment, or handling dangerous substances without training (Commission on Health and Safety and Workers Compensation, 2010).

Based on BPJS employment in Indonesia, in 2019 recorded 114.235 cases of accidents. While in 2020, from January to October, BPJS noted 177.161 cases. As many as 53 are work cause, while 11 are cases of Covid-19. The number of work accidents in Central Java has decreased quite significantly from 2018 to 2019. Disnakertrans of Central Java recorded work accidents in 2019, about 1.468. Down 48% from 2018, as much as 3.083 accidents. Whereas in Banyumas Regency, the number of work accidents in 2020, as much as 1339 events, increased compared to 2019, as much as 928 events.

Work accidents can be experienced by sugar farmers. It is due to the work activity, including those at risk of having an accident. In Banyumas Regency, there are about 26.580 Sugar farmers. Based on Kesra Setda Banyumas Regency, from 2017 to November 2019, there were 323 cases of Sugar farmers accidents, where 236 disabilities and 87 died. Based on research by Ulfah (2016), in Cilongok District, especially in the Village of Pageraji, Langgongsari, and Rancamaya, there are accidents on the Sugar farmers, as many as 94 people (89,5%), of which 94 people. Where 2 people (1.9 percent)

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fell from a coconut tree, 66 people (62,9%) slipped, and 26 people (24,8%) other scratched and splashed hot coconut water.

Based on research by Sulong et. al. (2018), the prevalence of work accidents among workers was 9.46%, but underreporting was 39.27%. In general, the findings indicate that the rate of work accidents among the FELDA oil coconut workers was relatively low, but the underreporting was at an alarming rate. Interventions to improve safety and health reporting among workers are crucial to reduce this issue. Hence a further study to identify the predictors for safety and health reporting is recommended.

Based on research by Mohankumar et al (2013), the ergo refined coconut tree climbing device (T2) enhanced the comfort and safety of male subjects with 7.8, 12.2, 10.7, and 20.5% reduction in heart rate, energy expenditure, overall discomfort rating, and body part discomfort score, respectively, and 2.6 and 4.1% increase in overall safety and ease of operation rating respectively when compared to T1. The ergo refined coconut tree climbing device resulted in 20.6% savings in cost and 11.8% savings in time of climbing and harvesting the coconut when compared with T1 mode.

The efforts to prevent work accidents among sugar farmers were actually, programmed by the government of Banyumas Regency in 2013 by offering coconut tree seeds "genjah entok". The type of "genjah entok" is a coconut tree with varieties size relatively short (no more than 2 meters), lots of fruit, and a harvest of 2 to 3 years. Hopefully, this program can minimize the occurrence of accidents. But the program implementation is very difficult for sugar farmers because the type of "genjah entok" should be planted on the soil with the average texture. While in the Banyumas region, most of the plantation land has the ground bumpy texture or hilly (Kesra Setda Banyumas, 2015).

The government of Banyumas Regency also has a benefits program for sugar farmers injured at work, amounting to 5 million rupiahs for fall, have a physical disability, and are unable to work again, and 10 million rupiahs for death. The granting of compensation is managed by the Regional Welfare Section of the Banyumas Secretary Office (Kesra Setda Banyumas). Sugar farmers who had an accident while working can ask for it by showing the Sugar farmers card. Losses due to the accident could not be covered by the compensation fund. Loss of material and non-material experienced sugar farmers not suitable with the compensation fund received. Most of the sugar farmers are the family head. They became the backbone of the family. If an accident occurred, it would result in the economic conditions of the family.

Methods

This study was conducted in Cilongok District, Banyumas Regency, with samples of as many as 200 people who work as sugar farmers. The sampling technique used purposive sampling, with inclusion criteria: sugar farmers willing to be respondents of the study, sugar farmers whose working period is more than 3 years, sugar farmers age is classified as productive between 18 to 40 years old, and the level of education at least primary school. While exclusion criteria: sugar farmers out of the profession as sugar farmers.

The instruments used in this study are questionnaires, checklists, and documentation tools. The first part of the questionnaire contains questions related to the characteristics of the sugar farmers, such as age, gender, education, work period, nutritional status, and knowledge. The second part of the questionnaire contains questions about the use of Personal Protective Equipment (PPE), past medical history, training accidents, breakfast before the climb, rainy conditions, and whether unhealthy conditions still climbing. Data analysis is univariate with a frequency distribution, bivariate with chi-square and multivariate with a logistic regression test.

Results and Discussion

Table 1 The Characteristics of Sugar Farmers in Banyumas Regency

No	Characteristics	Category	Frequency
1	Age	a. Age is not a risk (<40 years)	162
		b. Age-risk (≥40 years)	31
2	Education	a. Pass basic education (Elementary and Junior School)	193
		b. Pass advanced education (High School)	0
		c. Pass of higher education (D3 and S1)	0
3	Gender	a. Male	193
		b. Female	0
4	Work period	a. Long (>10 years)	110
		b. Medium (6-10 years)	62
		c. New (<6 years)	21
5	Nutritional Status	a. Not normal (<18,5) /(≥ 23,0)	109
		b. Normal (18.5 to 22.9)	84

Table 2. The Results of Univariate Analysis

No	Characteristics	Category	Frequency
1	The use of Personal Protective Equipment (PPE)	a. Not use PPE	192
		b. Using PPE	1
2	Past medical history	a. There is no past medical history	164
		b. There is past medical history	29
3	Training occupational accidents	a. Never follow training	169
		b. Follow training,	24
4	Breakfast before climbing	a. No breakfast before climbing	80
		b. Breakfast before climbing	113
5	Rainy condition still climb	a. Does Not climb	107
		b. Keep climbing	86
6	Unhealthy condition still climbing	a. Does Not climb	148
		b. Keep climbing	45

Table 3. The Results of Bivariate Analysis

Variables	Category	Accident					
		Yes	%	No	%	Total (N)	*p value*
Past medical history	a. There is no past medical history	5	2.6	24	12.4	29	0,000
	b. There is past medical history	4	2,1	160	82,9	164	
Protein adequacy	a. Hyper	1	0,5	0	0	1	0,000
	b. Deficit	3	1,6	77	39,9	80	
	c. Normal	5	2,6	107	55.4	112	
Breakfast	a. Breakfast	9	4.7	104	53.9	113	0,010
	b. Not breakfast	0	0	80	41,4	80	
Unhealthy condition still climbing	a. Does Not climb	3	1,6	145	75,1	148	0,002
	b. Keep climbing	6	3,1	39	20,2	45	
	Number (N)	9	4,7	184	95,3	193	

Table 4. The Results of Multivariate Analysis

No.	Variables	significance Value (p)	Odds Ratio (OR)
1.	Past medical history	to 0.020	0,155
2.	Protein adequacy	0,207	2,479
3.	Breakfast	0,996	0,000
4.	Unhealthy condition still climbing	0,022	5,943

The results showed a significant relationship between past medical history and accidents of falling from trees because of broken stems. In unhealthy conditions, the body's response in performing the work activity is significantly decreased, and alertness is reduced. Those can lead to accidents. The history of chronic diseases suffered can be an aggravating circumstance if the accident occurred.

The history of chronic diseases suffered by Sugar farmers, like complications, gastritis, rheumatism, anemia, and hypertension, allegedly reduce work productivity and can cause accidents. It is in line with the research of Akhtar et al. (2022), which shows a significant relationship between chronic past medical history with the loss of work productivity. Frely et al. (2017) stated that work accidents are influenced by internal and external factors. One of the internal factors that affect the past medical history. In addition, De Sousa Sena et al., (2017) said that workers with a history of Chronic Obstructive Pulmonary (COP) have attendance work more and the quality of work is lower than workers without a history of COP. Adam et al. (2017) said a significant relationship between Chronic Rhinosinusitis with loss of work productivity.

The results showed a significant relationship between protein adequacy with the accidents of the Sugar farmers in Banyumas Regency. It shows that the better the protein adequacy, then it will be the less likely the occurrence of the accident. A significant relationship between protein adequacy and an accident, allegedly caused by a lack of protein adequacy decreasing the work concentration. Miyamoto & Amrein (2017) said that when the glucose level in the blood is low, there will be a glycolysis process. It is regulated by two hormones secreted by alpha and beta cells namely glucagon and insulin. When glucose is low, then glucagon is secreted. When glucagon is secreted, it will break glycogen (the reserves of glucose) in the liver into glucose. In addition, when glycogen is less, then the formation of glucose-dependent enzymes increases the formation of glucose from carbon sources, namely amino acids and lactic acid.

Based on Wang et al. (2022) said that the synthesis ability of glucose from the metabolites is very vital for humans. We consume approximately 140-180 grams of glucose daily. As many as 75% is absorbed by the brain. Body fluids carry about 20 grams of glucose. So, if glucose flows in the blood a little bit, the body produces glucose through the precursor of non-carbohydrates. It is called gluconeogenesis. The effect of using glucose by muscle cells through the glycolysis and gluconeogenesis process is lactic acid. It makes the body tired. Every person who works in tired conditions is risky to cause accidents.

Breakfast habits (p-value = 0,000) significantly correlated with work fatigue that can be a trigger for workplace accidents (Watulinggas et al., 2020). Our findings suggest an association between nutritional variables and work-related accidents. It indicates the need, during the formulation of policies for these kinds of government benefits, to include nutrition aspects to minimize work-related accidents risks. Higher protein intake and physical activity are associated with healthier body composition and cardiometabolic health in Hispanic adults. Higher protein consumption, as a fraction of energy, is associated with a strong, independent, dose-responsive lower risk of incident frailty in older women. Using uncalibrated measures underestimated the strength of the association. Incorporating more protein into the diet may be an intervention target for frailty prevention (Brown et al., 2019).

Based on Yunieswati et al. (2020), worker

nutrition is the implementation of the principles and processes of nutrition for workers. When workers are not well fed, their health is deteriorating, so the risk of work accidents increases, and performance, efficiency, and production capacity are significantly affected by this situation. Researches emphasize that workers whose nutritional status is corrected produce several times more than those whose nutritional status is uncorrected. There is a significant relationship between nutritional status with labor productivity, p-value = 0.020 (Adrianto & Ningrum, 2010). The main reasons for the inadequate and unbalanced nutrition of the workers are; insufficient nutritional education and awareness of workers and employers, insufficient purchasing power, rapid population growth, and negative environmental conditions. The health and safety of the workers are closely related to their intake of quantity and quality of food in accordance with their work.

The results show a significant relationship between breakfast with the accident. A significant relationship between breakfast with the accident because not having breakfast before work leads to a lack of carbohydrates in the body. Carbohydrates as a source of energy to carry out activities. Workers who do not breakfast allegedly experience fatigue, lack of concentration, and carelessness, so still have work accidents.

It is in line with Khanna et al. (2016), stating significant differences in students aged 18-24 years at 3 different universities in Pune, India. Of 119 students who are accustomed to breakfast in the morning, 84 have good concentration, while 87 students who do not use to breakfast in the morning, 81 of them have poor concentration. The student used to breakfast by consuming milk. According to Jenkins et al. (2016), milk contains calcium that can release neurotransmitters. Milk also contains tryptophan, a precursor to serotonin and neurotransmitters needed in psychological processes. Tryptophan is an essential amino acid that can not be synthesized by the body. Increased concentration of tryptophan in the body will increase the release of serotonin, which play a role in cognition, memory, learning, concentration, comfortable, and happiness (Carhart-Harris & Nutt, 2017). It is in line with Furqaani (2017) stating the effect of physical exercise against brain boosters in children. Physical exercise stimulates the release of tryptophan that stimulates the secretion of serotonin, which can improve memory skills, concentration, and achievement in children (Young, n.d.)

Based on Heo et al. (2021), 11,952 (56.4%) participants consumed breakfast regularly. The prevalence of abnormal metabolic outcomes was higher among those with irregular breakfast consumption habits. Among young male workers, the negative binomial regression analysis showed that unregular breakfast eaters had a higher risk of abnormal metabolic outcomes, after adjusting for covariates.

Based on Yoshikawa et al. (2019), 575 employees across three Japanese worksites, depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (CESD). The frequency of breakfast consumption was categorized into 6 levels. Multi-regression analysis suggested that skipping breakfast was associated with high trait aggression, living alone, and low levels of physical exercise. Logistic regression suggests that skipping breakfast was associated with depression, even after adjusting for potential psychosocial factors, including trait aggression, resilience, physical exercise, fish and fried food consumption, social support, and life events that cannot be ruled out.

The results showed a significant relationship between unhealthy conditions still climbing with the accident. It is allegedly caused by the lack of Sugar farmers' concentration when climbing because of the unhealthy conditions, so Sugar farmers had an accident. It is in line with Celikhisar & Dasdemir Ilkhan (2019), stating a significant relationship between Obstructive Sleep Apnea Syndrome (OSAS) with work accidents at heavy equipment operators. OSAS is a disorder of breathing during sleep that result in disruption of the activity outside sleep. It is caused by obstacles in the upper respiratory tract during sleep. The barriers of the upper respiratory tract are due to impaired movement of the tongue and muscles of the dilators of the airway. In addition, OSAS can be caused by genetic factors (Spicuzza et al., 2015). OSAS is characterized by snoring

and choking during sleep, excessive sleepiness during the day, difficulty concentrating, loss of memory, anxiety, decreased libido, headaches in the morning, and quick-tempered. (Jordan et al., 2014) OSAS leads to disruption of work performance and traffic accidents.

Conclusions

Based on the results, all variables including past medical history, protein adequacy, breakfast, and unhealthy conditions still climbing have a significant relationship with the accident on the Sugar farmers in Banyumas Regency. Recommendations for this research are socialization about the importance of breakfast, paying attention to the body condition before climbing, energy consumption, and a protein diet related to the workload.

References

Adrianto, E.H., & Ningrum, D.N.A., 2010. Hubungan Antara Tingkat Kesegaran Jasmani Dan Status Gizi Dengan Produktivitas Kerja. *Kemas*, 5(2), pp.145-150.

Akhtar, S., Mohanty, S.K., Singh, R.R., & Sen, S., 2022. Chronic Diseases and Productivity Loss Among Middle-Aged and Elderly in India. *BMC Public Health*, 22(1), pp.2356.

Brown, A.F., Prado, C.M., Ghosh, S., Leonard, S.M., Arciero, P.J., Tucker, K.L., & Ormsbee, M.J., 2019. Higher-protein Intake and Physical Activity are Associated with Healthier Body Composition and Cardiometabolic Health in Hispanic Adults. *Clinical Nutrition ESPEN*, 30, pp.145–151.

Carhart-Harris, R., & Nutt, D., 2017. Serotonin and Brain Function: A Tale of Two Receptors. *Journal of Psychopharmacology*, 31(9), pp.1091–1120.

Celikhisar, H., & Dasdemir-Ilkhan, G., 2019. The Association of Obstructive Sleep Apnea Syndrome and Accident Risk in Heavy Equipment Operators. *Medicina*, 55(9), pp.599.

Commission on Health and Safety and Workers Compensation., 2010. *Preventing Workplace Injuries Andillnesses,* pp.14-16.

de-Sousa-Sena, R., Ahmed, S., Tan, W.C., Li, P.Z., Labonté, L., Aaron, S.D., Benedetti, A., Chapman, K.R., Walker, B., Fitzgerald, J.M., Hernandez, P., Maltais, F., Marciniuk, D.D., O'Donnell, D.E., Sin, D.D., & Bourbeau, J., 2017. Work Productivity Loss in Mild to Moderate COPD: Lessons Learned from the CanCOLD Study. *European Respiratory Journal*, 50(3), pp.1701154.

Frely, A.N., Kawatu, P.A.T., & Maddusa, S.S., n.d.. *The Relationship Between the Age of The Work and Long Work with the Fatigue of Work On the Driver of the Tank Truck at the Terminal of Fuel Oil (BBM) PT Pertamina Bitung*, pp.10.

Furqaani, A.R., 2017. Physical Exercise as a Brain Booster For Child Physical Exercise as a Brain Booster for Child. *Golden Age,* 1(1), pp.12.

Heo, J., Choi, W.-J., Ham, S., Kang, S.-K., & Lee, W., 2021. Association between Breakfast Skipping and Metabolic Outcomes by Sex, Age, and Work Status Stratification. *Nutrition & Metabolism*, 18(1), pp.8.

Jenkins, T., Nguyen, J., Polglaze, K., & Bertrand, P., 2016. Influence of Tryptophan and Serotonin on Mood and Cognition with a Possible Role of the Gut-Brain Axis. *Nutrients*, 8(1), pp.56.

Jordan, A., McSharry, D.G., & Malhotra, A., 2014. Adult Obstructive Sleep Apnoea. *The Lancet*, 383(9918), pp.736–747.

Khanna, S., Dharap, A., & Gokhale, D., 2016. Breakfast Eating Habits and Its Association with Mental Wellbeing and Mindful Attention Awareness Among University Students of Pune District, Maharashtra, India. *International Journal of Community Medicine and Public Health,* 2016, pp.1584–1588.

Miyamoto, T., & Amrein, H., 2017. Gluconeogenesis: An Ancient Biochemical Pathway with a New Twist. *Fly,* 11(3), pp.218–223.

Spicuzza, L., Caruso, D., & Di Maria, G., 2015. Obstructive Sleep Apnoea Syndrome and Its Management. *Therapeutic Advances in Chronic Disease*, 6(5), pp.273–285.

Wang, X., Tang, L., Ping, W., Su, Q., Ouyang, S., & Su, J., 2022. Progress in Research on the Alleviation of Glucose Metabolism Disorders in Type 2 Diabetes Using Cyclocarya paliurus. *Nutrients,* 14(15), pp.3169.

Watulinggas, V.N.P., Lestari, M., Novrikasari, N., Andarini, D., & Camelia, A., 2020. Fatigue in Loading and Unloading Workers at the Port. *Jurnal Kesehatan Masyarakat*, 16(1), pp.93–100.

Yoshikawa, E., Nishi, D., & Matsuoka, Y.J., 2019. The Relationship Between Skipping Breakfast and Depression Among Workers with a Focus on Psychosocial Factors. *Research Square*, 2019.

Young, S.N., 2007. How to Increase Serotonin in the Human Brain without Drugs. *J Psychiatry Neurosci*, 32(6), pp.394-399.

Yunieswati, W., Marliyati, S.A., & Setiawan, B., 2020. Nutritional Status, Health Status, and Work Productivity of Cocoa Farmers in Polewali Mandar, Indonesia. *Jurnal Gizi Dan Pangan*, 15(3), pp.169–174.