



**THE RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND THE PRODUCTIVITY OF PRODUCTION WORKERS**

**Inggrid Mentari Batu Bara\*, Nofi Susanti, Salianto**

Public Health Science Program, Faculty of Public Health, Universitas Islam Negeri Sumatera Utara, Jl. William Iskandar Ps. V, Medan Estate, Percut Sei Tuan, Deli Serdang, North Sumatera 20371, Indonesia

\*[zulk86544@gmail.com](mailto:zulk86544@gmail.com)

**ABSTRACT**

The industrial sector is a significant contributor to employment in Indonesia, necessitating the availability of skilled and competent workers. Enhancing worker productivity is crucial for companies to remain competitive, as it allows for the production of goods within predetermined proportions in a shorter timeframe. Productivity among workers is influenced by various factors, notably their nutritional status and health. This study aims to explore the relationship between nutritional status and productivity among production workers at Pt. Wijaya Karya Beton Tbk Ppb in North Sumatra. The research employs a quantitative approach with a cross-sectional study design, involving a sample of 63 workers from a total of 410 in the production department. Data collection tools included scales and microtoise for height measurement, with data analysis conducted using the chi-square test at a 95% confidence level ( $\alpha = 0.05$ ). The study found that out of the 63 workers, 27 (42.9%) were classified as productive, while 36 (57.1%) were deemed unproductive. The chi-square test results indicated a significant relationship between nutritional status and worker productivity (P value = 0.049). The study concludes that nutritional status significantly affects labor productivity, with normal nutritional status being a key factor in enhancing work performance.

Keywords: nutritional status; productivity; worker power

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**INTRODUCTION**

The industrial world is the largest development in terms of employment for Indonesia. In the national industrial sector, good and competent workers are needed. So it is necessary to increase worker productivity so that a company can compete with other companies (Ministry of Manpower. 2019). Productivity is how to produce or increase the highest possible yield of goods and services by utilizing human resources efficiently. Therefore, productivity is often interpreted as the ratio between output and input in certain units. Productivity is also a very important factor in maintaining and developing the success of an organization / company. As we know every organization / company invests vital resources (human resources, materials, and money) to produce goods or services. Using these human resources effectively will provide better results. Work productivity is the relationship between output (goods and services) with inputs (labor, materials, money or income) which is measured by success for companies in carrying out their production with efficiency in working (Sutrisno. 2010). So if a worker is able to produce products according to predetermined standards in a shorter unit of time, then the worker shows a better or higher level of productivity.

Work productivity has an important meaning as a view of life and mental attitude of all workers, where workers always try to improve the quality of life, today's situation must be better than yesterday and tomorrow's quality of life must be better than today (Umar. 2000). This provides encouragement to try and increase productivity in carrying out the work carried out. In addition, the importance of work productivity is planning, developing and implementing productive ways by using resources efficiently while maintaining quality. Therefore, the productivity of workers needs serious attention from company leaders. So that it can try to improve and increase the productivity of workers. Work productivity is influenced by many factors, one of the factors that has a very important role is nutritional adequacy. Fulfillment of nutritional adequacy during work is one form of implementing occupational safety and health requirements as an effort to improve the degree of occupational health. Nutrition is a factor that will determine employee work performance, adequacy and balanced calorie distribution during work.

According to WHO (world health organization) in 2018 consists of 9.7% underweight, 38.5% overweight in men, 39.2% in women, 11.1% obesity in men, 15.1% women. According to basic health research in 2018, the prevalence of overweight from 8.6% to 13.6% obesity from 10.5% to 21.8%, underweight from 18.4% to 19.6% (Reskesdes. 2018). So that one of the factors that affect the state of nutrition is diet. This is because the quantity and quality of food and drinks consumed will affect the level of individual health. Good nutrition makes body weight normal, the body is not susceptible to infectious diseases, increased productivity and protected from chronic diseases and premature death. Poor nutrition is a risk factor for NCDs (non-communicable diseases), such as cardiovascular diseases. In accordance with Permenakertans No. Per. 03/Men/1982 concerning occupational health services, regulated the main duties of health services, one of which is regarding nutrition and the implementation of meals at work.

Fulfillment of workers' nutritional adequacy during work is one form of implementing occupational safety and health requirements as part of efforts to improve the degree of worker health. Nutrition is one aspect of occupational health that has an important role in increasing work productivity. According to Suma'mur, occupational nutrition is a calorie needed by the workforce to meet the needs according to the type of work with the aim of improving labor health and productivity as high as possible. Meanwhile, according to Tarwaka et al, occupational nutrition is the provision of nutrition applied to working people with the aim of improving the degree of health, the highest efficiency of work productivity. This needs to be a concern for all parties, especially workplace managers increase the workers generally spend about 8 hours every day at work. Workers who do not get inadequate energy are clearly not productive even if they come in and keep working. Which will obviously slow down the rhythm of work to be able to stay at work. This can be seen from the decrease in the results of greeting or production of workers after working a few hours, especially if the person concerned does not get input such as food or drinks needed.

Workers who have unusual or malnourished nutrition symbolize poor physical condition. This unfavorable condition considers worker productivity so that it causes workers to get tired more easily or experience excessive fatigue. Workers with excess nutritional status tend to get tired more easily because people with excess nutritional status, have excess body weight, so the body has to work harder, and increase oxygen demand in the body, causing organs such as lungs, heart, and muscles to work harder and get tired quickly. On the contrary, malnourished workers are less easily tired because they do not have enough muscle mass. Thin people usually consume foods with little calorie content. The absence of enough calories makes a

person feel that he has no energy, weak body, and easily exhausted. In line with the research conducted (Bakri et al. 2022). Based on the results of the study, workers with normal nutritional status and productive work productivity were 15 people (62.5%) and unproductive workers were 9 people (37.5%). Meanwhile, workers with fat nutritional status and productivity were 4 people (23.5%) and unproductive workers were 13 people (76.5%). Statistical test results using Chi-Square obtained P value = 0.014, because the probability value  $\alpha < 0.05$ ,  $H_0$  was rejected and  $H_a$  was accepted, which means there is a relationship between nutritional status and work productivity at Pt. Angkasa Pura I (PESERO) Makassar City in 2021.

And these results are in accordance with the results of previous research conducted on workers of Pt. Era Media Informasi / Gatra shows that there is a relationship between nutritional status and work productivity, with P value = 0.013 where  $P < 0.05$  (OR=4.800 95% CI 1,370-16,812), meaning workers at Pt. Era Media Informasi who have abnormal nutritional status have a 4,800 times greater risk of experiencing a decrease in productivity than workers with normal nutritional status. Assessment of the nutritional status of workers needs to be carried out, because by knowing the nutritional status of workers can be determined the appropriate nutritional needs and the provision of nutritional interventions if needed. Nutritional status assessment is carried out through several ways, including: biochemical examination, clinical examination, biophysical examination and anthropometry. Anthropometry is the most frequently used method in assessing nutritional status. This method uses weight (BB) and height (TB) parameters. Through these two parameters, the calculation of the Body Mass Index (BMI) can be carried out.

Based on preliminary data collection on workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra, data obtained from the results of BMI (Body Time Index) measurements of 17 workers, there are 35% of workers included in the fat category, 65% included in the normal category. The initial data obtained regarding the average physical activity of employees has a high level of physical activity, the average work fatigue of employees experiencing fatigue and unstable work productivity, as well as less productive employees seen from the achievement of less stable production results in 2023 every day. Therefore, based on the reality in the field, this research aims to further examine "The Relationship between Nutritional Status and Productivity of Production Workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra".

## **METHOD**

This type of research uses quantitative survey research that uses an analytical observational research design with a cross sectional approach that studies the Relationship between Nutrition and Labor Productivity of Production Workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra in 2023. Determination of samples using the lemeshow formula with the number of sampel obtained by 63 people from 410 respondents, where the sample in this study was workers in the production department at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra, which was taken randomly (random). Data collection techniques by distributing questionnaires to assess labor productivity in terms of the number / person / day, concrete produced and measuring BMI (body mass index) using measuring instruments, weight scales (BB) and height measuring instruments (microtoise). After the data is collected, a completeness check is carried out and then data processing is carried out using a data analysis test using a statistical chi-square in order to explain the results of univariate data analysis of frequency and presentation as well as bivariate analysis to determine the relationship of the independent variable with the related variable.

## RESULTS

### Univariate Analysis

This univariate analysis was conducted to obtain an overview of the characteristic distribution of respondents, the Relationship between Nutritional Status and Labor Productivity at Pt.Wijaya Karya Beton Tbk Ppb North Sumatra.

### Characteristics of Respondents

Based on the results of research obtained on the characteristics of respondents of production workers at Pt.Wijaya Karya Beton Tbk Ppb North Sumatra in 2024, on the distribution of respondents based on age the majority of respondents are male as many as 63 people (100%), and on the distribution based on education for respondents of high school / high school education workers with a total of 63 people (100%).

Table 1.  
Distribution of Respondents Based on Age of Production Workers (n=63)

Age	f	%
20-30 Year	25	39,7
31-40 Year	24	38,1
41-50 Year	14	22,2

Table 1. That the frequency distribution of respondents based on the age of 63 samples, the majority of workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra are at the age of 20-30 years as many as 25 people (39.7%), at the age of 31-40 years as many as 24 people (38.1%), and at the age of 41-50 as many as 14 people (22.2%).

Table 2.  
Distribution based on length of service for production workers (n=63)

Years of service	f	%
1-10 Year	40	63,5
11-20 Year	20	31,7
21-25 Year	3	4,8

Table 2. That the frequency distribution of respondents based on the working period of 63 samples, obtained that the number of workers was in the working period of 1-10 years as many as 40 people (63.5%), in the working period of 11-20 years as many as 20 people (31.7%), and in the working period of 21-25 years as many as 3 people (4.8%).

Table 3.  
Distribution Based on Nutritional Status of Production Workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra 2024.

Nutritional Status of Workers	f	%
Abnormal	36	57,1
Normal	27	42,9

Table 3. That the frequency distribution of respondents with labor nutritional status from 63 samples, based on BMI (body mass index) the most with normal categories is 36 people (57.1%), while abnormal nutritional status is 27 people (42.9%).

Table 4.  
Characteristics Based on Productivity of Each Line in the Production Department Workforce at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra

Worker Productivity	Productivity Figures (Number/Day)
Productive	<30
Not productive	>30

The smoothness of the production process depends on the skills possessed by the workforce. To achieve the maximum goal of Pt. Wijaya Karya Beton Tbk Ppb North Sumatra, it is necessary to develop manpower with an effective system in accordance with a directed pattern. Workers of Pt. Wijaya Karya Beton Tbk Ppb North Sumatra who work daily and have different wages according to the daily production results produced by each worker of each line at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra Medan. Measurement of work productivity is one way to increase productivity, where the measurement results will be used as a reference to see employee work productivity in the past by looking at existing shortcomings to be corrected in the future so that employee worker productivity in the future can increase. The selection of benchmarks or ways of measurement to be carried out depends on the type or input and output factors of the company or organization concerned.

According to Muchdarsyah Sinungan (2005: 23), in general, productivity measurement means a comparison that can be distinguished in three very different types.

- 1 Comparisons between current implementation and historical implementation do not indicate whether the current implementation is satisfactory, but only indicate whether it has increased or decreased and its degree.
- 2 Comparison of the implementation of one unit (individual tasks, sections, processes) with others. Such measurements show relative achievement.
- 3 Comparison of the current implementation with the target and this is what works best as loading the attention of the goals and objectives.

Table 5.  
Distribution Based on Productivity of Production Workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra 2024.

Labor Productivity	f	%
Not productive	30	47,6
Productive	33	52,4

Table 5. That the frequency distribution of respondents with labor productivity from 63 samples, workers based on concrete printing results are the most with the category of unproductive as many as 30 people (47.6%), while work productivity with the productivity category is mostly 33 people (52.4%).

### Bivariate Analysis

This bivariate analysis was conducted to determine the Relationship between Nutritional Status and Labor Productivity at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra.

Table 6.  
Relationship between nutritional status and productivity of production workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra 2024.

	Not productive		Productive		P Value
	f	%	f	%	
Abnormal	21	70,0	15	45,5	0,049
Normal	9	30,0	18	54,5	

Table 6. Shows that workers with normal nutrition and abnormal work productivity are 9 people (30.0%), while workers with abnormal nutritional status whose work productivity is not productive as many as 21 people (70.0%), and workers with normal nutritional status whose work productivity is productive as many as 18 people (54.5%), while in workers with abnormal nutritional status who are productive as many as 15 people (45.5%). From the results of statistical tests using *chi-square* obtained P value = 0.049, because the probability value is  $\alpha < 0.005$ ,  $H_0$  is rejected and  $H_a$  is accepted, which means that there is a relationship

between nutritional status and the productivity of production workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra.

## **DISCUSSION**

Based on the results of frequency distribution data with characteristics based on age, the majority of respondents have the age of 20-30 years, namely as many as 25 people (39.7%), based on gender, the majority of respondents are male from 63 samples of male, based on the education of the majority of respondents from 63 samples with high school / high school education, and based on the working period of many workers have a working period of 1-10 years as many as 40 people (63.5%). And based on table 3 of fecal distribution obtained based on the nutritional status of production workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra has abnormal nutritional status as many as 36 people (57.1%), nutritional status is the state of the body as a result of food consumption and nutritional use. Poor nutritional status symbolizes poor body condition can affect workers at work and can cause work fatigue. And based on table 5 the frequency distribution obtained based on the labor productivity of the production department at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra has a productive productivity of 33 people (52.4%). Where the level of labor productivity that tends to be low can result in a decrease in the amount of production. And poor productivity can be affected by age, gender, a person arrives late, responsibilities do not fit. The results of the study stated that work productivity is influenced by several factors that come from within workers, as well as outside workers. These factors include work motivation, discipline, work ethic, skills, education, management, nutrition and health, income level, social security, work environment and climate, technology, and achievement opportunities. Work motivation and nutrition are factors that must be considered because they can affect work productivity. (Ramadhanti 2020).

Based on the results of research conducted by the author, it was revealed that of 63 workers who were categorized as normal nutritional status with productive productivity as many as 18 people (54.5%), while workers who were included in the category of abnormal nutritional status with unproductive productivity as many as 21 people (70.0%). Where the results of the chi-square test show that the value obtained P value = 0.049 which is significant for the relationship between nutritional status and the productivity of production workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra. Low consumption of protein and calories in the daily diet is the cause of low productivity and poor health conditions and causes the onset of disease. Where nutritional conditions are lacking due to economic capabilities such as poverty and low wage rates or insufficient knowledge about nutritional problems but also closely related to the still infected endemic diseases and parasitic diseases, as well as too large a workload plus the influence of adverse working conditions. Workers are the same as the general public who are entitled to equal basic rights, one of which is the right to be able to live a healthy life. The variety of labor nutrition problems is a challenge that must be faced and controlled as optimally as possible. The existence of occupational nutrition is important because the nutritional system will present the physical quality and immunity of workers, as a component of building substances and input when the body feels tired from work, and can increase motivation or enthusiasm at work which will determine work productivity. (Ramadhanti 2020)

Occupational nutrition is nutrition that is applied to employees to meet their needs in accordance with the type and workplace with the aim of increasing efficiency and productivity as high as possible. Energy is needed by humans to maintain the work process of their body and carry out physical activities. In relation to work productivity, a workforce with poor nutritional conditions will have better work capacity and body resistance. Someone who is less with underweight for weight and light, namely BMI (body mass index) < 17.0 and BMI (body mass index) 17.5-18.4,

then the person will be less able to work hard, while people who are obese or overweight, namely BMI (body mass index) 25.1-27.0 and BMI (body mass index) > 27.0 then the person is less agile and slow in working. While people who have a normal weight with a BMI (body mass index) of 18.5-25.0 will be more agile in working. Less or more energy intake caused by food consumed by workers is less varied, less diverse, and not nutritionally balanced in one day. This is supported by researchers conducted, showing that there is a relationship between nutritional status and work productivity where the results of statistical tests are obtained P value = 0.027 which means there is a relationship between nutritional status and employee work productivity. This researcher is also in line with, showing that there is a relationship between nutritional status and employee nutritional productivity. This is in line with this study obtained P value = 0.044 where there is a relationship between nutritional status and labor productivity production chart at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra. This is influenced by nutritional status factors that are still abnormal, so that it can have an impact on decreased work productivity and result in the quality of work not meeting predetermined standards. To be able to reduce the risk of decreased labor productivity, several ways are done, such as consuming balanced nutrition, someone has prepared themselves to start activities with complete preparation. Everyone's nutritional needs are different so that nutritional needs must be adjusted to the characteristics of age, gender, and length of work, each worker at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra.

## **CONCLUSION**

Based on the results of research that has been conducted, it can be concluded that from 63 production workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra, there are 27 people (42.9%) who are productive workers and 36 people (57.1%) are unproductive workers. And from the results of the chi-square test obtained P value = 0.049 which shows a significant relationship with the Relationship of Nutritional Status with the Productivity of Production Workers at Pt. Wijaya Karya Beton Tbk Ppb North Sumatra. Workers with abnormal nutritional status have lower work capacity and more balance. And factors such as normal nutritional status can affect work productivity, reduce the risk of workers' physical condition, and can increase work productivity results. To reduce low risk, low work productivity, it is better for the workforce to consume food separately and carry out activities with long-term goals, the needs of workers must be based on age, gender, and work experience.

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