Analysis of the Relationship between Nutritional Status and Health of Female Workers Who Received and Didn't Get Nutritious Food and Drinks on Night Work Shifts

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Abstract

The government presents special protection for woman workers who works at the night shift. Requiring employer to provide nutritious food and beverage according to Manpower Act also, it is regulated on Ministerial Decree No. 224 Year 2003, Labour inspectors found some companies were not comply the regulation, it has an impact towards nutrition status and health of woman night shift worker. The research design were used quantitative analysis with cross sectional design by using univariate and bivariate test. The activity was carried out on two companies that gave and did not provide nutritious food and drinks. Sampling was done by using purposive sampling with total sampling 95 respondents. Statistical tests showed that there was no significant relationship between the adequacy of energy, protein and fat with the provision of nutritious food and beverages in the night shift. There was a tendency of Fat Sufficiency Rate (AKL) on company which provided nutritious food and beverage higher than company which did not provide in a day. There was no difference proportion (unrelated) between provide food and beverage with BMI, anemia status, blood pressure, monthly pain for woman night shift worker and significant relations on age, marital status and working hours on BMI. Suggestion: 1). The Companies are advised to comply with the obligation to provide nutritious food and beverage for workers, adjust the number of calories according to the needs of workers and the type of work; 2). Workers are advised to exercise regularly; 3). The government should review the rules regarding the obligation to give 1400 calories and improve the quidance and supervision of Occupotional Safety and Health (OSH) norms, especially work nutrition.

***Keywords**: Woman, Night Shift worker, Work, Nutrition.*

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A. INTRODUCTION

Based on data from the Central Statistics Agency (BPS), August 2015, the average annual growth rate of women entering the labor market over the past seven years was much higher than that of men, partly due to the expansion of job opportunities in the service sector and progress in women's education. But in the formal sector, women's participation is still lower. Data on female labor participation worldwide reported by the International Labor Organization (ILO) July, 2015 total female workers 1,374,150,000 (49.4%) male workers 2,116,840,000 (76.1%) with a total

of 3,490,990,000 (62.8%) of the 5,561,875,000 total population. Research has shown that women's labor force participation rates vary systematically over a given age, with their marital status and level of education. There are also important differences in the participation rates of urban and rural communities, and between different socio-economic groups.

Indonesia has considerable potential to lead the economy in the Southeast Asia region because Indonesia is the largest country in ASEAN with the largest population of 40.58 percent compared to other ASEAN countries. We know that from year to year the population of Indonesia is increasing, this is reinforced by the data from the 2015 Intercensus Population Survey (SUPAS) as many as 255,182,144 people consisting of 128,231,889 males and 126,950,255.- growth rate of 1.43 percent per year. This number continues to increase in the period of fifteen years, namely 2000-2015, the population of Indonesia has increased by around 50.06 million people or an average of 3.33 million every year. Indonesia is now experiencing a change from an economy dominated by the rural agricultural sector, towards an economy with a larger share of activities in the industrial and service sectors in urban areas. This trend is driving rapid urbanization.

The increase in Indonesia's economic development has led to an increase in population participation in economic activities, including the participation of women (Streng et al., 2022; Ballard et al., 2020). In line with this, the participation of female workers entering the manufacturing, trade and service industries has also increased. As a result of the progress and demands of competition in the industrial world, many companies increase their production output, one of the efforts is to make the company continue to operate for 24 hours (Sun et al., 2018). Employment opportunities are given equally to male and female workers. It is often found that female workers in the world of work cannot avoid working shifts, so that it is a consequence of every worker involved in getting night work assignments (Xiang et al., 2020). This applies equally to male workers and female workers which results in the involvement of female workers on night shifts.

Legislation provides special protection for female workers who work at night because of their specificity. The government guarantees the protection of reproductive functions, physical health, mental and sex harassment in the workplace with Law Number 13 of 2003 concerning Manpower article 76 which regulates protection for women, namely the prohibition for female workers/laborers who are less than 18 years old. to work from 23.00 to 07.00. Employers are required to provide nutritious food and drinks, maintain decency and safety while at work and provide shuttle transportation to and from work. Employers are prohibited from employing pregnant women workers/laborers who, according to a doctor's statement, are dangerous for the health and safety of their wombs and themselves if the workers/laborers are employed at that hour. This rule was also confirmed by the enactment of the Decree of the Minister of Manpower and Transmigration R.I. Number 224/MEN/2003 concerning Obligations of Employers Who Employ Female Workers/Labourers between 23.00 to 07.00 WIT. Special government protection

through the Minister of Manpower Decree is because female workers are a group of workers who are vulnerable when working at night, one of which is related to the nutritional status and health of female workers. Companies are required to provide nutritious food and drinks as a condition for employing female workers at night and in Kepmenaker No. 224/2003 stipulates that nutritious food and drink as referred to in Article 2 paragraph (1) letter a must meet at least 1,400 calories and be given during breaks between working hours. The provision of food and drinks cannot be replaced with money and is given to workers/laborers with a varied menu.

The reality in the field is that not all companies apply the rules for providing nutritious food and drink in accordance with the existing norms for various reasons, among others, because it is considered that the provision of nutritious food and drinks of at least 1400 calories is considered too large and if given to female workers it tends not to be harmful. spent, another thing is the inability of some companies to comply with these provisions and the company has difficulty providing food and drinks for a large number of workers so that the company management then only provides food allowance for workers. Conditions like this cause the nutritional status of workers to depend on the availability and adequacy of food eaten/brought by workers while working, which in turn will have a major impact on the health of workers (Bahl, 2022).

Good nutrition will make workers more active, increase productivity and be thorough, thereby reducing the occurrence of work accidents (Bonham et al., 2016). Meanwhile, inappropriate calorie intake can cause a decrease in work capacity, increase fatigue and skeletal muscle complaints, so that it has an impact on achieving production targets and inappropriate calorie fulfillment has an impact on the health condition of workers (Suresh, 2015).

Work environment factors also have a major influence, which includes lifestyle behaviors such as one's food intake and level of physical activity carried out by the National Institute of Diabetes and Digestive and Kidney Disease (NIDDK, 2014). Lifestyle changes also have an impact on increasing body weight, which is an increase of about 50-60 calories from daily calorie intake and a decrease in physical activity can cause an increase of 2.4 kg of body weight at the end of the year. 95% of obese people, excess consumption can be generated by several environmental factors, one of which is the availability of many fast food foods offered to the community. The principle of this type of food is high in calories, high in protein, high in fat and low in fiber. Consumption of fast food on an ongoing basis will lead to obesity and several degenerative diseases such as hypertension, diabetes mellitus, stroke, coronary heart disease, etc. This happens a lot in urban areas (Khasanah, 2012). These degenerative diseases can lead to an increase in mortality rates and cause losses for the company, therefore providing appropriate and appropriate calorie intake to all workers will be an important investment for the company in maintaining the health and stability of the productivity of its workers.

There are 78 workers (73.6%) who have never had a history of disease caused by over nutrition, 27 workers (25.5%) have a history of disease caused by over

nutrition and 1 worker (0.9%) did not know to have a history of disease caused by overnutrition. overnutrition. The results of the study concluded that the implementation of calorie intake at United Tractors Ltd which was carried out according to calorie needs had a good impact on the health of workers, but on the other hand, if the company's calorie intake had not been carried out properly, it could have a negative impact on the health of workers in the company (Kamal et al. ., 2010).

Based on the company's inspection by the Labor Inspector, data found that in the past 5 (five) years there are still companies that have not provided food even though the rules have been set, on the other hand the company actually understands the impact of the consequences of an unbalanced calorie intake for increasing productivity and preventing financial losses due to malnutrition and degenerative diseases due to unbalanced excess nutrition (Oginska & Pororski, 2006). Therefore, in this study the authors wanted to analyze the relationship between nutritional status and health of female workers who received and did not receive nutritious food and drinks on the night shift at work**.**

Data from the 2015 Inter-Census Population Survey (SUPAS) were 255,182,144 people, consisting of 128,231,889 males and 126,950,255 women. with a growth rate of 1.43 percent per year. This number continues to increase in the period of fifteen years, namely 2000-2015, the population of Indonesia has increased by around 50.06 million people or an average of 3.33 million every year.

The increase in Indonesia's economic development has led to an increase in population participation in economic activities, including the participation of women. In line with this, the participation of female workers entering the manufacturing, trade and service industries has also increased. As a result of the progress and demands of competition in the industrial world, many companies have increased their production output, one of the efforts is to make the company continue to operate 24 hours a day. Employment opportunities are given equally to male and female workers. It is often found that female workers in the world of work cannot avoid working shifts, so that it is a consequence of every worker involved in getting night work assignments. This applies equally to male workers as well as to female workers which results in the involvement of female workers on night shifts.

Legislation provides special protection for female workers who work at night because of their specificity. The government guarantees the protection of reproductive functions, physical health, mental and sex harassment in the workplace with Law Number 13 of 2003 concerning Manpower article 76 which regulates protection for women, namely the prohibition for female workers/laborers who are less than 18 years old. to work from 23.00 to 07.00. Employers are required to provide nutritious food and drinks, maintain decency and safety while at work and provide shuttle transportation to and from work. Employers are prohibited from employing pregnant women workers/laborers who, according to a doctor's statement, are dangerous for the health and safety of their wombs and themselves if the workers/laborers are employed at that hour. This rule was also confirmed by the enactment of the Decree of the Minister of Manpower and Transmigration of the

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The reality on the ground is that not all companies apply the rules for providing nutritious food and drink in accordance with the existing norms for various reasons, among others, because it is considered that the provision of nutritious food and drinks of at least 1400 calories is considered too large and if given to female workers it tends not to be harmful spent, another thing is the inability of some companies to comply with these requirements and the company has difficulty providing food and drinks for a large number of workers so that the company management then only provides food allowance for workers. Conditions like this cause the nutritional status of workers to depend on the availability and adequacy of food eaten/brought by workers while working, which in turn will have a major impact on the health of workers.

Therefore, in this study the authors wanted to analyze the relationship between nutritional status and health of female workers who received and did not receive nutritious food and drinks on the night shift at work.

This conceptual framework describes the dependent variable analyzing nutritional and health status by measuring Body Mass Index (BMI), hemoglobin (Hb), hypertension and infectious diseases with independent variables providing nutritious food and drinks by measuring the adequacy of energy, protein and fat sources in 2 (two) group of female workers who are given and not given nutritious food and drinks on the night shift, while the variable characteristics of the respondents consist of age, marital status, number of family members, length of work in the company and sports activities.

B. LITERATURE REVIEW

1. Worker Nutrition Adequacy

In general, the nutritional needs of workers are greater than those of non-workers. Fulfilling the nutritional adequacy of workers while working is a form of application of occupational safety and health requirements as part of efforts to improve the health status of workers (Sun et al., 2018).

Nutrition is one aspect of occupational health that has an important role in increasing work productivity. This needs to be a concern for all parties, especially workplace managers considering that workers generally spend about 8 hours every

day at work. The amount of nutrients needed by workers is very dependent on the amount of energy expended to do a type of work. This amount depends on the number of muscles involved and the length of time these muscles have to work.

2. Other Conditions That Determine the Nutritional Needs of Workers

In the Guidelines for Fulfilling Worker Nutrition Adequacy During Work proposed by Chang & Peng (2021), there are other conditions that determine nutrition for workers, including: 1) Type of work or activities carried out daily. The heavier the activity carried out, the higher the need for nutrients, especially energy; 2) Physiological conditions that affect work nutrition are when female workers are pregnant and breastfeeding. During pregnancy and lactation, high nutrients are required from normal conditions as a result of increased metabolism and food consumption for the needs of female workers who are pregnant and breastfeeding their children and the needs of the baby itself as building blocks for infant growth and preparation for breast milk production; 3) Nutrients needed such as iron and folic acid. Female workers with good nutritional status with light-moderate types of work require an additional 180 kcal of calories per day in the 1st trimester, while in the 2nd and 3rd trimesters an additional 300 kcal per day is required. For breastfeeding mothers, the additional calories needed for the first 6 months is 330 kcal, then in the second 6 months 400 kcal. These extra calories are used to produce breast milk; 4) Special circumstances; In special conditions, such as in health recovery, Iron Nutrient Anemia (AGB) in workers, more nutrients are needed than usual and the problem of being overweight (Obesity); and 5) In workers who are recovering from illness energy from food is needed for health recovery.

3. Hypertension

Hypertension is defined as persistent blood pressure with a systolic pressure above 140 mmHg and a diastolic pressure above 90 mmHg. Patients with hypertension experience an increase in blood pressure that exceeds the normal limit, where normal blood pressure is 110/90 mmHg. Blood pressure is influenced by cardiac output, peripheral resistance in blood vessels, and the volume or content of circulating blood (Shaw et al., 2019). Hypertension can cause complications such as coronary heart disease, left ventricular hypertrophy and stroke which are carriers of high mortality.

Hypertension can be classified into two types, namely primary or essential hypertension whose cause is unknown and secondary hypertension which can be caused by kidney disease, endocrine disease, heart disease, and kidney disorders. Hypertension is also the third biggest risk factor for premature death. The Third National Health and Nutrition Examination Survey revealed that hypertension can increase the risk of coronary heart disease by 12% and increase the risk of stroke by 24%.

4. Infectious Diseases

Infectious diseases are still a major public health problem in Indonesia, in addition to the increasing problem of non-communicable diseases. Infectious diseases can also be experienced by workers in the workplace. Several infectious diseases that are the main problems in Indonesia are diarrhea, malaria, dengue hemorrhagic fever, influenza, abdominal typhus, digestive tract diseases and other diseases (Lim et al., 2020).

Infectious diseases collected in Riskesdas 2013 based on the media/mode of transmission, namely: 1) Through the air (Acute Respiratory Infections/ARI, pneumonia, and pulmonary TB); and 2) Through food, water and others (hepatitis, diarrhea); 3) Through vectors (malaria). This needs to be a concern for companies in their efforts to implement health services in the workplace so as to prevent the spread of disease in the workplace (Zhang et al., 2020).

C. METHOD

This research was conducted with a quantitative approach with a cross sectional design. This approach was taken because it wanted to see the correlation between companies that provide and do not provide food with the nutritional and health status of female workers who work on night shifts, as well as measurement of several variables carried out at the same time. The considerations for choosing the research location are 2 (two) industrial companies that employ women workers on the night shift, one company that provides nutritious food and drinks in North Jakarta and the other company that does not provide nutritious food and drinks (replaced with meal allowances) in North Jakarta. Depok. This research was conducted from August to October 2017. The population in this study were female workers who worked the night shift in 2 (two) companies that provided nutritious food and drinks in North Jakarta (X Ltd) and did not provide nutritious food and drinks in Depok. (Y Ltd). The female workers from these two companies work in the production department. The number of female workers in the production division working on the night shift at X Ltd is 114 people, while the number of female workers in the production division working on the night shift at Y Ltd is 100 people. In this study using proportioned random sampling technique. The sample in this study was 96 samples. The data in this study used the types of primary data and secondary data. Data processing in this study using manual processing and computer processing. Data analysis used two types of analysis, namely univariate analysis and bivariate analysis.

The research locations are 2 (two) industrial companies that employ women workers on the night shift, one company that provides nutritious food and drinks in North Jakarta and the other company that does not provide nutritious food and drinks (replaced with meal allowances) in Depok. This research was conducted from August to October 2018.

The population in this study are female workers who work on the night shift in 2 (two) companies that provide nutritious food and drinks in North Jakarta (X Ltd)

and does not provide nutritious food and drinks in Depok (Y Ltd), see Table 1:

Table 1. Respondent Population of Female Night Shift Workers

No.	Production	Number of Female Workers
1.	PT. X	114
2.	PT. Y	100
	Total	**214 Person**

Source: data proceed

This study used a proportioned random sampling technique. The sample size in this study can be calculated through the two-proportion difference hypothesis test formula (Lemeshow, 1997) and multiplied by the effect design. The proportions used were taken from previous studies. The calculation of the sample size for the population proportion is carried out using the following formula:

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{P_1(1-P_1)+P_2(1-P_2)}\right)^2}{(P_1-P_2)^2}$$

Description:

n = Minimum sample size for each group
Z = Standard value of normal distribution at 95 % confidence degree z= 1-α/2 1,96
Z = Standard value of normal distribution at 80 % test power (Z 1-β = 0,675)
1-α = Level of significance (in this study it was 95%)
α = Test I error (5%)
1-β = Test power (in this study 80%)
β = Type II error (20%)
P1 = Proportion of female workers with BMI classified as overweight who receive nutritious food and drinks at work.
P2 = Proportion of female workers with BMI classified as overweight who do not receive nutritious food and drinks at work.

The theoretical framework in this study is presented in the following figure:

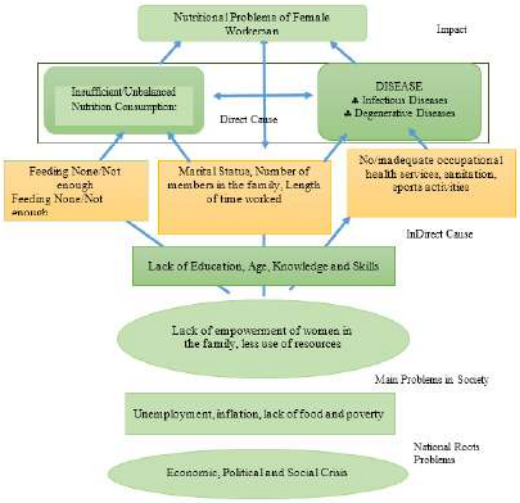


Figure 1. Theoretical Framework for Analysis of the Relationship of Women Workers Who Get and Don't Get Nutritious Food and Beverages With Nutritional and Health Status on Night Work Shifts

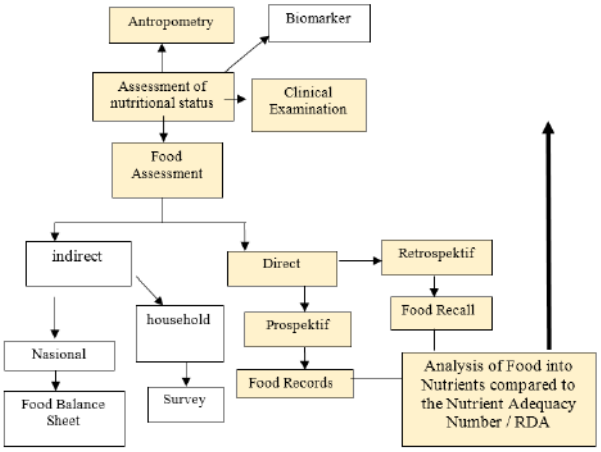


Figure 2. Modified Patterson (2009), Modified Conceptual Framework for Nutrition Problems

The figure below is a conceptual framework for the research:

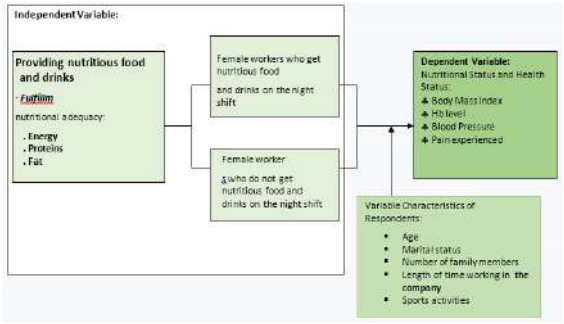


Figure 3. Conceptual Framework for Analysis of the Relationship of Women Workers Who Get and Don't Get Nutritious Food and Drinks with Nutritional and Health Status on Night Shift Work

The results of calculation of the sample size from several studies presented in the following table:

Table 2. The Results of Calculation of the Sample Size from Several Studies

Variable	P1	P2	N	Research
Marital Status	**0,44**	**0,095**	**32**	**Wahyuningrum, 2000**
Energy intake	0,739	0,237	12	Oktaviany, 2013
Protein intake	0,571	0,234	29	Oktaviany, 2013

Based on the calculation results above, the highest sample size was obtained, namely 32 samples, then the sample results were multiplied by 2 and 1.5. The sample is multiplied by 2 because the formula for hypothesis testing is 2 proportions, while it is multiplied by 1.5 because the sample is not selected at random (random), but is selected by purposive sampling, so the calculation for sample adequacy is: 32 x 2 x 1.5 = 96 samples.

To filter the sample, inclusion criteria and exclusion criteria were used. Inclusion criteria are the conditions that must be met so that respondents can become samples. The inclusion criteria used in this study include: a) Working age : 19 – 49 years old; b)Worker's gender: Female; c) Working period: workers who have worked for 1 year; and d) have the same type of work and regular night shift hours.

The exclusion criteria are the conditions that cannot be met by the respondent in order to become a sample. Exclusion criteria in this study include: a) Workers who are not willing to be respondents; b) Workers are menstruating/pregnant. To obtain data in this study, several instruments were used, including Questionnaire

This questionnaire represents the 13 test variables as follows: a) Providing nutritious food and drinks; b) Age; c) Marital status; d) Number of family members; e) Body Mass Index (BMI); f) Hemoglobin Level (Hb); g) Blood pressure; h) Infectious diseases; i) Energy sufficiency; j) Protein Adequacy; k) Adequate Fat; l) Length of work in the company; and m). Sports activities. Examination of Body Mass Index, including: a) Measurement of Body Weight (BB); b) Height measurement; c) BMI calculation.

Health Checkup, including Blood pressure and Examination of Blood Hemoglobin (Hb) Levels to test the research hypothesis as determined, statistical analysis was carried out using a computer program. Data were analyzed by univariate and bivariate.

For the purposes of univariate analysis, several variables with a ratio scale are grouped into several categories according to the operational definition previously stated. The variables are BMI, hemoglobin levels, hypertension, infectious diseases, energy adequacy, protein adequacy, fat adequacy, age, marital status, number of family members, length of work in the company and sports activities.

Bivariate analysis was carried out on two variables that were thought to be related or correlated (Notoatmodjo, 2010). The statistical test used is Chi Square. The chi square test was used to analyze the comparison between categorical and categorical, carried out to calculate the relationship between the independent variable and the dependent variable. The proof of the chi square test can use the following formula:

$$X^2 = \underline{\Sigma(0-E)^2}$$

X2 = Value of Chi Square
0 = Observed frequency
E = Expected frequency

Appendix 1 : Ages
Appendix 2 : Marital status
Appendix 3 : Number of family members
Appendix 4 : Length of work in the company
Appendix 5 : Sports activities

In addition, if the p value is significant, it will continue to look for OR. The strength of the relationship in research with a cross sectional design can be known based on the calculation of the size of the association Odds Ratio (OR), where if the value:

1. If OR = 1, it means that there is no relationship between variables.
2. If OR > 1, it means that the independent variable is at risk of causing events in the dependent variable
3. If OR < 1, it means that there is an independent variable that has a protective effect against events in the dependent variable

The OR calculation also aims to see whether the variable has the opportunity to be included in multivariate analysis by looking at the P value. The selection made is if P < 0.25 then this variable will have the opportunity to be included in multivariate and if P> 0.25 then the variable will not be included in the variable. In multivariate, except when substantially the variable has a strong relationship with BMI (Dahlan, 2012).

D. RESULT AND DISCUSSION

1. Description of Data and Research Objects

X Ltd is an instant noodle company that was founded in 1970. The company has 15 branches spread throughout Indonesia with a total of 16 factories. The Jakarta branch company is the oldest factory and started its commercial operations in 1971. To date, X Ltd Jakarta branch has received various awards at home and abroad.

The work shift system is divided into three, namely shift I at 07.00 WIT - n15.00 WIT, shift II at 15.00 WIT - 23.00 WIT and shift III at 23.00 - 07.00 WIT. The food service is handed over to the catering company. Nutritious food and drinks are provided to all workers according to their respective work shifts. Especially for shift III workers are given additional food, in the form of tea/milk and bread.

The food system uses a supply system, rice is provided freely and workers can take as desired, while side dishes and fruit are measured on each plate. Drinks are available freely and for additional food in the form of tea/milk and bread are provided each worker takes one.

While Y Ltd is a company that has decades of experience in presenting tea drinks in the midst of Indonesian society. This company has positioned itself as a fragrant tea and orange-flavored beverage company. The company's products, apart from producing jasmine tea, also produces tea in glass and plastic bottles and mineral water in plastic packaging. The company has a mission to be committed to providing the best quality products and the best service through its expertise in the tea and beverage industry for more than half a century and a vision to become a leading tea and beverage company in Indonesia. The work shift system is divided into three, namely shift I at 07.00 WIT - 15.00 WIT, shift II at 15.00 WIT - 23.00 WIT and shift III at 23.00 - 07.00 WIT. The company does not provide food to workers who work in the company, but provides food allowance to workers. Workers usually bring their own food from home or buy food from workers who often bring food to sell, such as lontong and fried food.

2. Univariate Analysis

Univariate analysis in this study describes the distribution of respondents and describes the independent variables and related variables. The results of the univariate analysis are presented in the following table:

Table 3. Distribution of Respondents Based on Giving Nutritious Food and Drink for Female Night Shift Workers at X Ltd and Y Ltd in 2017

Providing nutritious food and drinks (n = 95)	n	%
Dind't get	41	43,2
Get	54	56,8
Total	**95**	**100**

Based on table 3 above, out of 95 respondents, it is known that the proportion who received nutritious food and drink (56.8%) was higher than those who did not receive nutritious food and drink (43.2%).

Based on the distribution of data in table 4 below, it is known that most of the respondents' ages are in the 30-49 year old category (78.9%) and a small proportion are 19-29 years old (21.1%). The education level of most of the respondents is High School/Vocational High School by 62.1% and a small proportion of S1 graduates are 1.1%. Most of the respondents were married (74.7%) and the rest were unmarried/divorced/divorced (25.3%). Furthermore, it is known that more than half of respondents who have family members 4 people (52.6%) are almost the same as respondents who have family members < 4 people (47.4%).

Table 4. Distribution of Respondents by Category Age, Education, Marital Status, Number of Family Members, Family Planning Participation, Genetics, Length of Work and Sickness in a month

Distribution Responden (n=95)	n	%
Age		
30-49 years	75	78.9
19-29 years	20	21.1
Education		
Graduated from Elementary School	3	3.2
Graduated from Middle School	30	31.6
Graduated from High School/Vocational	59	62.1
Graduated from Diploma	2	2.1
Graduate from Bachelor	1	1.1
Marital Status		
Married	71	74.7
Unmarried/divorced	24	25.3
Number of Family Members		
Risk (≥ 4 person)	50	52.6
No Risk (< 4 person)	45	47.4
KB Participation Status		
No	53	55.8
Yes	42	44.2
Genetic Disease		
Yes	10	10.5

No	85	89.5
Length of Work		
≥ 3 years	79	83.2
< 3 t years	16	16.8
Sport		
<150 minutes/week	95	100
>150 minutes/week	-	-

Table 5. Distribution of Respondents by Category BMI, Hemoglobin Level, Blood Pressure and Pain in a Month

Distribution Respondents (n=95)	N	%
BMI		
Overweight + Obesitas	55	57,9
Skinny + Normal	40	42,1
Hemoglobin Level (Hb)		
Anemia Hb < 12 gr/dl	41	43,2
No Anemia Hb ≥12 gr/dl	54	56,8
Blood pressure		
Risky (No normal ≥140/90)	11	11,6
No Risk (Normal < 140/90)	84	88,4
Sick in a Month		
Yes	51	53,7
No	44	46,3

Source: data proceed

Based on the distribution of data in table 5, it is known that less than half of the respondents have a thin and normal BMI, while those with overweight and obesity are more than half of 57.9%. Meanwhile, based on the BMI categories in more detail, they are classified as thin (2.1%), normal (43.2%), overweight (42.1%), and obese (12.6%).

Furthermore, most of the respondents had non-anemic hemoglobin levels (Hb 12 g/dl) of 56.8% and the rest had hemoglobin levels of <12 g/dl (anemia) of 43.2%. Based on the blood pressure category, it is known that most of the respondents with blood pressure <140/90 are 88.4% and a small number of respondents are in the category of blood pressure 140/90 by 11.6%.

Based on research data, the average female worker with a blood pressure category of 140/90 has a parent/family history of hypertension. In accordance with JNC VIII, it is necessary to evaluate and treat hypertension for these workers. WHO data in September, 2011 states that hypertension causes 8 million deaths per year worldwide and 1.5 million deaths per year in Southeast Asia. Factors that trigger hypertension include family history, gender, age, obesity, lack of physical activity, smoking behavior, and consumption patterns of foods containing sodium and saturated fat.

The distribution of data on respondents who experienced pain in this month (53.7%) and those who did not experience pain was 46.3%. Respondents who suffered from illness based on the type of illness experienced by workers, the most common were flu/cough/cold by 28.4% and less by 1.1% in hypercholesterolemia, colds, calcification of bones, rheumatism and post-surgery. Respondents in this study also

did not carry out regular and sufficient exercise activities.

Table 6. Distribution of Respondents Based on Adequacy of Energy, Protein and Fat according to Recall Results

	Get nutritious food + drink						Not getting nutritious food + drinks					
Nutrients	Night Shift recall results (1)	% Nutrient Adequacy Rate	The results of the morning or afternoon shift recall (2)	% Nutrient Adequacy Rate	Total = (1+2)/number of recall days	Total % Nutrient Adequacy Rate	Night Shift recall results (3)	% Nutrient Adequacy Rate	The results of the morning or afternoon shift recall (4)	% Nutrient Adequacy Rate	Total = (1+2)/number of recall days	Total % Nutrient Adequacy Rate
Energy	Min	216.0	10.0	427.0	19.8	391.0	18.2	527.8	24.5	779.1	36.2	710.6	33.05
	Max	2601.5	121	3139.0	146	2556.6	118.9	24691.1	114.8	1816.4	86.6	1991.4	92.6
	Mean±sd	1321± 481.4	61.4 ± 22.4	1422 ± 558.8	66.1 ± 25.9	1372 ± 469.2	63.75± 23.15	1350 ± 528.7	62.8 ± 24.6	1323 ± 278.6	61.5 ± 12.9	1336 ± 330.7	62.15 ± 18.75
Protein	Min	**3.1**	**5.4**	**16.6**	**29.1**	**12.6**	**22.1**	**16.4**	**28.7**	**11.2**	**19.6**	**13.8**	**24.2**
	Max	**92.7**	**162.6**	**176.6**	**30.9**	**109.2**	**191.6**	**75.9**	**133.1**	**80.0**	**140.3**	**68.4**	**120**
	Mean±sd	**42.6 ± 17.8**	**74.7 ± 31.2**	**49.0 ± 25.7**	**85.9 ± 45.1**	**54.0 ± 22.0**	**80.3 ± 38.15**	**42.9 ± 14.1**	**75.3 ± 24.7**	**43.3 ± 16.0**	**75.9 ± 28.1**	**43.1 ± 11.7**	**75.6 ± 26.4**
Fat	Min	9.7	16.2	10.8	18	22.8	38	12.0	20	7.8	130	12.9	21.5
	Max	112.8	188	166.8	278	195.0	325	141.2	235.3	91.2	152	98.9	164.8
	Mean±sd	52.7 ± 24.1	87.8 ± 40.2	55.4 ± 29.1	92.3 ± 48.5	81.0 ± 30.8	90.05 ± 44.35	53.8 ± 29.1	89.6 ± 48.5	46.6 ± 17.4	77.6 ± 29	50.2 ± 18.4	83.6 ± 38.75

Energy Adequacy Rate = 2150 Kcal/capital/day; Protein Adequacy Rate = 57 g/capital/day; Fat Adequacy Rate = 60 g/capital/day

Source: Permenkes No. 75 of 2013

It is known that for energy adequacy, respondents who get nutritious food and drinks have a minimum value of 18.2% RDA and a maximum value of 118.9% RDA with an average value of 63.75% RDA and sd± 24.15%. The RDA for respondents who do not get nutritious food and drinks has a minimum value for energy adequacy of 33.05% RDA and a maximum value of 92.6% RDA with an average value of 62.5% RDA and up to 18.75% RDA.

For protein adequacy, respondents who get nutritious food and drinks have a minimum value of 22.1% RDA and a maximum value of 191.6% RDA with an average value of 80.3% RDA and up to 38.15% RDA, while for respondents who not getting nutritious food and drink has a minimum value for protein adequacy of 24.2% RDA and a maximum value of 120% RDA with an average value of 75.6% RDA and up to ± 26.4% RDA.

Meanwhile, for the adequacy of fat in respondents who get nutritious food and drinks, the minimum value is 38% RDA and the maximum value is 325% RDA with an average value of 90.05% RDA and sd± 44.35% RDA, while for respondents who do not get food and nutritious drinks have a minimum value for fat adequacy of 21.5% RDA and a maximum value of 164.8% RDA with an average value of 83.6% RDA and up to ± 28.75% RDA. The results of the calculation of nutrients at dinner given during the night shift at company X, obtained a dinner contribution of approximately 850 Cal (39.5% RDA) about 40 grams of protein (70% RDA) and about 35 grams of fat (59% RDA).

Univariate analysis in this study is divided into several points as follows:

1. **Distribution of Respondents Based on Provision of Nutritious Food and Drinks to Female Night Shift Workers X Ltd and Y Ltd**

Based on the decision of the Minister of Manpower and Transmigration No. KEP-224/MEN/2003 concerning Obligations of Employers Who Employ Female

Workers/Labourers Between 23.00 and 07.00, Article 2 of KEP-224/MEN/2003 explains that companies that employ female workers at 23.00–07.00 are required to provide food and drinks nutritious. In this study it was found that Y Ltd did not provide nutritious food and drinks for female workers who worked from 23.00 to 07.00. This means that Y Ltd does not meet the provisions of labor norms. The role of the company in ensuring adequate nutrition for workers is very important. Workplace eating programs can prevent micronutrient deficiencies and chronic diseases, including obesity. Investments in nutrition are paid back in reducing sick days, work accidents, increasing productivity and morale (Wanjek, 2005)

2. **Distribution of Respondents by Category Age, Education, Marital Status, Number of Family Members, Family Planning Participation, Genetics, Length of Work and Sickness in a month**

According to Anna Lipowicz, 2002 age, education level and marital status have a significant role with a woman's nutritional status. In his research, it was found that there was a positive and significant relationship ($P < 0.001$), the difference in Body Mass Index (BMI) between married and unmarried people increased with age. Married women are more likely to be overweight and obese than unmarried women. While the level of education is significantly related to BMI. The higher a person's education, the more likely that person's information about the intake of nutritious and balanced foods will be so that they can choose food according to their needs.

From the data distribution of the age of the workers who became respondents in this study, more than half of the respondents were workers aged over 30 years with the most education being Senior High School/Vocational High School. This is common in companies that employ a lot of female workers in production. Generally, they accept workers with secondary education status, although some workers with less than three years of service have a D3/S1 education. This is because the work at both X Ltd and Y Ltd is included in the category of work that does not require much planning, coordination of ideas, and high problem solving so that a workforce with a high school education level is sufficient to be able to complete work, especially in the production section.

Based on the participation in family planning (hereinafter referred to as family planning), it is known that more than half of the respondents (55.8%) follow family planning and the rest do not take family planning (44.2%). The type of family planning that is mostly used by respondents is injectable family planning (54.7%) and the type of family planning that is rarely used by respondents is implant/implant family planning (4.7%). As for other types of family planning, such as pills, 28.5% of respondents and IUDs were 11.9%. This happens because the average female worker already has more than one child, this can be seen from the average number of people in a family of 4 more people than those with less.

Based on the category of genetic diseases such as hypertension, kidney, heart, diabetes mellitus, it is known that most respondents do not have genetic diseases (89.5%) and a small proportion of respondents have genetic diseases (10.5%). Furthermore, it is known that most of the respondents have a working period of 3

years by 83.2% and a small proportion of respondents have a working period of <3 years by 16.8%. Based on the category of sports activities, it is known that all respondents (100%) in sports activities <150 minutes/week.

Genetic diseases such as diabetes and hypertension are strongly influenced by healthy living habits and a balanced diet. For female workers who work at X Ltd and Y Ltd, the company has conducted regular health checks on workers, once a year. In the research of Brum et al. (2020) on Risk Factors for Overweight and Obesity in Adults in Indonesia (Basic Health Research Data Analysis 2013) it was found that respondents with less physical activity had a risk of being overweight and obese respectively 1.7 times and 2.55 times compared to with respondents with sufficient physical activity. By doing exercise habits and having a diet that meets balanced nutrition, workers will avoid health problems and chronic degenerative diseases.

3. Distribution of Respondents by Category BMI, Hemoglobin Level, Blood Pressure and Pain in a Month

From the research data, it can be seen that the nutritional status of workers in both companies is more overweight and obese. This is in line with the research of Cheng et al. (2021) on Risk Factors for Overweight and Obesity in Adults in Indonesia (Basic Health Research Data Analysis 2013). In his research, it was found that female respondents had a risk of being overweight and obese 1.76 times and 3.43 times greater than male workers. Married respondents have a risk of being overweight and obese respectively 2.13 times and 2.37 times compared to unmarried respondents. This means that both companies face the condition of female workers with nutritional status who are at risk and are vulnerable to chronic degenerative diseases.

Based on the results of the distribution of respondents with hemoglobin levels, WHO has issued a provision, anemia becomes a public health problem when the prevalence is >20%. From this data, it can be seen that the percentage of respondents in both companies who experience anemia is 43.2%, this condition includes severe public health problems.

Based on research data, the average female worker with a blood pressure category of 140/90 has a parent/family history of hypertension. In accordance with JNC VIII, it is necessary to evaluate and treat hypertension for these workers. WHO data in September, 2011 states that hypertension causes 8 million deaths per year worldwide and 1.5 million deaths per year in Southeast Asia. Factors that trigger hypertension include family history, gender, age, obesity, lack of physical activity, smoking behavior, and consumption patterns of foods containing sodium and saturated fat.

4. Bivariate Analysis

Bivariate analysis aims to see the relationship between two variables, namely the dependent variable and the independent variable and to see the magnitude of the probability value (OR). The relationship was considered statistically significant if the p value <0.05. This analysis also aims to select variables that can be included in multivariate analysis with a p value of 0.25 and substantially p> 0.25 affect the nutritional status and occupational health in providing nutritious food and drinks to

female night shift workers. Bivariate analysis using the Chi-Square test, if the Chi-Square test analysis does not meet the requirements, an alternative test will be carried out, namely the Fisher's exact test. The Chi Square test is not eligible when there are cells that have an expected value (E value) of less than 1, and a cell that has an expected value (E value) of less than 5, more than 20% of the total number of cells. The results of the analysis can be seen in the following table:

Based on table 7, it shows that there is no difference in the proportion between energy consumption and the provision of nutritious food and drinks (p=0.168). The Relationship of Adequate Consumption of Energy, Protein and Fat with the Provision of Nutritious Food and Beverages presented in the following table:

Table 7. Relationship between Adequate Energy, Protein and Fat with Nutritious Food and Beverage

Consumption		Nutritious Food and Beverages				Total		OR	95% CI	Pvalue
		No		Yes						
		n	%	N	%	n	%			
Energy	< 80%	35	40.7	51	59.3	86	100	0.343	0.080-1.465	0.168
	≥80%	6	66.7	3	33.3	9	100			
Protein	< 80%	22	33.3	44	66.7	66	100	0.263	0.105-0.661	0.07
	≥80%	19	65.5	10	34.5	29	100			
Fat	< 80%	25	49.0	26	51.0	51	100	1.683	0.738-3.835	0.301
	≥80%	16	36.4	28	63.6	44	100			

Source: data proceed

Based on the table above, it shows that there is no difference between protein consumption and nutritious food and drink (p=0.07). Based on the table above, it shows that there is no difference in the proportion between fat consumption and the provision of nutritious food and drinks (p=0.301). However, there is a tendency that companies that provide nutritious food and beverages consume more fat, which is 80% (63.6%) compared to those in the <80% category (51.0%).

The Relationship of Adequate Consumption of Energy, Protein and Fat with the Provision of Nutritious Foods and Drinks presented in the following table:

Table 8. The Relationship of Adequate Consumption of Energy, Protein and Fat with the Provision of Nutritious Foods and Drinks

Consumption		Nutritious Food and Beverages				Total		OR	95% CI	Pvalue
		No		Yes						
		n	%	N	%	n	%			
Energy	< 80%	35	40.7	51	59.3	86	100	0.343	0.080-1.465	0.168
	≥80%	6	66.7	3	33.3	9	100			
Protein	< 80%	22	33.3	44	66.7	66	100	0.263	0.105-0.661	0.07
	≥80%	19	65.5	10	34.5	29	100			
Fat	< 80%	25	49.0	26	51.0	51	100	1.683	0.738-3.835	0.301
	≥80%	16	36.4	28	63.6	44	100			

Based on table 8, it shows that there is no difference in the proportion between energy consumption and the provision of nutritious food and drinks (p=0.168).

Based on the table above, it shows that there is no difference between protein

consumption and nutritious food and drink (p=0.07). Based on the table above, it shows that there is no difference in the proportion between fat consumption and the provision of nutritious food and drinks (p=0.301). However, there is a tendency that companies that provide nutritious food and beverages consume more fat, which is 80% (63.6%) compared to those in the <80% category (51.0%).

Relationship of Nutritious Food and Drinks with BMI, Anemia Status, Blood Pressure, and Sickness in a Month presented in the following table:

Table 9. Relationship between Provision of Nutritious Food and Drinks with BMI

Variable		IMT				Total		OR	95% CI	Pvalue
		Skinny + normal ≤25		Overweight + Obesity >25						
		N	%	N	%	N	%			
Nutritious Food and Drinks + Nutritious Drinks	Can Not	20	48.8	21	51.2	41	100	0.618	0.271-1.409	0.348
	Can	20	37.0	34	63.0	54	200			

Based on table 9 above, it is known that there is no difference in the proportion between the provision of nutritious food and drinks with BMI (p> 0.05), however, respondents with BMI Overweight and Obesity in companies that receive more nutritious food and drinks (63.0%) than those with BMI. the respondents with BMI Overweight and Obesity in companies that do not get nutritious food and drinks.

Table 10. The Relationship between Provision of Nutritious Food and Drinks with Hemoglobin Levels (Hb)

Variable		Anemia Status				Total		OR	95% CI	pvalue
		Anemia <12		No Anemia ≥12						
		n	%	n	%	n	%			
Nutritious Food and Drinks	Can Not	19	46.3	22	53.7	41	100	1.256	0.554-2.851	0.736
	Can	22	40.7	32	59.3	54	100			

Based on table 10 above, it is known that there is no difference in the proportion between the provision of nutritious food and drinks with anemia status. However, respondents with anemia category (Hb level <12gr/dl) were found more in companies that did not receive nutritious food and drinks (46.3%) compared to respondents who received nutritious food and drinks (40.7%). anemia status

Table 11. Relationship between Provision of Nutritious Food and Drinks with Blood Pressure

Variable		Blood pressure				Total		OR	95% CI	pvalue
		≥140/90mmHg		<140/90mmHg						
		n	%	n	%	n	%			
Nutritious Food + and Drinks	Can Not	4	9.8	37	90.2	41	100	0.726	0.187-2.668	0.752
	Can	7	13.0	47	87.0	54	100			

Based on table 11 above, it is known that there is no difference in the proportion between companies that provide and do not provide nutritious food and beverages with the category of blood pressure. However, there is an exception that respondents in companies that get nutritious food and beverages with blood pressure category 140/90mmHg are more (13%) than respondents in companies that do not get nutritious food and drinks by 9.8%.

Table 12. Relationship Between Provision of Nutritious Food and Drinks with Pain in a Month

Variable		Sick				Total		OR	95% CI	Pvalue
		yes		No						
		N	%	n	%	N	%			
Nutritious Food and Drinks	Can Not	23	56,1	18	43,9	41	100	1,187	0,525-2,682	0,839
	Can	28	**51,9**	26	48,1	54	100			

Based on table 12, it is known that there is no difference in the proportion between companies that provide and do not provide nutritious food and drinks with the category of experiencing illness in a month. However, respondents in the sick category at companies that did not get food were more (56.1%) compared to respondents who received nutritious food and drinks by 51.9%.

Relationship of BMI, Hemoglobin Level, Blood Pressure and Pain in a Month with Respondents' Internal Factors presented in the following table

Table 13. The Relationship Between BMI and Respondents' Internal Factors

Variable		IMT				Total		OR	95% CI	pvalue
		Overweight + Obesitas >25		Skinny+ normal ≤25						
		n	%	n	%	n	%			
Ages	30-49	52	69.3	23	30.7	75	100	12.812	3.416-48.049	0.001*
	19-29	3	15.0	17	85.0	20	100			
Marital Status	Marry	49	69.0	22	31.0	71	100	6.682	2.334-19.132	0.001*
	Not married/divorced/divorced	6	25.0	18	75.0	24	100			
Numbers of Family Members	≥4 people	33	66.0	17	34.0	50	100	2.029	0.888-4.640	0.139
	<4 people	22	48.9	23	51.1	45	100			
Length of work	≥3 year	52	65.8	27	34.2	79	100	8.346	2.188-31.831	0.001*
	<3 year	3	18.8	13	81.2	16	100			

*Shows a significant value

Based on table 13 it is known that there is a difference in the proportion between age and BMI ($p < 0.05$). It can be seen that there are more overweight and obese respondents aged > 30 years (69.3%) compared to respondents aged 19-29 years (15.0%). This indicates that the risk of being overweight and obese (> 25) in the age group > 30 years is 12 (twelve) times greater than the risk of being overweight and obese (> 25) in the age group 19-29 years.

Based on table 13 it is known that there is a difference in the proportion between age and BMI (p <0.05). It can be seen that there are more overweight and obese respondents aged >30 years (69.3%) compared to respondents aged 19-29 years (15.0%). This indicates that the risk of being overweight and obese (>25) in the age group >30 years is 12 (twelve) times greater than the risk of being overweight and obese (>25) in the age group 19-29 years.

Based on table data 13 there is a difference in the proportion between marital status and BMI (p <0.05). Respondents who are overweight and obese (>25) are more in the group with married marital status (69.0%) compared to 25% who are not married. This shows that the risk of being overweight and obese in the group with married marital status is 6 (six) times greater than that of the less and normal respondents.

Based on table 13 there is no difference in the proportion between groups with the number of family members with BMI (p>0.05). However, it can be seen that respondents who are overweight and obese are more in the group with 4 family members by 66.0% compared to respondents with <4 family members (48.9%).

Meanwhile, for respondents with length of work, it was found that there was a difference in the proportion between length of work and BMI (p<0.05). Respondents who were overweight and obese were more in the group with 3 years of work (65.8%) compared to those with <3 years of work (18.8%). This indicates that the risk of being overweight and obese in the group with a length of work 3 years has a risk of 8 (eight) times greater than the respondent whose duration of work is <3 years. This means that the longer a person works in the company, the pattern of food intake will be influenced by the work environment in which the worker works.

Table 14. Relationship between Hb Levels and Respondents' Internal Factors

Variable		Level Hb				Total		OR	95% CI	Pvalue
		<12		≥12						
		n	%	n	%	n	%			
Ages	30-49	30	40.0	45	60.0	75	100	0.545	0.202-1.475	0.342
	19-29	11	55.0	9	45.0	20	100			
Marital Status	Married	31	43.7	40	56.3	71	100	1.085	0.425-2.770	0.865
	Unmarried/ Divorce/Death Divorce	10	41.7	14	58.3	24	100			
Number of Family Members	≥4 people	25	50.0	25	50.0	50	100	1.812	0.795-4.134	0.226
	<4 people	16	35.6	29	64.4	45	100			
Length of work	≥3 year	31	39.2	48	60.8	79	100	0.388	0.128-1.174	0.151
	<3 years	10	62.5	6	37.5	16	100			

Table 15. Distribution of Respondents by Category BMI, Hemoglobin Level, Blood Pressure and Pain in a Month

Respondent Distribution (n=95)	n	%
IMT		
Overweight + Obesity	55	57.9
Skinny + Normal	40	42.1
Hemoglobin Level (Hb)		
Anemia Hb < 12 gr/dl	41	43,2
No Anemia Hb ≥12 gr/dl	54	56.8
Blood pressure		
Risky (Abnormal 140/90)	11	11.6
No risk (Normal < 140/90)	84	88.4
Sick in a Month		
Yes	51	53.7
Nor	44	46.3

Based on table 15 above, it is known that there is no difference in the proportion between age and Hb levels (p>0.05). However, it can be seen that respondents whose Hb level <12 (anemia) is greater in the age group 19-29 years (55.0%) compared to respondents aged > 30 years by 40%.

In this study, there was no difference in the proportion between marital status and Hb levels (p>0.05). It can be seen that respondents with Hb <12 (anemia) in the group with married marital status (43.7%) were greater than the group of respondents who were not married/divorced/divorced by 41.7%.

Based on the number of family members, it is known that there is no difference in the proportion between the number of family members and Hb levels (p>0.05). However, it can be seen that respondents with Hb levels <12 (anemia) in the group with 4 family members were greater (50.0%) compared to the group of respondents with <4 family members by 35.6%.

As for the difference in the proportion between the length of work with Hb levels there is no difference (p> 0.05). However, more than half (62.5%) of respondents with Hb <12 (anemia) in the group with working duration of <3 years were more than half (62.5%) compared to 39.2% of respondents who worked 3 years.

The results of the research above can be concluded that there is no significant relationship between age, marital status, number of family members, length of work on Hb levels of female workers.

Table 16. The Relationship netween Blood Pressure and Respondents' Internal Factors

Variable		Blood pressure				Total		OR	95% CI	pvalue
		≥140/90mmHg		<140/90mmHg						
		N	%	n	%	N	%			
Ages	30-49	11	14.7	64	85.3	75	100	0.853	0.777-0.937	0.113
	19-29	0	0	20	100	20	100			
Marital status	Marry	10	14.1	61	85.9	71	100	3.770	0.457-31.126	0.280
	Not married/divorced	1	4.2	23	95.8	24	100			
Number of family members	≥4 orang	7	14.0	43	86.0	50	100	1.669	0.454-6.128	0.648
	<4 orang	4	8.9	41	91.1	45	100			
Length of work	≥3 year	11	13.9	68	86.1	79	100	0.861	0.788-0.941	0.201
	<3 year	0	0	16	100	16	100			

Table 17. Relationship between Pain and Respondents' Internal Factors

Variable		Sick				Total		OR	95% CI	pvalue
		Yes		No						
		n	%	n	%	n	%			
Age	30-49	41	54.7	34	45.3	75	100	1.206	0.449-3.237	0.905
	19-29	10	50.0	10	50.0	20	100			
Marital status	Marry	41	57.7	30	42.3	71	100	1.913	0.749-4.889	0.172
	Not married/divorced	10	41.7	14	58.3	24	100			
Number of family members	≥4 people	29	58.0	21	42.0	50	100	1.444	0.642-3.247	0.494
	<4 people	22	48.9	23	51.1	45	100			
Length of work	≥3 year	44	55.7	35	44.3	79	100	1.616	0.547-4.773	0.549
	<3 year	7	43.8	9	56.2	16	100			

Based on table 17 above, it is known that there is no difference in the proportion between age and illness experienced in a month (p>0.05). More than half of respondents with illness in the age group > 30 years (54.7%) compared to respondents in the 19-29 year age group by 50.0%.

There was no difference in the proportion between marital status and illness experienced in a month (p>0.05). However, it can be seen that respondents with illness in the group with married marital status were more (57.7%) compared to respondents with married/divorced/divorced status of 41.7%.

There was no difference in the proportion between the number of family members and the illness experienced in a month (p>0.05). However, it can be seen that respondents who experienced illness in the group with 4 family members were

more (58.0%) than those in the category of <4 family members at 48.9%.

As for the difference in the proportion between the length of work and the pain experienced, there was no difference (p>0.05). However, it can be seen that there are more respondents who experience illness in the group with 3 years of work (55.7%) compared to 43.8% of respondents with less than 3 years of work.

Bivariate analysis in this study is presented in the following points:

1. **Relationship of Adequate Consumption of Energy, Protein and Fat with Nutritional Food and Beverage**

Based on research data, it shows that there is no difference in the proportion between energy consumption and the provision of nutritious food and drinks (p=0.168). However, it is known that respondents in companies that provide nutritious food and drinks have higher energy consumption in the <80% category, which is 59.3% compared to companies that do not provide nutritious food and drinks with energy consumption in the category >80% (33.3 %). This is in accordance with the conditions in the field, because companies that provide nutritious food and drinks use a supply system in the provision of food in the workplace. The supply system allows workers to take the rice according to their free will, not measured by the company.

Based on research data, it shows that there is no difference between protein consumption and nutritious food and drink (p=0.07). However, respondents in companies that provide nutritious food and drinks, it turns out that protein consumption is greater in the <80% category, which is 66.7% compared to companies that provide nutritious food and drinks with protein consumption in the >80% category (34.5%). This is in accordance with the reality on the ground, companies that provide nutritious food and drinks in the distribution of vegetable and animal protein are given the same amount to each worker, while in companies that do not provide food, the protein intake of each worker depends on the food brought. by each worker (van de Langenberg et al., 2019).

2. **Relationship of Nutritious Food and Drinks with BMI, Anemia Status, Blood Pressure, and Sickness in a Month**

Based on the results of the study, there was no difference in the proportion between the provision of nutritious food and drinks with BMI, anemia status, blood pressure, and illness in a month (p>0.05).

However, the results of BMI with obesity and overweight categories which were found to be greater in companies that provide nutritious food and beverages indicate that the provision of nutritious food and beverages needs to be reviewed. Based on observations in the field, more food is served by frying. This condition needs to be balanced because it has an impact on the nutritional status and health of workers.

Respondents with anemia category (Hb level <12gr/dl) were found more in companies that did not receive nutritious food and drinks (46.3%) this explains that the provision of food and drink in the workplace has a positive impact on workers, otherwise if not given will affect the health of workers. Blood pressure category

140/90mmHg which is more in companies that get nutritious food and drinks.

3. **Relationship between BMI, Hemoglobin Level, Blood Pressure and Pain in a Month with Respondents' Internal Factors**

Based on the data, it is known that there is a difference in the proportion between age and BMI ($p<0.05$). It can be seen that there are more overweight and obese respondents aged >30 years (69.3%) compared to respondents aged 19-29 years (15.0%). This indicates that the risk of being overweight and obese (>25) in the age group >30 years is 12 (twelve) times greater than the risk of being overweight and obese (>25) in the age group 19-29 years.

This is in line with research conducted by Shiva Bhandari et al (2016) on Dietary Intake Patterns and Nutritional Status of Women of Reproductive Age in Nepal: Findings From a Health Survey. The study said women ages 15 to 24 were about 3 times more likely to be malnourished than women aged 35 to 49. Similar findings were also found by Stone et al. (2019) in the study of Risk Factors for Overweight and Obesity in Adults in Indonesia (Basic Health Research Data Analysis 2013). This study says that respondents in the 45-54 year age group have 1.5 times and 1.6 times the risk of being overweight and obese, respectively, compared to respondents in the 25-35 year age group. Women are also said to be at risk for overweight and obesity 1.76 times and 3.43 times compared to men.

His research says that analysis of the relationship between marital status for women and nutritional status shows that those who have never been married are more likely to be malnourished than those who are currently married or living with their partners. Similar findings were also reported in Lim et al. (2018) in Socio-economic Correlates of Malnutrition among Married Women in Bangladesh. His findings suggest that many married women are financially dependent on their partners and thus single women are economically disadvantaged and less able to achieve food security and maintain optimal health in a sustainable manner.

Meanwhile, for respondents with length of work, it was found that there was a difference in the proportion between length of work and BMI ($p<0.05$). Respondents who were overweight and obese were more in the group with 3 years of employment (65.8%) compared to those with <3 years of employment (18.8%). This indicates that the risk of being overweight and obese in the group with a length of work 3 years has a risk of 8 (eight) times greater than the respondent whose duration of work is <3 years. This means that the longer a person works in the company, the pattern of food intake will be influenced by the work environment in which the worker works.

Based on the data, it is known that there is no difference in the proportion between age and Hb levels ($p>0.05$). However, it can be seen that respondents whose Hb level <12 (anemia) is greater in the age group 19-29 years (55.0%) compared to respondents aged > 30 years by 40%. This study is in line with Rizza et al. (2021) on Factors Associated with the Degree of Anemia During Pregnancy at Siti Fatimah Maternal and Child Hospital Makassar. The results of this study showed that there was no relationship between maternal age and the degree of anemia due to the value of (0.534). Research Vetter et al. (2018) about the Prevalence of Anemia Risk Factors

in Pregnant Women in Kerman Iran. shows the same thing, there is no relationship between the age variable and anemia status in women of childbearing age.

In this study, there was no difference in the proportion between marital status and Hb levels (p>0.05). It can be seen that respondents with Hb <12 (anemia) in the group with married marital status (43.7%) were greater than the group of respondents who were not married/divorced/divorced by 41.7%. As for the difference in the proportion between the length of work with Hb levels there is no difference (p> 0.05). However, more than half (62.5%) of respondents with Hb levels <12 (anemia) in the group with working duration of <3 years were more than half (62.5%) compared to 39.2% of respondents who worked 3 years. The results of this study are in line with Fink (2020) regarding Factors Relating to Hemoglobin (Hb) Levels in Blood in Pedicab drivers at Mranggen Market, Demak. The results showed (p=0.018), there was no relationship between years of service and blood Hb levels.

The results of the research above can be concluded that there is no significant relationship between age, marital status, number of family members, length of work on Hb levels of female workers. There was no difference in the proportion between marital status and blood pressure (p>0.05). It can be seen that respondents with blood pressure 140/90 mmHg in the group with married marital status (14.1%) than respondents with unmarried/living/divorced status of 4.2%. This research is in line with Hanum (2014). His research explained that the relationship between marital status and the incidence of hypertension was not significant (p>0.05) with r = 0.006. The correlation between marital status and the incidence of hypertension shows a positive but very weak correlation.

As for the difference in the proportion between length of work and blood pressure, there was no difference (p>0.05). However, it can be seen that respondents who have blood pressure 140/90 mmHg in the group with 3 years of work are more (13.9%) compared to 0% of respondents who have worked 3 years. This is in line with the research conducted by Riyadina (2002) on gas station operators in Jakarta. This study explains that respondents classified as hypertension are workers who have worked an average of 18.2 years compared to respondents whose blood pressure is normal (10.3 years). The working period indicates the length of time workers are exposed to the risk of health problems in the workplace.

Based on the data, it is known that there is no difference in the proportion between age and illness experienced in a month (p>0.05). More than half of respondents with illness in the age group > 30 years (54.7%) compared to respondents in the 19-29 year age group by 50.0%. These results are in line with the research of Loef et al. (2019) on Factors Associated with Byssinosis Incidence in Textile Factory "X" Employees in Semarang. His research explained that from statistical tests there was no significant difference (p=0.09) and the prevalence ratio was less. This means that there is no relationship between age and the incidence of byssinosis and risk factor analysis shows the same trend between female and male workers.

There was no difference in the proportion between marital status and illness experienced in a month (p>0.05). However, it is seen that respondents with illness in

the group with married marital status are more (57.7%) compared to respondents with married/divorced/divorced status of 41.7%. There was no difference in the proportion between the number of family members and the illness experienced in a month ($p>0.05$). However, it can be seen that respondents who experienced illness in the group with 4 family members were more (58.0%) compared to respondents in the category of <4 family members at 48.9%.

As for the difference in the proportion between the length of work and the pain experienced, there was no difference ($p>0.05$). However, it can be seen that there are more respondents who experience illness in the group with 3 years of work (55.7%) compared to 43.8% of respondents who have worked <3 years. The results of this study are not in line with the research of Mancio et al. (2018). His research shows there is a positive correlation with the incidence of byssinosis. The incidence of byssinosis is 2 times more for those who have worked more than five years compared to those who have worked less than five years. The results of the research above can be concluded that there is no significant relationship between age, marital status, number of family members, length of work and illness experienced in a month in female workers.

E. CONCLUSION

Based on the results of research and discussion on the comparative analysis of nutritional status and health of female workers who received and did not receive nutritious food and drinks on the night shift at X Ltd and Y Ltd, the following conclusions were drawn: 1) There was no significant relationship between the adequacy of energy, protein and fat by providing nutritious food and drinks on the night shift. There is a tendency to fulfill the Fat Adequacy Ratio (AKL) which is higher in companies that provide nutritious food and drinks than companies that do not provide nutritious food and drinks in a day; 2) There is no significant relationship between the provision of nutritious food and drinks with BMI, anemia status, blood pressure and illness in a month for female workers who work night shifts; 3) There is a significant relationship between age, marital status and length of service with BMI; 4) Hypertension status tends to be found more in workers who receive nutritious food and drinks (63.0%) compared to companies that do not receive nutritious food and drinks; and 5) Companies that do not provide nutritious food and drinks on the night shift appear to be at risk to the health status of women workers. Female workers have Hb levels < 12 gr/dl and infectious diseases.

Implementing workplace policies to provide nutritious food and beverages in the workplace remains the best option to ensure workers are healthier and more productive. This needs to be a concern for Y Ltd to comply with applicable labor norms. Companies that provide nutritious food and drinks need to pay attention to the food menu provided in order to meet the provisions of a balanced menu and in accordance with the calorie needs of female workers in order to avoid the risk of nutritional status and health risks such as obesity, overweight and hypertension. Companies actually need to provide nutritious food and drinks so that workers avoid

anemia and illness.

Several variables such as age, marital status and length of work have been proven to have a significant impact on the nutritional status of female workers. Therefore, the company needs to make efforts to maintain the health status of workers, considering that female workers tend to have more problems with high stressors because of their dual role as workers and housewives. stairs and a slower metabolism with age. One of the real efforts is to routinely exercise to maintain fitness, as well as carry out health checks for workers once a year and carry out promotions and prevention in health programs for both workers and the work environment in accordance with Permenaker No. 3 of 1982. Provision of nutritious food and drinks should meet the provisions of balanced nutrition, sufficient carbohydrates, protein, fat and vitamin mineral elements. The food menu should also be varied and for female workers who work at night, serving warm food is very important because it increases the appetite of workers.

The government, in this case the Indonesian Ministry of Manpower, needs to review the provisions for fulfilling 1400 KKal for every company that employs women workers at night in the Decree of the Minister of Manpower and Transmigration of the Republic of Indonesia Kep-224/MEN/2003. This amount is considered too large, this is evident in the results of research at X Ltd was found to be at risk of BMI and more workers with blood pressure 140/90 mmHg. It is recommended that the number of calories given to female workers who work on night shifts is 30-45% of the total calories/day needs of female workers based on the risk of heavy and light work. Therefore, it is necessary to re-examine these regulations. The government is also advised to improve the guidance and supervision of occupational safety and health norms, especially occupational nutrition.

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