Correlation Between Dietary Inflammatory Index and Lipid Profile on Female Workers

Dwi Sarbini [1], **Novi Gita Noer Febrian**[2], **Rini Dwi Puryaningtias**[3]

[1] Department of nutrition, Universitas Muhammadiyah Surakarta, Indonesia
[2] Department of nutrition, Universitas Muhammadiyah Surakarta, Indonesia
[3] Department of nutrition, Universitas Muhammadiyah Surakarta, Indonesia
Dwi.Sarbini@ums.ac.id

Abstract

Dyslipidemia is associated with metabolic syndrome. The increasing of blood cholesterol levels, low-density lipoprotein levels, triglyceride levels, and decreasing of high-density lipoprotein levels can be caused by a high intake of a pro-inflammatory diet. This study aims to determine the correlation between the dietary inflammatory index and lipid profiles (blood cholesterol levels, low-density lipoproteins, triglycerides, and high-density lipoproteins) in female workers at PT Iskandar Indah Printing Textile. This study is an observational study with a cross-sectional approach. The samples are female workers aged 26-45 years who taken by proportional random sampling of 34 female workers who meet the inclusion and exclusion criteria. Inflammatory dietary intake was analyzed by a semi-quantitative food frequency questionnaire, and lipid profiles were measured using by spectrophotometer methods. The statistical test carried out is using by Rank Spearman Correlation (p<0,05). We found almost of samples who has moderate category of dietary inflammatory index intake (41.2%), HDL levels nearby optimal or normal (94.1%) and high triglyceride levels (44.7%). We also found 11.8% of samples on high cholesterol levels and 17.6%) on high LDL level. There were no significant correlation between dietary inflammatory index and lipid profiles among female workers at PT Iskandar Indah Printing Textile (p<0,05.).

Keywords: *Dietary Inflammatory Index; female worker; lipid profiles*

1. Introduction

Dyslipidemia is characteristics by high levels of total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides, and high density lipoprotein cholesterol (HDL-C) in the blood. Dyslipidemia is a major risk factor for cardiovascular disease [34]. The cardiovascular disease is the main cause of mortality internationally, combined ischemic heart disease and all types of stroke are associated with the death of around 13 million people globally in 2010 [28]. Cardiovascular disease has also developed into one of the major health problems in the Asia Pacific region and has been magnified by an increasing in the average prevalence of dyslipidemia [12]. [35] show that the prevalence of dyslipidemia by TC indicator are 30.3% in Southeast Asia and 35.8% in Indonesia. The increasing prevalence of dyslipidemia is also influenced by diet [26].

Diet and dietary habit play an essential role in the development of the pathogenesis of the cardiovascular disease and as a potential determinant of various disease [3]. One form of diet that can be a determining factor for cardiovascular disease is the proinflammatory diet. because, based on the results of the study, there is a correlation between pro-inflammatory diet and cardiovascular disease [36]. A high-inflammatory diet is characterized by high consumption of high carbohydrates in glycemic load, omega-6 fatty acids, and low consumption of omega-3 fatty acids [8]. Also, some of the nutrients included in the proinflammatory and antiinflammatory diets in the DII score calculation are energy, carbohydrates, protein, fat, fiber, cholesterol, polyunsaturated fatty acids (PUFAs),

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monounsaturated fatty acids (MUFAs), omega- 3, omega-6, trans fat, saturated fat, thiamin, riboflavin, niacin, vitamin B6, vitamin B12, folic acid, iron, zinc, magnesium, selenium, vitamin A, vitamin C, vitamin E, vitamin D, ß-carotene [18]. According to [27], to reflect pro-inflammatory intake quantitatively can use the dietary inflammatory index (DII). The dietary inflammatory index itself is definitively an index that represents the pro-inflammatory and anti-inflammatory diet of the scoring algorithm based on a broad literature review [24]. Individuals have a high DII score, and it means that the individual has a pro-inflammatory diet [18].

Based on [6], individuals with high DII scores show several abnormal blood lipid conditions such as low HDL concentrations and high triglyceride concentrations. Based on research by [19], it turns out that the DII score in women is higher than in men. This indicates that women have a pro-inflammatory diet compared to men. Moreover, according to research by [22], individuals who work have a DII score with an indication of a higher pro-inflammatory diet than those who do not work. Changes in unhealthy diets, such as high consumption of saturated fat and soft drinks, are experienced by shift workers [29]. High consumption of fats and simple carbohydrates is one of the pro-inflammatory dietary criteria [8]. According to [2], some of the disadvantages of health problems for workers will have an impact on health care costs and decreased productivity.

A preliminary survey conducted by researchers in July 2019 showed 33.3% of female workers at PT Iskandar Indah Printing Textile Surakarta have abdominal circumference in the central obesity category. This data is the same as the Central Java Province Health Profile data, which shows the prevalence of central obesity in Central Java of 31%. Based on the description above, it is necessary to study the correlation between dietary inflammatory index (DII) and lipid profiles in female workers.

2. Research Method

This study is an observational study with a cross-sectional approach. The population in this study were all female workers at PT Iskandar Indah Printing Textile Surakarta. The sample was determined through proportional random sampling with inclusion and exclusion criteria and then obtained 34 female workers as a sample.

Measurement of the patient's blood lipid profile was carried out by taking blood samples and tested with a spectrophotometer. The levels of triglycerides, HDL, cholesterol, and LDL in the blood serum of female workers are expressed in mg/dl units. They are measured using the GPO-PAP method for triglycerides and cholesterol and the CHOD-PAP method for HDL. LDL levels were measured indirectly from other lipid profiles.

Measurement of the Dietary Inflammatory Index (DII) is obtained from a quantitative measure of the intake of macronutrients (energy, carbohydrates, protein, fat) from the SQFFQ, which will then be multiplied by each food variable effect score (potential inflammation for each food variable) with the formula:

$$\frac{Nutritional\ mean\ based\ on\ parameter\ data - actual\ intake}{SD\ of\ nutrition\ based\ on\ parameter\ data} \rightarrow Z - score \rightarrow Percentile$$
$$\rightarrow percentile \times inflammation\ effect\ score$$

3. Result and Discussion

3.1. General Description

PT Iskandar Indah Printing Textile is a textile company in Surakarta that produces patterned batik cloth or batik printing. The company is located at Jalan Pakel No. 11 RT 03 RW VIII Kelurahan Kerten, Kecamatan Laweyan, Surakarta. The company was first

established on 23 May 1975 under the name CV Iskandartex then since 2 January 1991 officially became PT Iskandartex with a business license number 100/II.16.PB/VIII/1991/PT. and since February 1996 changed to PT Iskandar Indah Printing Textile. PT Iskandar Indah Printing Textile itself employs 614 weaving machines, 3 warping machines, 2 starch machines, 1 diesel engine, 1 boiler machine, 5 valding machines and 1 spool. The number of workers is 109 people.

3.2. Characteristics of Respondents

The characteristics of female workers described in Table 2 include age, education level, income level, disease history, smoking status, and consumption of supplements obtained through interviews..

Table 1. Distribution of Number of Female Workers Based on Subject Characteristics

	Total (n)	Percentage (%)
Age		
Early Adulthood	5	14,7
Late Adulthood	29	85,3
Total	34	100
Education Level		
Basic Education	28	82,4
Further Education	6	17,6
Total	34	100
Income Level		
Above UMR	34	100
Total	34	100
Current Disease History		
There is no current history	32	94,2
Have a history of hypertension	2	5,8
Total	34	100
Family Disease History		
There is no family disease history	22	64,7
There is a history of DM	2	5,9
There is a history of hypertension & hyperlipidemia	10	29,3
Total	34	100
Smoking Status		
Do not smoke	34	100
Consumption of Supplements		
Do not take supplements	34	100

3.2.1 Age

Based on Table 1, from 34 female workers, most of the respondents were included in the late adulthood category (85.3%) with an average age of 41.5 years. Increasing the age of workers will be in line with the level of productivity because they are in the productive age; the older the workers are, the productivity will decrease because it is influenced by a decrease in physical and health conditions [16]. [4] explained that the increasing age and risk of dyslipidemia in women is due to the influence of pre and post-menopausal hormones. Based on the research of [17], it is stated that those aged ≥ 40 years have a 2.72 times risk of experiencing coronary heart disease; according to Kumar (2012), this is due to increasing age is also followed by increasing cholesterol levels in the body, if hypercholesterolemia occurs, it can cause vessel constriction blood due to accumulation of cholesterol which can then occur coronary heart disease (CHD). Apart from dyslipidemia and CHD, according to [13] as getting older, the accumulation of fat in the abdomen, which can cause central obesity, also occurs; this is supported by research from [31], which shows a positive correlation between age and central obesity.

3.2.2 Education Level

Based on Table 1, from 34 female workers, most of the respondents were included in the late adulthood category (85.3%) with an average age of 41.5 years. Increasing the age of workers will be in line with the level of productivity because they are in the productive age;

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the older the workers are, the productivity will decrease because it is influenced by a decrease in physical and health conditions [16]. [4] explained that the increasing age and risk of dyslipidemia in women is due to the influence of pre and post-menopausal hormones. Based on the research of [17], it is stated that those aged ≥ 40 years have a 2.72 times risk of experiencing coronary heart disease; according to [5], this is due to increasing age is also followed by increasing cholesterol levels in the body, if hypercholesterolemia occurs, it can cause vessel constriction blood due to accumulation of cholesterol which can then occur coronary heart disease (CHD). Apart from dyslipidemia and CHD, according to [13] as getting older, the accumulation of fat in the abdomen, which can cause central obesity, also occurs; this is supported by research from [31], which shows a positive correlation between age and central obesity.

3.2.3 Income Level

Table 2 shows that 100% of female workers have an income above the UMR in Surakarta. [21] state that a person's small income will prioritize meeting the need for food. The lower the expenses for meeting food needs, the better the level of welfare. [21] also stated that if someone has a high income, it can affect consumption patterns, which is quality, quantity, and variation. According to [20], increased income will motivate individuals to buy food of good quality and quantity..

3.2.4 Current Disease History

Current disease history is a degenerative disease experienced by respondents currently. The current medical history of female workers was obtained through interviews with respondents. As many as 94.2% of female workers did not have a history of current illness, but it was still found that 5.8% of female workers had hypertension or high blood pressure.

3.2.5 Family History Disease

Family history disease is a disease experienced by the family, especially parents, both father and mother, and siblings. Family history disease data were obtained through interviews with respondents. As many as 64.7% of female workers do not have a family history of illness, but it is still found that 5.9% of female workers have a family history of diabetes mellitus, and as many as 29.3% of female workers have a family history of hypertension or high blood pressure and hyperlipidemia.

3.2.6 Smoking Status

Smoking status data were obtained through interviews with respondents. As many as 100% of female workers do not smoke. [1] states that the nicotine content in cigarettes can reduce insulin sensitivity, then increase lipolysis and free fatty acid levels in the blood, in addition to increasing the production of catecholamine hormones, which can trigger an increase in blood pressure, heart rate, and respiration. According to research by [14], men and women aged 15-40 years have a 3.82 times greater risk of suffering from myocardial infarction, while respondents with an increase in serum cholesterol have a 1.67 times greater risk of suffering from myocardial infarction. [32] explained that nicotine could increase fat metabolism so that blood cholesterol levels, especially LDL, can increase. Nicotine can increase the secretion of adrenaline in the adrenal cortex, which encourages an increase in serum concentrations of free fatty acids (FFA), which in turn stimulates the synthesis and secretion of hepatic cholesterol such as the secretion of Very Low-Density Lipoprotein (VLDL) of the liver and therefore increases blood triglyceride levels (Nilawati, 2008).

3.2.7 Supplement Consumption

Supplement consumption data were obtained through interviews with respondents. As many as 100% of female workers do not take supplements.

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3.1. Lipid Profile of Female Worker

The components of the lipid profile examination include triglycerides, HDL, cholesterol, and LDL, which are described in Table 2.

Table 2. Number of Female Workers Based on Metabolic Syndrome Components

No	Variable	Category	Total	
			n=34	%
1	Triglyceride Levels	High	5	14,7
		Borderline	15	44,4
		Normal	14	41,2
2	HDL Levels	Near Optimal	32	94,1
		Normal	2	5,9
3	Cholesterol Levels	High	2	5,9
		Borderline	4	11,8
		Normal	28	82,4
4	LDL Levels	High	4	11,8
		Borderline	6	17,6
		Normal	24	70,6

3.3.1 Trygliceride Level

The categorization of triglyceride levels in female workers refers to the cut off of plasma lipid levels according to [33]. Triglyceride levels are categorized as high if the measurement results are ≥200 mg/dl, are categorized as borderline (slightly high) if the TG measurement results are 150-199 mg/dl, and are categorized as normal if the measurement results are <150 mg/dl. Table 2 shows that most female workers have slightly high triglyceride levels (44.4%).

3.3.2 HDL Level

The categorization of HDL levels in female workers refers to the cut off of plasma lipid levels according to [33]. The results of measuring HDL levels <40 mg/dl are categorized as low whereas, if HDL levels are 40-59 mg/dl are categorized as near-optimal, and ≥60 mg/dl are categorized as normal. Table 2 shows that most of the female workers have HDL levels close to optimal or normal (94.1%).

3.3.3 Cholesterol Level

Categorization of cholesterol levels in female workers refers to the cut off of plasma lipid levels according to [33]. Cholesterol levels are categorized as high if the measurement results are ≥240 mg/dl, are categorized as borderline (slightly high) if the measurement results are 200-239 mg/dl, and are categorized as normal if the measurement results are <200 mg/dl. Table 2 shows that most of the respondents have normal cholesterol levels (82.4%).

3.3.4 LDL Level

The categorization of female workers' LDL levels refers to the cut off of plasma lipid levels according to [33]. LDL levels are categorized as normal if the measurement results are <130 mg/dl, are categorized as borderline (slightly high) if the measurement results are 130-159mg / dl, and are categorized as high if the measurement results are ≥160 mg/dl. Table 3 shows that most female workers have normal LDL levels (70.6%).

3.4. Dietary Inflammatory Index Intake

Dietary Inflammatory Index (DII) is a quantitative measure of macronutrient intake, including energy, protein, carbohydrates, and fats, which can be used as parameters to provide an overall picture of the inflammatory nature of the diet. To obtain an individual DII score, the individual daily intake of each nutrient in the SQFFQ is reduced by the global average intake and divided by the global standard deviation to produce a z-score that is converted to a percentile score. This score is then multiplied by the score for the effect of

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inflammation; after all individual nutritional values are calculated using this formula, then the results are added up to obtain a total DII score. DII score data were obtained through interviews using the SQFFQ form, which were analyzed using Nutrisurvey and SPSS. Table 3 shows the descriptive statistical results of the DII score among female workers.

Table 3. DII Score Descriptive Statistics Results

Variable	N	Min	Max	Mean	Median	Std. Deviation	Percentile		
							25 (Q1)	50 (Q2)	75 (Q3)
DII Score	34	0,00	0,23	0,185	0,215	0,064	0,16	0,22	0,23

Based on Table 3, it shows that of the 34 sample data, the DII score has a minimum value of 0.00 and a maximum value of 0.23, while the mean value is 0.185 with a standard deviation of 0.064. Standard deviation is a reflection of the average value of the data deviation from the mean. The standard deviation value in this study shows a value that is smaller than the mean, so it can be said that the data is homogeneous, which means that the average DII score has a low deviation rate.

The results of DII intake were divided into female workers with low DII intake, moderate DII intake, and high DII intake. DII intake is low if female workers have total DII intake ≤ Q1 (0.16), DII intake is moderate if Q1 < total DII ≤ Q3 (0.16-0.23), and high DII intake if female workers have total DII intake > Q3 (0.23). Table 4 shows the number of female workers based on the DII score.

Table 4 . Number of Female Workers based on DII Score

DII Score	Total	
	N	%
Low	9	26,5
Moderate	14	41,2
High	11	32,4
TOTAL	34	100

Table 4 shows that there are still respondents who have DII intake, which is in the high category (32.4%). A low DII score indicates that respondents consume less pro-inflammatory food sources or those that cause inflammation, while a high DII intake indicates that respondents consume more pro-inflammatory food sources. Pro-inflammatory sources of macronutrients include fats and simple carbohydrates.

Based on the SQFFQ results, the types of pro-inflammatory foods that are often consumed by respondents from high-fat food sources such as fried foods which are used as a snack, low-fiber vegetables such as gori / young jackfruit processed using coconut milk, fried animal side dishes such as fried chicken and fried eggs. Respondents often consume sources of food high in simple carbohydrates as a distraction, which include sugar, packaged mung bean juice, Pisang ijo cake, sweetened condensed milk, and biscuits.

3.5. The Correlation Between DII Score and Lipid Profile Levels

3.5.1. Correlation Between DII Score and Triglyceride Levels

Table 5 shows the results of descriptive and analytical statistics between the respondents' DII score variables obtained through the conversion of food intake on the SQ-FFQ with the variable triglyceride levels obtained through examining the respondent's blood sample with a spectrophotometer with the GPO-PAP method.

Table 5. Correlation between DII score and Triglyceride Level

Variable	N	Min	Max	Mean	Median	Std. Deviation
DII Score	34	0,00	0,23	0,185	0,215	0,064
TG Levels	34	100	217	159,73	156,60	29,79
P Value	0,193*					

*Rank Spearman Test

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Based on Table 5, it shows that from 34 samples of triglyceride data, it has a minimum value of 100 and a maximum value of 217, while the mean value is 159.73 with a standard deviation of 29.79. Standard deviation is a reflection of the average value of the data deviation from the mean. The standard deviation value in this study shows a value that is greater than the mean, so it can be said that the data is heterogeneous.

Table 6. Distribution of Triglyceride Level Based On DII Score

DII	Triglyceride Levels						TOTAL	
	High		Borderline		Normal			
	n	%	n	%	n	%	N	%
High	2	18,2	7	63,6	2	18,2	11	100
Moderate	1	7,1	6	42,9	7	50	14	100
Low	2	22,2	2	22,2	5	55,6	9	100
TOTAL	5	14,7	15	44,1	14	41,2	34	100

Table 6 shows that respondents who had a high DII score mostly had borderline triglyceride levels (63.6%). Respondents with moderate and low DII intake mostly had normal triglyceride levels (50% and 55.6%). This shows the tendency of respondents with high, moderate, and low DII intake not to have high triglyceride levels, supported by the Spearman Rank test results in table 6 that there is no correlation between DII scores and triglyceride levels (p = 0.193).

This result is in line with the research of [10] on the adult population in Indonesia, showing that there is no correlation between DII scores and triglyceride and HDL levels. [10] also showed a tendency for DII scores to have a more positive correlation with plasma leptin concentrations. Leptin is a cytokine produced by adipose tissue that can trigger inflammation. The pro-inflammatory characteristics of leptin share similarities with immune cell cytokines such as tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6).

3.5.2. Corellation Between DII Score and HDL Level

Table 7 describes the results of descriptive and analytic statistical tests between the respondents' DII score variables obtained from the conversion of food intake on SQFFQ with the respondents' HDL levels obtained from taking the respondent's blood samples, which were then tested using a spectrophotometer with the CHOD-PAP method.

Table 7. Correlation between DII Score and HDL Levels

Variable	N	Min	Max	Mean	Median	Std. Deviation
DII Score	34	0,00	0,23	0,185	0,215	0,064
HDL Levels	34	42	69	47,88	45,45	6,044
P Value	0,939*					

*Spearman Rank Test

Based on Table 7, it shows that from 34 samples of HDL data, it has a minimum value of 42 and a maximum value of 69, while the mean value is 47.88 with a standard deviation of 6.044. Standard deviation is a reflection of the average value of the data deviation from the mean. The standard deviation value in this study shows a value that is greater than the mean, so it can be said that the data is heterogeneous.

Table 8. Distribution of HDL levels based on the DII score

DII Score	HDL Levels				TOTAL	
	Approaching Normal		Normal			
	n	%	n	%	N	%
High	10	90,9	1	9,1	11	100

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DII Score	HDL Levels				TOTAL	
	Approaching Normal		Normal			
	n	%	n	%	N	%
Moderate	14	100	0	0	14	100
Low	8	88,9	1	11,1	9	100
TOTAL	32	94,1	2	5,9	34	100

Table 9 shows that most of the respondents who had high, moderate, and low DII scores had HDL levels that were close to normal. This shows the tendency that the DII score is not sufficient to affect the HDL level of the respondents to be normal. This is supported by the results of the Spearman Rank test in table 8, which shows that there is no correlation between the DII score and the respondent's HDL level (p = 0.939). This result is in line with the research conducted by Muhammad et al. (2019), who found that the DII score was not related to HDL levels (p = 0.572). According to [11], in their research, it shows that respondents who have been given dietary interventions do not show a correlation between DII scores and changes in HDL and LDL values. The study also describes that the DII score tends to be positively correlated with the bioinflammatory marker, which is IL-6.

3.5.3. Correlation Between DII Score and Cholesterol Total Level

Table 9 illustrates the descriptive and statistical test results between the DII score obtained from the conversion of food intake on SQFFQ with the total cholesterol level obtained from taking the respondent's blood sample, which is then checked through a spectrophotometer and tested using the GPO-PAP method.

Table 9. Correlation Between DII Score and Cholesterol Total Level

Variable	N	Min	Max	Mean	Median	Std. Deviation
DII Score	34	0,00	0,23	0,185	0,215	0,064
TC Levels	34	138,4	246,2	175,288	167,950	28,665
P Value	0,773*					

*Spearman Rank Test

Based on Table 9, it shows that from 34 samples of total cholesterol data, it has 138.4 in minimum value and 246.2 in maximum value, while the mean value is 175.288 with 28.665 in standard deviation. The standard deviation value in this study shows is greater than the mean value, so it can be said that the data is heterogeneous.

Table 10. Distribution of Total Cholesterol Levels Based on the DII Score

DII Score	Total Cholesterol Levels						TOTAL	
	High		Borderline		Normal			
	n	%	n	%	n	%	N	%
High	0	0	2	18,2	9	81,8	11	100
Moderate	1	7,1	1	7,1	12	85,7	14	100
Low	1	11,1	1	11,1	7	77,8	9	100
TOTAL	2	5,9	4	11,8	28	82,4	34	100

Table 10 shows that most respondents with high, moderate, and low DII scores had normal total cholesterol levels. This shows a tendency that the DII score does not really affect the total cholesterol level of the respondents. This is supported by the results of the Spearman Rank test in Table 10 that there is no correlation between the DII score and the total cholesterol level (p = 0.773). This results have similarity with the research of Boden et

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al. (2017) on the adult population in Sweden that there is no correlation between DII scores and total cholesterol in female respondents (p = 0.740). In this study also explained that the DII score in female respondents was correlated with the body mass index (p = 0.017). According to [9] and [25], body mass index (BMI) plays a role as a dietary mediator, mild chronic inflammation, and diseases associated with inflammation. Body fat creates from proinflammatory metabolic, and BMI has a positive correlation with CRP and other inflammatory markers.

3.5.4. Correlation Between DII Score and LDL Level

Table 11 illustrates the correlation between respondents' DII scores obtained through the conversion of food intake on SQFFQ with LDL levels obtained through blood sampling and tested through a spectrophotometer with the results obtained indirectly from other lipid profile measurements.

Table 11 . Correlation Between DII Score and LDL Level

Variables	N	Min	Max	Mean	Median	Std. Deviation
DII Score	34	0,00	0,23	0,185	0,215	0,064
LDL Levels	34	93,7	186,9	126,397	122,550	23,7901
P Value	0,793*					

*Spearman Rank Test

Table 11 shows that from 34 samples of LDL data, it has 93.7 in minimum value and 186.9 in maximum value, while the mean value is 126.397, with standard deviation in 23.7901. The standard deviation value in this study shows is greater than the mean value, so it can be concluded that the data is heterogeneous.

Table 12 . Distribution of LDL Levels Based on the DII Score

DII Score	LDL Levels						TOTAL	
	High		Borderline		Normal			
	n	%	n	%	n	%	N	%
High	2	18,2	1	9,1	8	72,7	11	100
Moderate	1	7,1	4	28,6	9	64,3	14	100
Low	1	11,1	1	11,1	7	77,8	9	100
TOTAL	4	11,8	6	17,6	24	70,6	34	100

*Spearman Rank Test

Table 13 shows that most of the respondents with high, moderate, and low DII scores had normal LDL levels. This shows that the tendency of the DII score is not sufficiently influential on the LDL levels of the respondents. This is supported by the results of the Spearman Rank test in table 12 that there is no correlation between the DII score and LDL levels (p = 0.793). The results of this study are in line with [30] that there is no correlation between DII scores and LDL levels. [11] also showed that respondents who had been given dietary interventions did not show a correlation between DII scores and changes in LDL and HDL values. The study also describes that the DII score tends to be positively correlated with the bioinflammatory marker, which is IL-6.

4. Conclusion and Suggestion

Conclusion

a. As many as 26.5% of female workers are in the low category of DII intake, 41.2% of female workers have moderate DII intake, and 32.4% of female workers are in the high category of DII intake.

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b. Most of the female workers have HDL levels near-optimal or normal (94.1%), and there are still female workers with high cholesterol levels (11.8%), high LDL levels (17.6%), and high TG levels (44.7%). %).
c. There was no significant correlation between DII and levels of triglycerides, HDL, total cholesterol and LDL among female workers (p = 0.193; 0.939; 0.773; 0.793)

1.2. Suggestion

a. For PT Iskandar Indah Printing Textile Surakarta

Since female workers who have abnormal lipid profile levels (dyslipidemia) are still found, it is necessary to have regular health checks so that workers' health status is monitored and worker productivity remains optimal. The role of the factory in routine health checks for workers is to check the results of workers' health checks regularly (once every 6 months) if it is done independently or to facilitate routine health checks at the factory location.

b. For Female Workers

Female workers can carry out periodic health checks independently so that they can find out their health status so that they can be followed up in improving their health status early.

c. For Researchers

Further research is needed regarding the correlation of pro-inflammatory diet or anti-inflammatory diet with other variables, which are thought to affect the health of workers such as diabetes mellitus, central obesity, and hypertension.

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