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The Hypertension and Mechanic's Lifestyle in Medan City and its Relation to Nutritional Status

Kejadian Hipertensi dan Gaya Hidup Mekanik Bengkel di Kota Medan serta Kaitannya dengan Status Gizi

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ABSTRACT

Background: Lifestyle has a role in determining a person's nutritional status, such as eating habits, smoking habits, physical activity, and alcohol consumption. Mechanics tend not to pay special attention to health, especially in their lifestyle. In addition, the majority of mechanics have high blood pressure. Therefore, the authors were concerned about their nutritional status and its relationship with the affecting factors.
Objectives: To analyze the correlation of age, lifestyle, and blood pressure with the nutritional status of repair shop mechanics.
Methods: This study used a cross-sectional design on 70 mechanics at 12 motorcycle repair shops in 6 districts of Medan City. Age and lifestyle data were obtained from questionnaires, blood pressure data from direct measurements using a sphygmomanometer twice with a five-minute interval, and nutritional status data from anthropometric measurements. All collected data were analyzed using Spearman's Correlation with the Kolmogorov Smirnov's normality test.
Results: The bivariate test showed a significant relationship between smoking (p=0.004, r=-0.342), physical activity (p=0.000, r=-0.484), sodium intake (p=0.000, r=0.570), and blood pressure (p=0.001, r=0.382) with the nutritional status of mechanics. Meanwhile, no significant relationship exists between age (p=0.255) and alcohol consumption habits (p=0.774) with mechanical nutritional status.
Conclusions: Mechanical nutritional status negatively correlated with smoking and physical activity but positively correlated with sodium intake and blood pressure.

INTRODUCTION

Hypertension occurs when the systolic blood pressure is above 140 mmHg and above 90 mmHg in diastolic blood pressure[1]. The prevalence of hypertension in Indonesia reaches 33%, but only 8% of which are diagnosed and receive treatment. Meanwhile, others remain untreated due to negligence, unaffordable medication, feeling healthy, or low awareness of hypertension. This condition raises the death incidence due to hypertension in Indonesia, which has reached 427,2182[2]. In North Sumatra Province, 41,382 people are suffering from hypertension, but only 51.98% of them have been regularly medicated[3]. In specific, 7,174 people in Medan City are suffering from hypertension[3]. For people above 18 years old, numerous reasons play a role in the incidence of hypertension, whereas the most dominant reasons (95%) are less physical activity, smoking, overnutrition, and bad eating habits[2]. Unhealthy and high-sodium diets can also trigger hypertension. Apart from causing hypertension, consumption pattern also plays a role in determining their nutritional status.

The body's condition determines nutritional status after consuming food and nutrient utilization[4]. Nutritional status conditions are divided into severely underweight, underweight, normal, overweight, and obesity[5]. Every person has a different nutritional intake, depending on age, gender, daily activities, body weight, etc. The nutritional intake and energy expenditure balance results in good nutritional status. If nutritional intake is more or less than daily energy requirements and expenditure, it can cause nutritional problems[6]. In Indonesia, a double burden of nutritional problems may occur simultaneously, namely undernutrition and overnutrition. Therefore, food intake is a direct cause of nutritional problems[7].

In Medan, many people are suffering from hypertension due to low awareness of their health; thus, most of them are unaware that they have hypertension despite the occurring symptoms. Repair shop mechanics are one of the groups with a high hypertension risk. Their

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environmental conditions with a high level of distraction, exposure to pollutants from vehicle emissions, and poor lifestyles are the risk factors for hypertension. Based on the initial survey, many motorbike mechanics have health complaints resulting in hypertension symptoms. From the interview results, several mechanics have unhealthy consumption patterns. Therefore, the incidence of hypertension, the nutritional status of repair shop mechanics, and their lifestyle should be investigated further. Moreover, this study also aimed to determine the relationship between age, lifestyle, blood pressure and nutritional status. With this research, respondents can obtain their nutritional status, blood pressure conditions, and factors related to their health condition. This information can be useful for them to improve their lifestyle and food intake.

METHODS

This study was an observational study with a cross-sectional design on motorbike repair shop mechanics working in 12 workshops in six different districts of Medan City (*Medan Sunggal, Medan Baru, Medan Helvetia, Medan Amplas, Medan Petisah*, and *Medan Kota*). The number of workshops was determined using a purposive sampling technique by taking 30% of the 21 districts in Medan City, resulting in 6 districts as samples. In each district, two repair shops were selected, according to how they run their business, where at least 20 motorbikes are repaired daily and employ a minimum of four mechanics. Therefore, 12 repair shops were obtained as the study locations, and 70 mechanics working in those 12 repair shops were collected as study objects.

This study consists of a dependent variable (mechanics' nutritional status) and independent variables, such as mechanics' characteristics (age, blood pressure) and lifestyle (smoking habit, alcohol consumption, physical activity, and sodium intake). Nutritional status data were obtained from anthropometric measurements, namely body height and weight. Body weight measurements were obtained by direct measurement using an *Omron* digital weight scale, and body height was measured twice using a microtoise with an accuracy of 0.1 cm. The nutritional status was calculated using the index of BB (kg) per TB^2 (m^2)[6]. Then, the nutritional status was categorized into severely underweight, underweight, normal, overweight, and obesity[5]. Blood pressure data were obtained twice from direct measurements using a sphygmomanometer with a two-minute interval[8]. Blood pressure was then categorized as normal if the blood pressure was ≤140/90 mmHg and high if the blood pressure was >140/90 mmHg[1]. Moreover, interviews were conducted to obtain age and lifestyle data. The lifestyle variables included smoking habits, alcohol consumption, sodium intake, and physical activity. The smoking habit variables were obtained from the interview results, including the number of cigarettes consumed per day, whereas light smokers spend 1-10 cigarettes per day, moderate spend 11-20 cigarettes per day, and heavy smokers spend >20 cigarettes per day.

For alcohol consumption data, mechanics were asked whether they drank alcohol or not. Sodium intake was obtained using the 24-hour Food Recall form, calculated using the *Nutrisurvey* software, and categorized according to nutritional adequacy into the excess intake (>110% RDA) and sufficient intake (80-100% RDA) referring to Minister of Health Regulation No. 28 of 2019 regarding the Nutritional Adequacy Rates[9]. Physical activity data were obtained from interviews using the 1x24-hour activity recall formula, and the PAL value was calculated based on FAO (2001), whereas light activity shows PAL ≤1.99 and heavy activity shows 2.00 ≤ PAL ≤ 2.39.

All data were analyzed using the univariate and bivariate analyses. The univariate analysis was carried out to describe the respondents' variables. Data were also tested for normality using the Kolmogorov Smirnov's Test, and bivariate analysis was carried out using Spearman's Correlation test with a confidence level of 95%.

RESULTS AND DISCUSSION

Respondent Features

According to the results, all mechanics are men, and 42 mechanics have worked ≤5 years. The age data of the mechanics is presented in Table 1.

Table 1. The motorbike repair shop mechanics' characteristics in six sub-districts of Medan City based on age, nutritional status, blood pressure, smoking habit, alcohol consumption, sodium intake, and physical activity

Characteristics	Category	n (N=70)	%
Age	≤31 Years Old	50	71.4
	>31 Years Old	20	28.6
Nutritional Status	Severely Underweight	6	8.6
	Underweight	10	14.3
	Normal	29	41.4
	Overweight	17	24.3
	Obesity	8	11.4
Blood Pressure	Normal	14	20.0
	Prehypertension	17	24.3
	Hypertension Grade 1	31	44.3
	Hypertension Grade 2	8	11.4
Smoking	Light	33	47.1
	Mild	27	38.6
	Heavy	10	14.3
Drinking Habit	No	51	72.9

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Characteristics	Category	n (N=70)	%
Sodium Intake	Yes	19	27.1
	Adequate	28	40.0
	Excessive	42	60.0
Physical Activity	Low	40	57.1
	Moderate	20	28.6
	Heavy	10	14.3

The interview results describe the age of mechanics among 20-42-year-olds. Thus, they are divided into two categories with a median value of 31 years. The majority of the mechanics are ≤31 years old (50 people), with more than 20 of them being overweight and obese. There are 20 mechanics in >31 years old and 15 of them have normal nutritional status. Age can influence the nutritional requirement. In general, when the people become older, the nutritional requirements also tend to increase unless you have entered an old age phase[9]. Table 1 shows the nutritional status of repair shop mechanics.

The mechanics' nutritional status is majorly in the normal category (29 people, 41.4%), while 17 people are in overweight and 8 people are obese conditions. Mechanics are mostly suffering from grade-1 hypertension (31 people, 44.3%), whereas 21 people are ≤31 years old, 20 people are moderate smokers, 11 people have normal nutritional status, 18 people have low physical activity, and 22 people have excess sodium intake. The incidence of hypertension in motorbike repair shop mechanics in Medan City is related to low physical activity and excessive sodium intake, despite not being too risky for their age. In addition, lifestyle can also determine a person's nutritional status. Table 1 shows the frequency distribution of mechanics according to their lifestyles.

All mechanics are active smokers to varying degrees. The majority of the mechanics are lightly active smokers (33 people, 47.1%), and 16 of them are overweight. Mechanics take at least 12 cigarettes per day and up to 21 cigarettes. They smoke when working (repairing) and resting. The 51 mechanics have no drinking habit. Most mechanics' sodium intake is in the excessive category (42 people), and 24 mechanics are overweight.

Mechanics work every day for 8 hours, even more than 8 hours, so mechanics spend more time in the repair shop. The activities carried out by mechanics in the repair shop are classified as low activities. According to the results of interviews and PAL calculations, the 40 mechanics have low physical activity (57.1%). Mechanics spend most of their time in the repair shop, rather than in the outside before or after the working hours. Motorcycle repair activities are generally carried out through sitting and standing positions. During breaks, mechanics also tend to sit and smoke. Mechanics with moderate and heavy physical activity categories before or after working in the workshop have more activities besides working, like pumping the water for morning shower, pedaling a bicycle to the repair shop, and selling vegetables at the market.

Bivariate Analysis

Data analysis was conducted using Spearman's correlation test with a confidence level of 95%. Normality level of the data was also tested using the Kolmogorov Smirnov's test. The bivariate test results are presented in Table 2.

Table 2. Correlation between age, blood pressure, and lifestyle with the mechanics' nutritional status

Variable	Nutritional Status	
	r	p
Age	-0.138	0.255
Blood Pressure	0.382	0.001*
Smoking Habit	-0.342	0.004*
Drinking Habit	0.035	0.774
Sodium Intake	0.570	0.000*
Physical Activity	-0.484	0.000*

Spearman's Correlation Test; *) Significant if (p<0.05)

From the statistical tests, all variables are correlated with the nutritional status of mechanics, except for the age and alcohol drinking habits. The existence of a positive correlation between sodium intake and blood pressure with nutritional status shows a fairly strong relationship (r=0.570 and r=0.382). This unidirectional correlation shows that the nutritional status value will also increase when sodium intake and blood pressure increase. From the interview results, mechanics often consume high-sodium foods such as instant foods (bottled drinks, instant noodles, chips, etc.), junk foods (fries, meatballs, chicken noodles, etc.), and fast foods (fried chicken, burgers, etc.), but rarely consume fruit and vegetables. Excessive consumption of junk food can cause overnutrition because it contains high levels of sodium, fat, sugar and calories but low in micronutrients and fiber[10]. Consuming vegetables and fruit in moderate amounts can reduce the possibility of consuming junk food, and *vice versa*[11].

A negative correlation is shown in the physical activity variable. When physical activity is low, the nutritional status tends to be excessive. The accumulation of excess body fat causes the risk of overnutrition. Many factors influence this condition, including large portions of food, low activity, eating patterns, and unhealthy food choices. An imbalance

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between food intake and energy expenditure is often found triggering the overnutrition condition and degenerative diseases such as hypertension[12]. Physical activity has a large role in energy expenditure and daily energy balance. Physical activity is all movements carried out by the body that uses skeletal muscles and increases the excess energy expenditure more than the body's energy requirements[13].

Smoking habits are also negatively correlated with the nutritional status of respondents. The heavier the smoking habit committed, the less nutritional status obtained. Smokers tend to experience malnutrition due to a lack of nutritional intake. The nicotine content in cigarettes causes appetite suppression and lowers the food taste, resulting in a food portion reduction. Moreover, smoking can also cause overnutrition because smokers tend to eat more snacks as a result of poor appetite[14].

Most respondents have low physical activity, negatively correlated with nutritional status. Physical activity and food intake balance are required to avoid nutritional problems. Low physical activity can increase 4.9 times of abnormal nutritional status risk[15]. This condition differed from Azis' study, which reported that physical activity had no relationship with nutritional status as an undirected factor. Large food intake must be balanced with sufficient activity.

Excessive alcohol consumption can be a major cause of nutritional deficiencies. Alcohol affects the intake and metabolism of nutrients and body organ disruptions. Alcoholics experience micronutrient deficiencies, such as vitamins and minerals, and other serious organ disorders depending on the amount and frequency of drinking alcohol[17]. This study presents no correlation between alcohol and the nutritional status of the respondents.

CONCLUSIONS

This study presents that all mechanics are men, active smokers, and between 20-31 years old. Most mechanics have normal nutritional status. Of the 70 respondents, 31 of whom are suffering from grade-1 hypertension. High blood pressure is caused by high sodium intake, low physical activity, and smoking habits. According to the results of statistical tests, a positive relationship that affects the respondents' nutrition status is found between sodium intake and blood pressure. The higher the sodium intake and blood pressure, the more excessive nutritional status. Meanwhile, physical activity and smoking negatively correlate with mechanics' nutritional status. In contrast, low physical activity affects the nutritional status, while high smoking habit tends to decrease the nutritional status of mechanics.

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Conflict of Interest and Funding Disclosure

All authors have no conflict of interest regarding this article.

Author Contributions

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