Blood Pressure and Sodium Consumption: A Study of Fast-Food Workers in Central Jakarta

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ARTICLE INFO	ABSTRACT
	This study aimed to investigate the relationship between blood pressure and the frequency of consuming sodium-rich foods among employees of a western-style fast food restaurant "X" in Hayam Wuruk, Central Jakarta. A cross-sectional study was conducted with 30 respondents aged 20-50 years, selected using purposive sampling. Data on respondent characteristics, blood pressure, and frequency of consuming sodium-rich foods were collected using questionnaires and a food frequency questionnaire (FFQ). The results showed that prehypertension and stage 1 hypertension were more prevalent in respondents who had worked for ≤ 3 years (76.7%), were aged 19-29 years (76.7%), were male (56.7%), had a high school education (96.7%), and rarely consumed sodium-rich foods (43.3%). However, no significant associations were found between blood pressure and duration of working time, sex, age, or frequency of consuming sodium-rich foods (p>0.05). The most frequently consumed sodium-rich foods were chicken eggs, butter, margarine, beef meatballs, chicken noodles, fried tempeh, and bakwan. The prevalence of hypertension in this study (6.7%) was lower than that reported in the 2018 Basic Health Research (Riskesdas) data for Central Jakarta (39.05%). The study's limitations include the focus on a single fast food restaurant and the small sample size. The findings suggest that restaurant employees should avoid high-sodium foods and monitor their blood pressure regularly.

INTRODUCTION

Blood pressure is a very important factor in the circulatory system. According to the *World Health Organization* (WHO) 2013, blood pressure is the pressure exerted on the walls of the arteries when the blood is pumped by the heart throughout the body. The higher the blood pressure, the harder the heart works. There are two kinds of blood pressure disorders, including what is known as low blood pressure (hypotension) and high blood pressure (hypertension).[1]

Hypertension is a condition when systolic blood pressure is equal to or above 140 mmHg and/or diastolic blood pressure is equal to or above 90 mmHg Hypertension is often referred to as the *silent killer* because it is often without complaints, so patients do not know that they have hypertension. However, later on, they find out that there are complications of hypertension.[3] The prevalence of hypertension is increasing every year. According to WHO data, worldwide, around 972 million people or 26.4% of the earth's inhabitants have hypertension with a ratio of 26.6% of men and 26.1% of women. [1] Based on Basic Health Research (Riskesdas) data in 2018 Indonesia has a prevalence of hypertension of 34.11%. Based on Riskesdas in 2013 and 2018, the prevalence of hypertension in DKI Jakarta Province increased from 20% to 33.43%. Based on the results of

the Basic Health Research in 2018, it shows that the highest prevalence in the DKI Jakarta Province area is Central Jakarta with a prevalence of hypertension based on the results of measurements in the population aged ≥18 years of 39.05%.[4]

Hypertension can trigger the onset of a disease, such as ischemic stroke with a prevalence of over 80%, chronic kidney failure around 80%, coronary heart disease between 60-70%, and type 2 diabetes mellitus around 60-88%. One of the factors that trigger hypertension is sodium consumption. Excess sodium consumption causes the body to retain fluid which can increase blood volume.[5,6] Food intake with high fat and sodium content can affect the high and low blood pressure in the body, causing hypertension. An increase in sodium levels in the blood can stimulate renin secretion and result in narrowing of peripheral blood vessels which results in increased blood pressure. [7] Based on the results of the 2013 Riskesdas, the proportion of the population aged ≥10 years who consumed foods at risk of hypertension was 26.2% from salty foods, and 77.3% from seasoning. [8] According to *Health Canada's nutritional recommendations*, our bodies only need 115 milligrams of sodium per day to live a healthy life. For comparison, 1 teaspoon of salt contains 2,000 milligrams of sodium. While based on the UK RNI (*United Kingdom Reference Nutrient Intakes*) the minimum limit is 575 mg and the maximum is 1,600 mg. based on the world health agency, WHO (*World Health Organization*) recommends limiting sodium consumption to 2,400 mg or about 1 teaspoon of salt per day. [9]

There are several links to *fast food,* including fast food*, junk food, instant food* and *street food. Fast food* such as *fast* food is fast food in which the cooking process does not require a long time, foods that are classified in this category such as *fried chicken*, fried foods, instant noodles, humberger, etc. *Junk food* is usually in the form of snacks or snacks made from tubers, potatoes, or corn that are made into chips or similar crisps. *Chips* or similar chips in the form of packaged foods, these foods with high calorie content, high sugar / fat / salt content and low nutritional value in terms of protein, fiber, vitamin and mineral content (Kaushik, at all. 2011) for example *chips*/ chips, chocolate, ice cream, snacks etc.. *Instant food* is food that undergoes special processing ready to be served in one sitting or dispersed in liquid with a short cooking time such as instant noodles, *corn flakes*, soup powder, instant porridge, spaghetti (Kaushik, at all. 2011). While *street food* is food and beverages processed by food craftsmen at the point of sale and or served as ready-to-eat food for sale to the public other than those served by catering services, restaurants, and hotels (Kepmenkes, 2003) such as cilok, siomay, otak-otak, cakwe, etc. [10]

In the preliminary survey, food handlers at the *western style* fast food restaurant *"X"* in Hayam Wuruk, Central Jakarta generally get ready-to-eat food rations such as discounts on certain menus (rice, chicken, drinks), some of these food rations are brought home and some eat directly on the spot. Some employees at mealtimes or breaks eat lunch brought from home, buy restaurant menu products or buy food outside the restaurant.

The results of the above study, the researcher is interested in examining employees who work at the *western style fast* food restaurant "X" in Hayam Wuruk, Central Jakarta to see the relationship between *fast food* such as *fast food, junk food, instant food* and *street food* consumed by employees whether it has an influence on their blood pressure. The choice of fast food *western style* restaurant "X" in Hayam Wuruk, Central Jakarta is because the restaurant is open 24 hours, employees who work quite a lot, many restaurant visitors because it is located on the edge of a large highway, close to the shopping center for clothes and daily necessities and close to public transportation access such as TransJakarta Bus Stop.

METHODS

This research is descriptive quantitative with *cross sectional* research design*.* Data presentation using SPSS chi-square test*.* In this study the data collected were respondent characteristics, blood pressure data and FFQ data on sodium source foods. Sampling in this study used *purposive sampling,* because it was based on certain considerations made by the researcher in accordance with the inclusion criteria and exclusion criteria which are risk factors for hypertension. The sample of this study was the entire population who met the inclusion and exclusion criteria, which met the inclusion criteria of 30 people.

The following are the inclusion and exclusion criteria: a) Inclusion Criteria 1) Aged 20 - 50 years 2) Not on a low sodium/sodium diet 3) Willing to be a respondent b) Exclusion Criteria 1) Obesity 2) Smoking 3) Consuming alcohol. This study uses tools in the form of a respondent characteristic questionnaire and blood pressure data. The FFQ form contains the type of sodium source food, the type of sodium source food is obtained from the diet guide book (see results). The sodium source is the score on the frequency of eating sodium source foods, namely never given a score of 0 (zero), rarely (1-2x / week) given 10 (ten) and often (3-6x / week) given a score of 15 (fifteen). In categorizing the frequency of eating sodium source foods according to Sirajuddin, et al (2018), it is determined based on the mean (average) number of scores from each respondent, the mean value is obtained through the help of the SPSS application. To avoid bias during the FFQ interview, the researcher crosschecked with his friend. Blood pressure measurements were taken by a nurse using a mercury *sphygmomanometer* tensimeter. At the time of blood pressure measurement, the respondent's position was sitting leaning for 5 minutes with feet touching the floor and arms positioned on a table at a height equivalent to the position of the heart, it is recommended to urinate first, because a full bladder can affect the measurement results, measurements are taken twice with a 1-2 minute break. If the second measurement has a result of more than 5 mmHg, then a third measurement should be taken. This study has obtained an ethical permit from the Health Research Ethics Committee of the Poltekkes Kemenkes Jakarta II, Number LB.02.01/KE/31/382/2023.

RESULTS

The characteristics of the respondents are detailed in the table below, which outlines key aspects such as length of working time, age, gender, education level, consumption patterns, and blood pressure categories. This table provides a comprehensive overview of the respondents' demographic and health-related factors that are relevant to the study of sodium consumption and its potential impact on blood pressure

Table 1 Characteristics of Respondents

Characteristics	n	%
Length of Working Time		
≤3 years	23	76.7
>3 years	7	23.3
Age (years)		
19-29	23	76.7
30-49	7	23.3
Gender		
Man	17	56.7
Woman	13	43.3
Education level		
High School/Equivalent	29	96.7
PT	1	3.3
Categories Consumption Patterns		
Rare (1-2x/week)Mean<340.2	13	43.3
Frequent (3-6x/week)/Mean	17	56.7
Blood pressure		
Normal (< 120/80 mmHg)	11	36.7
Prehypertension ((120-139)/(80-89) mmHg)	17	56.7
Stage 1 hypertension ((140-159)/(90-99) mmHg)	2	6.7

From Table 1, it is known that the length of working time ≤3 years is 76.7%, while the >3 years is 23.3%, The results of research conducted by Harahap (2016) show that workers who have the longest working period > 3 years in the work environment have quite important intensity and many roles during work. [13] . The age category of 19-29 is 76.7%, and the age of 30-49 is 23.3%. Male gender in this study as many as 56.7% of respondents were female 43.3%. The education

level of the respondents in this study was 96.7% high school/equivalent and 3.3% of state universities. The rare category had a sodium consumption pattern in the respondents as much as 43.3% while the frequent category of respondents was 56.7%. [4]

The results of this study show the proportion of hypertension which is lower than the data of Riskesdas (2018). Data from Riskesdas (2018) shows that hypertension in DKI Jakarta has a prevalence of 33.43%, while the prevalence of hypertension in Central Jakarta is 39.05% and the prevalence in this study is 6.7%. [14]

Table 2 Food Groups of Sodium Sources

Food Group Sodium Source	Categories Consumption Patterns							
	Never		Infrequently		Often		Total	
	n	%	n	%	n	%	n	%
Chicken Eggs (food mixture)	1	3.3	3	10.0	26	86.7	30	100.0
Mentega	0	0.0	0	0.0	30	100.0	30	100.0
Margarine	0	0.0	0	0.0	30	100.0	30	100.0
Beef meatballs	0	0.0	6	20.0	24	80.0	30	100.0
Chicken Noodles	0	0.0	11	36.7	19	63.3	30	100.0
Flour Fried Tempeh	2	6.7	1	3.33	27	90.0	30	100.0
Fried tempeh	1	3.3	3	10	26	86.7	30	100.0
Bakwan	1	3.3	3	10	26	86.7	30	100.0
Omelette	1	3.3	3	10	26	86.7	30	100.0

Based on Table 2, it can be seen that employees in the restaurants studied often consume chicken eggs (food mixtures) such as eating instant noodles, egg meatballs, Padang specialties and gado gado. The use of butter and margarine such as omelets, ingredients in bread or as an additional topping, beef burger and chicken burger. Food such as beef meatballs, chicken noodles, flour fried tempeh, fried tempeh, bakwan are often consumed because only these foods are easily accessible during work breaks or meal hours, the menu is easy to order and buy because the location of the food seller is very close to the restaurant and the food has become their daily consumption habit. Based on the results of observations and conducting a question and answer to one of the restaurant staff who was researched, it was said that every employee who worked was given a discount for the chicken package menu (rice, flour fried chicken and drinking the restaurant's products).

Table 3. Working time with blood pressure

Variables	Normal		Prehypertension – Hypertension Stage 1		P-value
	n	%	n	%	
Length of Working Time					
≤ 3 years	13	56.6	10	43.4	0.301
> 3 years	2	28.6	15	71.4	
Age (years)					
19-29	12	52.1	11	47.9	0.259
30-49	3	43.0	4	57.0	
Gender					
Man	10	59.0	7	41.0	0.269
Woman	5	38.4	8	61.6	
Frequency of Eating Sodium Source Foods					
Rare (1-2x/week)Mean<340.2	6	46.0	7	54.0	1.000
Frequent (3-6x/week)/Mean	9	53.0	8	47.0	

Table 4 shows that normal blood pressure is more common in respondents who have worked for a long time ≤ 3 years by 56.6%. Meanwhile, prehypertensive and stage I hypertension blood pressure was more common in respondents who worked for >3 years at 71.4%. The results of the Fisher *'s Exact Test* (p > 0.301) p> 0.05 value showed no significant relationship between

the age of the respondent and the blood pressure.

Table 4 shows that normal blood pressure is more common in respondents aged 19-29 years by 52.1%. Meanwhile, prehypertensive blood pressure and stage I hypertension were more common in respondents aged 30 - 49 years by 57%. The results *of the Fisher's Exact Test* (p= 0.259) p> 0.05 value showed no significant relationship between the age of the respondent and the blood pressure.

Based on table 4, normal blood pressure is more common in male respondents by 59%. While prehypertension and stage I hypertension blood pressure were more common in female respondents by 61.2%, from the results *of Fisher's Exact Test* the p-value = 0.269 p> 0.05, there was no meaningful relationship between sex and blood pressure.

Normal blood pressure was more common in respondents who ate foods with frequent sodium sources (*mean* ≥340.2) by 53%. Meanwhile, prehypertensive blood pressure and stage I hypertension were more common in respondents who ate rarely (*mean* <340.2) of 54%. The fisher extact test is p=1 with a p> value of 0.05, then there is no significant relationship between the frequency of eating sodium source foods and blood pressure.

DISCUSSION

There was no significant relationship between length of work and blood pressure (p=0.301). Research conducted by Sabrina (2018) also obtained the results of an analysis of the relationship between working period (>3 years) and systolic blood pressure (p=0.0333, p<0.05) while there was no relationship between working period (≤3 years) and diastolic blood pressure (p=0.957, p>0.05) in workers at the Seruni Catering kitchen, Bonto Duri Center, Makassar City in 2018. The results of another study also have the same thing done by Nurmagfira (2016) on tofu factory workers in Bara – East Baraya Village, Makassar District, Makassar City. The study proved that there was a relationship between working period and workers' blood pressure where out of 68 respondents 78.6% experienced an increase in blood pressure with a working period of more than 3 years. [11,15,16] Normal blood pressure was more common in male respondents by 59%. Meanwhile, prehypertensive and stage I hypertension blood pressure was more common in female respondents by 61.6%. A study with similar results conducted by Agrina, et al. (2011) produced findings that based on gender in 60 hypertensive patients in West Sidomulyo Village, Pekanbaru City, the most female sex was obtained as many as 35 people (58.3%).[17] This is explained by the theory of Junaidi (2010) stating that the female sex is indeed more prominent than the male gender, because there are greater hormonal factors in the female body compared to the male.[12] Gender is a factor that cannot be changed, so prevention is needed, if blood pressure cannot be controlled, it can increase the risk of life-threatening complications.[18]

Normal blood pressure was more common in respondents aged 30 – 49 years (57%), this is not in accordance with the theory because at the age of 19 – 29 years (43%) the flexibility of blood vessels is better than at the age of 30 – 49 years. However, this happened in studies due to a possible lack of sample numbers. Age factors greatly influence the incidence of hypertension, including natural changes in the heart and human blood circulation, which occur naturally as a process of aging.[1]

Normal blood pressure was more common in respondents who ate foods with frequent sodium sources (*mean* ≥340.2) by 53%. Meanwhile, prehypertensive blood pressure and stage I hypertension were more common in respondents who ate foods with a rare sodium source (*mean* <340.2) of 54%.
The results of a similar study conducted by Hasbullah et.al. at the Regional General Hospital (Makassar City Hospital) showed that samples with sodium intake often tended to have mild or even normal hypertension, while sodium intake was rarely more likely to experience moderate to severe hypertension.[19] The level of food consumption contains high sodium, where sodium retains water so that it increases the load of blood entering the heart and results in an increase in blood pressure.[20] Based on the results of the statistical test, a value *of p=0.003* was obtained which was smaller than the value of α (0.05) which means that there was a relationship between sodium intake and hypertension levels.[13]

CONCLUSIONS

A total of 30 respondents participated in this study, most of whom were male (56.7%) The respondents in this study had the longest duration of working ≤ 3 years (76.7%). Consumption of sodium source foods is the most 3-6x/week (56.7%) In this study, normal blood pressure was found more in respondents who ate sodium source foods frequently (53%). The duration of working time, gender, age and frequency of consumption of sodium source foods were not significantly related to blood pressure (p>0.05). The limitation in this study is that only one western *food restaurant* / one fast food brand and the respondents are only employees of restaurant X *western food*.

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