

# CHAPTER I

## INTRODUCTION

### A. Research Background

Hypertension was a major factor in morbidity and mortality and was classified as one of the leading Non-Communicable Diseases (NCDs) causing the highest mortality rates worldwide<sup>1</sup>. Hypertension, also known as high blood pressure, is a condition in which blood pressure reaches  $\geq 140/\geq 90$  mmHg. This disease was often referred to as a silent killer or silent disease because individuals would not be aware that they had hypertension unless their blood pressure was measured. This was because hypertension did not cause specific symptoms<sup>2,3</sup>. Uncontrolled increases in blood pressure led to a higher risk of hypertension among adolescents within two to four years<sup>4</sup>. University students aged 18-24 years were classified as young adults. In this age group (18-29 years), hypertension increased and was often undiagnosed<sup>5</sup>.

The 2023 WHO data recorded that the prevalence of hypertension in Southeast Asia was 32%, making it the region with the highest hypertension rate. Meanwhile, the prevalence of hypertension in Indonesia reached 40%, with 36% of cases among women and 45% among men<sup>6</sup>. The 2023 Indonesian Health Survey (SKI) report stated that the prevalence of

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<sup>1</sup> Sugeha, F.Z., et al. (2023) 'Hubungan Status Gizi , Pola Makan , Kebiasaan Minum Kopi dan Tekanan Darah pada Mahasiswa Universitas Airlangga', *Amerta Nutrition*, 7(2), pp. 267–273.

<sup>2</sup> WHO. (2023) *Global Report on Hypertension: The Race Against a Silent Killer*. Geneva: World Health Organization.

<sup>3</sup> Kario, K. et al. (2024) 'The WHO Global Report 2023 on Hypertension Warning the Emerging Hypertension Burden in Globe and Its Treatment Strategy', *Hypertension Research*, 4, pp. 1099–1102.

<sup>4</sup> Titah Khoirurrokhmah et.al, (2021) 'Faktor-Faktor Yang Berhubungan Dengan Prehipertensi Pada Usia Dewasa Di Wilayah Kerja Puskesmas Cipayung', *Jurnal Gizi Kerja Dan Produktivitas*, 2.2, pp. 77–85.

<sup>5</sup> Nadya Zahra and Fajri Marindra Siregar, (2021) 'Prevalensi Prehipertensi Dan Hipertensi Pada Mahasiswa Profesi Dokter Fakultas Kedokteran Universitas Riau Tahun 2020', *Jurnal Kedokteran Dan Kesehatan*, 19.1, pp. 50–64.

<sup>6</sup> WHO, (2023) *Global Report on Hypertension: The Race Against a Silent Killer*.

hypertension in East Java among the 18-24 age group was 10.7%, affecting approximately 85,230 people<sup>7</sup>. The East Java Provincial Health Office recorded in 2022 that the estimated number of hypertension patients aged  $\geq 15$  years in Ngawi Regency reached 272,720 people<sup>8</sup>. Based on a preliminary study conducted by the researcher on 50 female students at Universitas Darussalam Gontor aged 18-23 years, blood pressure measurements showed that 34% (17 people) had normal blood pressure, 56% (28 people) had prehypertension, and 10% (5 people) had hypertension.

Restriction of sodium intake, increasing the consumption of fruits and vegetables containing fiber, and limiting caffeine intake were associated with lowering high blood pressure<sup>9</sup>. The sensitivity of the taste buds influences food intake control. A low salt taste threshold or low sensitivity to salty taste tended to increase salt consumption to achieve the desired salty flavor<sup>10</sup>. Sodium or salt intake needed to be limited because it was associated with the incidence of hypertension. High sodium intake could narrow the diameter of the arteries, causing the heart to pump harder to circulate the blood through the constricted vessels, leading to an increased in blood pressure. The recommended sodium intake for the 19-29 age group was 1,500 mg daily<sup>11</sup>. A study conducted by Syifadhiya and Farapti (2023) on the relationship between salt taste threshold and hypertension among adolescents in Surabaya found a significant association between increased systolic and diastolic blood pressure and a high salt taste threshold<sup>12</sup>.

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<sup>7</sup> Kemenkes RI, (2023) *Survei Kesehatan Indonesia (SKI) 2023 Dalam Angka*.

<sup>8</sup> Dinkes Jawa Timur, (2023) *Profil Kesehatan Provinsi Jawa Timur Tahun 2022*.

<sup>9</sup> WHO, (2021) *Guideline for The Pharmacological Treatment of Hypertension in Adults* (World Health Organization).

<sup>10</sup> Qayra Syifadhiya and Farapti Farapti, (2023) 'Hubungan Ambang Rasa Asin Dengan Kejadian Hipertensi Pada Remaja Di Surabaya', *Amerta Nutrition*, 7.4, pp. 487-93, doi:10.20473/amnt.v7i4.2023.487-493.

<sup>11</sup> Permenkes, (2019 ) 'Peraturan Menteri Kesehatan Republik Indonesia Nomor 28 Tahun 2019 Tentang Angka Kecukuan Gizi Yang Dianjurkan Untuk Masyarakat Indonesia'.

<sup>12</sup> Syifadhiya and Farapti, (2023) 'Hubungan Ambang Rasa Asin Dengan Kejadian Hipertensi Pada Remaja Di Surabaya'.

The recommended fiber intake was 32 g for women and 37 g for men in the 19-29 age group<sup>13</sup>. Fiber is indigestible by stomach acid, so its absorption occurs through fermentation by gut microbiota. A study by Yuan Xue et al. (2021) stated that a high-fiber diet supplementation effectively reduced hypertension. Fiber fermentation by gut microbiota produced volatile fatty acids (butyrate and propionate), which had anti-inflammatory effects and were associated with blood pressure reduction. These compounds could relax arterial walls, modulate the renin-angiotensin-aldosterone system, and act as inhibitors of Histone Deacetylase (HDAC)<sup>14</sup>.

Another dietary factor related to reducing hypertension was caffeine restriction. High caffeine intake led to increased secretion of catecholamines such as adenosine, serotonin, and dopamine. The increased secretion of adenosine affected the central nervous system, influencing heart rate and blood vessel dilation. As a result, individuals who consumed high amounts of caffeine tended to have higher blood pressure<sup>15</sup>. The recommended caffeine intake was 100–200 mg daily, while the maximum caffeine limit in food and beverages was 150 mg daily and 50 mg each serving<sup>16</sup>. A study conducted by Sutarjana (2021) on the relationship between caffeine consumption frequency and hypertension found that caffeine intake affected the increase in blood pressure<sup>17</sup>.

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<sup>13</sup> Permenkes, (2019) 'Peraturan Menteri Kesehatan Republik Indonesia Nomor 28 Tahun 2019 Tentang Angka Kecukupan Gizi Yang Dianjurkan Untuk Masyarakat Indonesia'

<sup>14</sup> Yuan Xue et.al, (2021) 'The Effect of Dietary Fiber ( Oat Bran ) Supplement on Blood Pressure in Patients with Essential Hypertension : A Randomized Controlled Trial', *Nutrition, Metabolism and Cardiovascular Diseases*, 31.8, pp. 2458–70, doi:10.1016/j.numecd.2021.04.013.

<sup>15</sup> Made Adi Sutarjana, (2021) 'Hubungan Frekuensi Konsumsi Kafein Dan Tingkat Stres Dengan Kejadian Hipertensi Pada Usia Dewasa Muda', *Gizi Indonesia*, 44.2, pp. 145–54, doi:10.36457/gizindo.v44i2.536.

<sup>16</sup> Vincent Vandestyo Chandra and Susilodinata Halim, (2020) 'Pengaruh Kopi Terhadap Tekanan Darah Dan Denyut Nadi Mahasiswa Universitas Tarumanagara', *Tarumanagara Medical Journal*, 2.2, pp. 425–29.

<sup>17</sup> Sutarjana, (2021) 'Hubungan Frekuensi Konsumsi Kafein Dan Tingkat Stres Dengan Kejadian Hipertensi Pada Usia Dewasa Muda'.

Humans obtain energy from food and beverages to carry out daily activities, especially in worshipping Allah SWT. However, some people do not pay attention to the food they consume, even though food can also become a source of harm if not consumed according to religious principles<sup>18</sup>. Allah SWT explained in His words in Surah Abasa, verse 24, about the importance of being mindful of food:

*"Then let man look at his food."* (QS. Abasa: 24)

Based on the explanation above and previous studies, the researcher developed an interest in studying the salt taste threshold, caffeine intake, and fiber intake about to blood pressure among female students at Universitas Darussalam Gontor (UNIDA). In particular, research on the salt taste threshold variable had never been conducted at UNIDA before. Therefore, the researcher believed it necessary to conduct a study on *"The Relationship Between Salt-Taste Threshold, Fiber Intake, and Caffeine Intake with Blood Pressure Among Female Students at Universitas Darussalam Gontor."*



<sup>18</sup> Mustika Rahayu, (2019) 'Pola Makan Menurut Hadist Nabi SAW (Suatu Kajian Tahlili)', *Jurnal Diskursus Islam*, 7.2, pp. 295–313.

## **B. Research Problem**

Was there a relationship between the salt taste threshold, fiber intake, and caffeine intake with blood pressure among female students at Universitas Darussalam Gontor?

## **C. Research Objectives**

### **1. General Objective**

To analyze the relationship between the salt-taste threshold, fiber intake, and caffeine intake with blood pressure among female students at Universitas Darussalam Gontor.

### **2. Specific Objectives**

- a. To identify the characteristics of female students at Universitas Darussalam Gontor in relation to their salt taste threshold, fiber intake, and caffeine intake.
- b. To analyze the relationship between the salt-taste threshold and blood pressure among female students at Universitas Darussalam Gontor.
- c. To analyze the relationship between fiber intake and blood pressure among female students at Universitas Darussalam Gontor.
- d. To analyze the relationship between caffeine intake and blood pressure among female students at Universitas Darussalam Gontor.

## **D. Research Benefits**

### **1. Theoretical Benefits**

This research was expected to provide information that could enhance knowledge and serve as a theoretical reference regarding the relationship between the salt taste threshold, fiber intake, and caffeine intake with blood pressure among female students at Universitas Darussalam Gontor.

### **2. Practical Benefits**

This research was expected to increase awareness among female students, especially those living in dormitories, so that they could apply the findings in their daily lives regarding the salt taste threshold, fiber intake, and caffeine intake about blood pressure.

## E. Authenticity Research

Table 1. Research Originality

Research Title	Research Type	Variables	Results	Research Differences
Nutritional Status, Sodium and Fiber Consumption Patterns with Hypertension Incidence: A Cross-Sectional Study (Dyah Opsa and Rani Rahmasari, 2021) <sup>19</sup>	Cross-Sectional	Dependent: Nutritional Status, Sodium and Fiber Consumption Patterns; Independent: Hypertension	There was no relationship between nutritional status and fiber intake with hypertension incidence (p = 0.017).	a. Dependent: Salt taste threshold, fiber intake, and caffeine intake
The Effect of Dietary Fiber (Oat Bran) Supplement on Blood Pressure in Patients with Essential Hypertension: A Randomized Controlled Trial (Xue Yuan et al., 2021) <sup>20</sup>	Case-Control	Dependent: Dietary Fiber Supplement; Independent: Hypertensive Patients	There was a relationship between dietary fiber supplementation and decreased blood pressure in hypertensive patients.	a. Dependent: Fiber intake b. Research Design: Cross-Sectional
Relationship Between Nutritional Status, Eating Patterns, Coffee Drinking Habits, and Blood Pressure in Students of Airlangga University (Fuad et al., 2023) <sup>21</sup>	Cross-Sectional	Dependent: Nutritional Status, Eating Patterns, Coffee Drinking Habits; Independent: Blood Pressure	There was a relationship between nutritional status, high sodium eating patterns, and coffee-drinking habits with blood pressure (p = 0.046).	a. Dependent: Salt taste threshold, fiber intake b. Sample: Female students of Universitas Darussalam Gontor
The Relationship Between Salt Taste Threshold and Hypertension Incidence in Adolescents	Cross-Sectional	Dependent: Salt Taste Threshold; Independent: Hypertension	There was a significant relationship between high salt taste threshold and hypertension incidence in male respondents (p = 0.027).	a. Dependent: Fiber intake and caffeine intake b. Sample: Female students

<sup>19</sup> Dyah Opsa Melini and Rani Rahmasari Tanuwijaya, (2021) 'Status Gizi, Pola Konsumsi Natrium Dan Serat Dengan Kejadian Hipertensi: A Cross Sectional Study', *Jurnal Nutrisia*, 23.2, pp. 101–8, doi:10.29238/jnutri.v23i2.241.

<sup>20</sup> Xue et.al, (2021) 'The Effect of Dietary Fiber ( Oat Bran ) Supplement on Blood Pressure in Patients with Essential Hypertension : A Randomized Controlled Trial'.

<sup>21</sup> Zulkarnain et.al, (2023) 'Hubungan Status Gizi , Pola Makan , Kebiasaan Minum Kopi Dan Tekanan Darah Pada Mahasiswa Universitas Airlangga'.



Research Title	Research Type	Variables	Results	Research Differences
Surabaya (Syifadhiya and Farapti, 2023) <sup>22</sup>				
The Relationship Between Caffeine Consumption Frequency and Stress Levels with Hypertension Incidence in Young Adults (Sutarjana, 2021) <sup>23</sup>	Cross-Sectional	Dependent: Caffeine Consumption Frequency and Stress Levels; Independent: Hypertension	There was a relationship between caffeine consumption frequency and stress levels with hypertension incidence (p < 0.05) with moderate strength (0.406).	a. Dependent: Salt taste threshold, fiber intake

<sup>22</sup> Syifadhiya and Farapti, (2023) 'Hubungan Ambang Rasa Asin Dengan Kejadian Hipertensi Pada Remaja Di Surabaya'.

<sup>23</sup> Sutarjana, (2021) 'Hubungan Frekuensi Konsumsi Kafein Dan Tingkat Stres Dengan Kejadian Hipertensi Pada Usia Dewasa Muda'.