RESEARCH STUDY
English Version

OPEN ACCESS

Association of Nutritional Status, Diet, Coffee Drinking Habits and Blood Pressure of Universitas Airlangga Students

Hubungan Status Gizi, Pola Makan, Kebiasaan Minum Kopi dan Tekanan Darah pada Mahasiswa Universitas Airlangga

Fuad Zulkarnain Rozaq Sugeha[1]*, Trias Mahmudiono[1], Bella Kartini Rochmania[2]

[1]Department of Nutrition, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia
[2]Department of Health Promotion and Behavioral Sciences, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

ABSTRACT

Background: Non-Communicable Diseases (NCD) is the leading cause of death in the world. One of the causes of death is heart and blood vessel disease. The American Heart Association (AHA) states that one in three people over 20 suffer from hypertension. Hypertension is a risk factor for blood vessels and heart disease. Hypertension risk factors are obesity, a high diet of calories, fat, and salt, a sedentary lifestyle, stress, and lack of exercise. The risk of obesity at a productive age can cause hypertension. UKM members tend to be more active and productive in their daily life than students who do not participate in UKM.

Objectives: To analyze the association of nutritional status, diet, coffee drinking habits, and blood pressure of UNAIR Students

Methods: The design of this study is a cross-sectional study of 80 student members of UKM UNAIR. Respondents were taken from the population based on the accidental sampling method. The independent variable in this study is blood pressure. The study's dependent variables are nutritional status, diet, and coffee-drinking habits. Data were analyzed using chi-square.

Results: There is a correlation between nutritional status (p=0.009), high sodium diet (p=0.022), coffee drinking habits (p=0.046), and blood pressure, and there is no correlation between high-calorie diet (p=0.663) and high-fat diet (p=0.215) and blood pressure.

Conclusions: There was a correlation between nutritional status, high sodium diet, and coffee-drinking habits with blood pressure in UNAIR Students.

INTRODUCTION

Non-Communicable Diseases (NCDs) are the highest cause of death in the world, approximately 71% each year. As many as 54.6% of deaths due to NCDs were heart and blood vessel diseases, while other NCDs caused 45.4% of cases of death[1]. The American Heart Association (AHA) stated in 2014 that 74.5 million people over 20 suffer from hypertension, or 1 in 3 of the population. In 90-95% of cases, the cause is unknown[2]. Indonesian Basic Health Research (Riskesdas) data for residents aged 18 years and over in 2018 showed an increase in the prevalence of hypertension by 25.8% of cases to 34.1% of cases and obesity by 14.8% of cases to 21.8% of cases[3]. Hypertension is blood pressure with a persistent increase in systolic of 140mmHg or more and a persistent increase in diastolic systolic of 90mmHg or more[4]. Hypertension as a risk factor is very influential in the emergence of vascular and heart disease[3]. The prevalence of hypertension in adolescents has increased over the last few years. Several studies have stated that hypertension that has arisen since adolescence has not been widely recognized, causing hypertension to emerge when adulthood and the elderly[5].

Nutritional status is a balance between the intake of nutrients consumed by the body's nutritional needs for metabolic processes. Each individual's nutritional needs differ depending on gender, age, body weight, and daily physical activity[6]. The risk of excess nutrition or obesity in productive age groups can cause hypertension[7]. Other risk factors for hypertension are high-fat consumption, high salt consumption, overeating, unhealthy lifestyle, emotional stress, and lack of physical activity[8]. Drinking coffee can be changed as a preventive measure for the risk of hypertension. Coffee contains polyphenols, potassium, and caffeine, which can affect blood pressure if consumed. Caffeine in the body, besides reducing drowsiness, can also help provide a stimulus to the work of the central nervous system, trigger a heartbeat, and trigger the work of blood flow. Caffeine is a natural substance found in coffee, tea, and chocolate[9].

e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
Sugeha et al. | Amerta Nutrition Vol. 7 Issue 2 (June 2023). 267-273

268

Riskesdas data for 2018[3] East Java Province, Indonesia, showed an increase in the proportion of overweight by 2.85% (2013 by 10.9%, 2018 by 13.75) and obesity by 14% (2013 by 8.4%, 2018 by 22.37). The risk factor for hypertension is obesity, OR = 4.02 times in obese people compared to those who are not obese[10]. The relative risk of hypertension is four times higher for people with excess nutrition (obese) than people with normal nutrition[11]. Excessive coffee consumption per day of 1-2 cups can increase the risk of hypertension by 4.12 times[12]. The study concluded that there was an effect of coffee consumption on increasing blood pressure. Someone has a low adaptation to the effects of caffeine when used to drinking low doses of coffee. The health profile of students participating in the Student Activity Unit (UKM) must be considered. Some students visit coffee shops when experiencing fatigue from assignments or lecture activities to refresh their minds by enjoying coffee. The coffee shop is a place to gather and exchange information in various ways. Student knowledge about coffee is limited to caffeine and its benefits. Students consider there is no danger from excessive and prolonged coffee drinking[13].

Students are the next generation of young people who are demanded to be productive and qualified to be prepared to face the future. Students need to maintain their health, one of which is through a healthy lifestyle. A healthy generation can maximize productivity. One productivity that students can do during their education is participating in non-academic activities. Specific health behaviors and existing environmental conditions will mutually influence the creation of individual health conditions. Individuals who have healthy lifestyles create healthy environmental conditions as well. Unhealthy physical and biological conditions will trigger individuals to improve their behavior to achieve better health[14].

Universitas Airlangga, Indonesia (UNAIR) students have solid academic activities, namely teaching and learning activities, practicum, field studies, and non-academic activities, including joining UKM. Students taking part in UKM are taught to improve leadership, collaboration, and communication skills to improve soft student skills to produce quality graduates[15]. Students who are members of UKM tend to have more activities and are more productive in lecture activities than students who do not join UKM. This productivity requires UKM members to manage time and maintain health optimally. Technological developments also facilitate access for UKM students to food selection. The phenomenon that is happening right now is that UKM students gather at coffee shops to do assignments, organize, or pass the time. UKM students are also allowed to consume snacks (junk food) because they have a variety of food variants with preferred flavors. Prolonged consumption of junk food in students, in this case, UKM students, can improve nutritional status and lead to obesity. Excess nutritional status can affect the health status of UKM students, especially in blood pressure. Early detection of health problems, especially blood pressure in college students, needs to be studied further, considering the long-term health effects of blood pressure which can harm the body in the future.

Preliminary studies conducted by researchers in 2019 measuring the blood pressure and nutritional status of 20 student members of UKM UNAIR showed that six students experienced hypo-tension, eight students experienced normal blood pressure, and six students experienced hypertension. Students who experience low blood pressure complain of dizziness, weakness, and drowsiness. Students who experience high blood pressure complain that they feel heavy on the back of their heads and nauseous, making them uncomfortable when doing activities. Measuring the nutritional status of the 20 students found that five were thin, 6 had normal nutritional status, four were overweight, and five were obese. Research conducted in 2018 on 393 Universitas Airlangga students showed that body mass index (BMI), physical activity, sleep quantity, smoking habits, coffee consumption, and stress have a significant relationship with the risk of hypertension[14]. Students need to know the risk factors for hypertension and risk factors that can affect an increase in blood pressure, and they must be able to maintain emotional stability in completing campus and off-campus activities to avoid anxiety, anger, and panic. Efforts to improve the quality of health and health promotion need to be carried out through having a positive mind and having the ability to manage stressors that are influenced by the environment and the learning process.

METHODS

This was an analytic observational study using a cross-sectional study on student members of UKM UNAIR located on campus C Mulyorejo, Surabaya City, Indonesia. The independent variables of this study were nutritional status, diet, and coffee-drinking habits, while the dependent variable was blood pressure data analysis using chi-square.

The population in this study was 400 active student members of UKM. The research sample was active students who were members of UKM with inclusion criteria, namely registered as UNAIR students, registered as active members of one or more UKM, aged 18-25 years, and regularly drinking coffee daily. Researchers conducted research at the UNAIR Student Center from March to April 2020. Respondents were taken from the population using the accidental sampling method. The researcher determined a sample of student members of UKM who were found at the research location according to the inclusive criteria. Respondents obtained during the sampling period were 80 student members of UKM. Research data collection used a closed questionnaire as an instrument which the respondents filled out after being explained to the researcher.

The characteristics of the respondents in the study were age and level of education. The age of the research respondents was calculated from the year of birth to the year the research was conducted, expressed in years. The education level of the respondents, namely the educational level that was being pursued when the research was conducted based on the categories of semesters 1-2, semesters 3-4, semesters 5-6, semesters 7-8, and > semester 8. Knowledge of nutrition related to the respondent's ability to answer general questions about blood pressure and nutrition. Nutritional

Nutrition Amerta

e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
Sugeha et al. | Amerta Nutrition Vol. 7 Issue 2 (June 2023). 267-273

269

knowledge was categorized into good (score >75%), sufficient (score 61-74%), and poor (score <60%).

The researcher measured the respondent's blood pressure. Before taking blood pressure measurements, the steps were for respondents who have done moderate physical activities such as sports, martial arts, dancing, running, or long walks, and please rest for 30 minutes. Blood pressure measurement by trained personnel using a digital sphygmomanometer brand AND type UA 767S. Blood pressure measurement was carried out in a relaxed and comfortable sitting position, and the cuff was placed on the left arm, which is the arm closest to the heart. Blood pressure based on JNC VII classification[16]that is:

Table 1. Blood pressure based on JNC VII classification

Classification	Systole	Diastole
Hypotension	<90	<70
Normal	90-119	60-79
Pre Hypertension	120-139	80-89
Hypertension I	140-159	90-99
Hypertension II	160-179	100-109
Emergency Hypertension	$\geq$180	$\geq$110

The six interpretations in the study were simplified into two categories: low risk of hypertension (if interpreted as hypotension and normal blood pressure) and high risk of hypertension (if interpreted as prehypertension, hypertension I, hypertension II, and hypertension emergency).

Nutritional status is determined through anthropometric measurements, body weight, and height measurements to determine Body Mass Index (BMI). Measurements were carried out by trained personnel. Classification of BMI (kg/m^2) (Ministry of Health Republic of Indonesia, 2014b) namely very thin (BMI value <17 kg/m^2), thin (BMI value 17-18.5 kg/m2), normal (BMI value 18.5- 25 kg/m^2), obesity (BMI value 25-27 kg/m^2), and obesity (BMI value > 27 kg/m^2). The five interpretations are further divided into undernourishment (if the BMI in the interpretation is very thin, thin, and normal) and overweight (if the BMI is interpreted as overweight and obese). Weight measurement used a GEA brand bathroom scale type EB 1622, and height measurement used a GEA brand microtoise.

Diet is an individual or group food consumption repeated to form a habit. Factors that can influence eating patterns are cultural, physiological, and psychological. Frequency of eating > 1 time a day, 1 time a day, > 3 times a week, 1-3 times a week, 1 time a month, and never. The six answers were then divided into three categories, namely often (if food is consumed daily), sometimes (if food is consumed weekly, and rarely (if food is consumed monthly or never). Coffee drinking habits were calculated based on the amount of coffee drunk (unit cup). Frequency of drinking coffee in a 1-day direct interview using semi-quantitative FFQ rarely categorized if drinking coffee < 3 Cups/day and often if drinking coffee $\geq$3 cups/day[17]. The researcher permitted UNAIR management, the Head of UKM, to ask permission to research UKM members. Researchers conducted research at the UNAIR Student Center. The researcher explained the research procedure.

Data collection uses primary data through instruments in the form of questionnaires and measurements of blood pressure, weight, and TB. Data collection was carried out after student members of UKM UNAIR were given an explanation before the research approval (PSP) and signed informed consent. After signing the informed consent, 80 respondents filled out the research questionnaire, measuring blood pressure, weight, and height lasting ± 30 minutes and processing data using a chi-square test with a significance of 90%. This research has passed the requirements and received permit approval from the Ethics Commission of the Faculty of Dentistry, Airlangga University, Surabaya Number 066/HRECC.FODM/II/2020, on February 28, 2020.

RESULTS AND DISCUSSION

The results showed that most of the characteristics were aged 19-21 years, had an education in semester 4, attended UKM nature-loving students (Wanala), had sufficient nutritional knowledge, had a low risk of hypertension, had no more nutritional status, often ate foods high in sodium, and rarely drank coffee as shown in Table 2. The chi-square test showed that there was a relationship between blood pressure and nutritional status (p=0.009), high-sodium diet (p=0.022), and coffee-drinking habits (p=0.046). There was no relationship between blood pressure and high-calorie (p=0.663) and high-fat diet (p=0.215).

Nutritional status data in this study on the blood pressure of respondents in Table 3 shows that most respondents have no more nutritional status. Most respondents who were categorized as nutritional status were not experienced a high risk of hypertension. Nutritional status can be influenced by various factors, namely technological developments, competition for food variations, and food prices, so respondents tend to be free to choose food. Over-nutrition can be caused by an imbalance between incoming calories from food and calories the body uses as energy. More nutritional status has calorie savings in the form of fat. Changes in fat and sugar metabolism occur due to increased body fat.

Table 2. Frequency distribution of respondent characteristics

Characteristics of Respondents	Frequency (n)	Percentage (%)
Gender		
Man	37	46.3
Woman	43	53.7
Age (Years)		
<20	32	40
20-25	48	60
Study Period (Semester)		
<5	53	66.2
5-8	22	27.5
>8	5	6.3
Educational Sciences Cluster		
Economy	10	12.5
Natural Science (MIPA)	10	12.5
Animal Science	7	8.7
Language	17	21.3
Health	23	28.7
Social, Political, and Humanities	12	15
Education	1	1.3
Followed SMEs		
Pencak Silat (PSHT)	8	10.0
Taekwondo	12	15.0
Holy Site	22	27.5
Nature-loving Students (Wanala)	38	47.5

Table 3. Cross tabulation results between high blood pressure risk and variables

Variables	High Blood Pressure Risk				p-value
	Tall		Low		
	n	%	n	%	
Nutritional status					0.009
More Nutrition	15	18.75	39	48.75	
No More Nutrition	16	20	10	12.5	
High-Calorie Foods					0.663
Often	10	12.5	15	18.75	
Sometimes	16	20	22	27.5	
Seldom	5	6.25	12	15	
High-Fat Foods					0.215
Often	8	10	7	8.75	
Sometimes	13	16.25	30	37.5	
Seldom	10	12.5	12	15	
High Sodium Foods					0.022
Often	12	15	6	7.5	
Sometimes	13	16.25	30	37.5	
Seldom	6	7.5	13	16.25	
Coffee Drinking Habits					0.046
Often	21	26.25	22	27.5	
Seldom	10	12.5	27	33.75	

Amerta Nutrition

e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
Sugeha et al. | Amerta Nutrition Vol. 7 Issue 2 (June 2023). 267-273

271

People with more nutritional status will need energy intake throughout the body by increasing the work of their organs, so one of the impacts is an increase in blood pressure. Energy imbalance due to excess energy intake in a certain period can cause excess nutritional status. Excess nutritional status is a risk factor for non-communicable diseases, one of which is hypertension[18]. The greater the BMI, the more blood is needed to send oxygen and nutrients to all body tissues[19]. An increase in heart rate and an increase in insulin levels in the blood can also occur in people who are overweight. A sign of obesity is an increase in body fat tissue followed by an increase in fat blood levels. Increased fat can increase blood viscosity, so blood pressure increases. People with more nutritional status have a more significant potential to experience an increase in blood pressure 1.710 times compared to people with normal BMI. Excessive BMI has a relationship with blood pressure[20]. Mechanism When hypertension occurs in someone who is obese, it is strongly influenced by weight gain. The mechanism is not yet clearly understood, but it is suspected that an increase in blood plasma volume and cardiac output can cause an increase in blood pressure. People with obese nutritional status have a risk of suffering from hypertension 3.474 times compared to people with normal nutritional status[21]. Burning calories in the body of someone who is obese requires more oxygen. The heart will work harder than usual so that there is an increase in blood pressure which can trigger hypertension during this process.

Table 3 shows that a high-calorie and high-fat diet has no relationship to the risk of hypertension. There is a relationship between a high-sodium diet and the risk of hypertension from respondents who eat foods high in sodium, such as instant noodles and processed meat (nuggets, sausages, and corned beef). Sodium preparations are widely used in food ingredients and daily food processing, such as salt, MSG, seasonings, preservatives, and food preparations. Excess sodium intake can cause an increase in blood viscosity, resulting in increased heart effort when pumping blood throughout the body and increased blood pressure. Sodium in food absorbed by the body causes an increase in blood plasma volume, cardiac output, and blood pressure. The recommended sodium consumption for adults is 2,300 mg/day or the equivalent of 5 grams of salt.

Sodium is a positive ion in the extracellular fluid that maintains acid balance in the body and plays a role in glucose absorption, nerve activity and muscle contraction, and transportation of other nutrients across cell membranes. The body cannot excrete excess sodium, which can accumulate in the blood. Excessive sodium consumption can result in fluid retention in the body, which causes the kidneys not to function optimally. The heart and blood vessels will pump blood throughout the body and become heavier when the body fluids volume increases. The condition of increased blood pressure causes hypertension[22].

There is a relationship between hypertension and a high-sodium diet[23,24]. Dietary patterns of high-sodium foods are associated with the incidence of hypertension[25]. The research shows that foods with a high sodium content can cause blood vessels to narrow so that the heart's work will be heavier, resulting in rising blood pressure. Prolonged high blood pressure can cause health complications, including heart failure, kidney failure, stroke, and blindness. People who experience the disease will decrease their quality of life, accompanied by decreased productivity.

The results showed that 43 out of 80 respondents often drank coffee. The risk of hypertension can be triggered in respondents who frequently drink coffee (p=0.046). The results showed a significant relationship between coffee consumption and the risk of hypertension. Respondents who often consume coffee have a higher risk of experiencing hypertension 2.577 times than respondents who rarely drink coffee. People who are used to drinking 1-2 cups of coffee every day can increase the risk of hypertension 4.12 times based on hypertension risk factors, namely the habit of drinking coffee[9]. Complex hormone regulation in the body has a role in maintaining blood pressure stability so that the body tolerates exposure to caffeine derived from coffee hemodynamically when the exposure occurs periodically and continuously. The risk of developing hypertension increases in people who have a habit of drinking coffee. Someone with a high frequency of drinking coffee has a 4.11 times risk of developing hypertension compared to someone who does not drink coffee[26]. Students who consume Americano coffee can increase systolic and diastolic blood pressure. Students also experience an increase in pulse rate[27].

Some studies show no significant effect of coffee on blood pressure (p=0.465). This finding can be caused because young adults tend to be in good physical fitness and coffee content, namely Potassium and Polyphenols. Potassium and polyphenols can also lower blood pressure in addition to the effects of caffeine which can increase blood pressure. Enabling factors that can increase blood pressure are obesity, stress, and consumption of high-risk foods[28]. People who have a habit of drinking coffee have a higher risk of suffering from hypertension, 2.234 times. One of the risk factors for hypertension is due to coffee consumption. People with hypertension are not advised to consume coffee because of the dangers of coffee's caffeine content which increases blood pressure[21].

This study described the results that there is a relationship between nutritional status, high-sodium diet, and coffee-drinking habits on blood pressure in students who are members of UKM UNAIR. The students who were the respondents belonged to young adults with high productivity in the academic and non-academic fields. Early detection is needed for respondents as an effort to prevent degenerative diseases in old age. The health status in the previous life cycle will affect the next life cycle.

The benefits of research results are essential for students to increase their knowledge about risk factors that affect blood pressure. Increasing students' blood pressure knowledge is expected to improve attitudes and abilities in maintaining their health by achieving an ideal BMI, eating a balanced nutritional diet, and drinking enough coffee. This term is a preventive effort to improve the quality of students' health.

CONCLUSIONS

This study concludes a relationship between nutritional status, high-sodium diet, and coffee-drinking habits on blood pressure in student members of UKM UNAIR.

ACKNOWLEDGEMENTS

Conflict of Interest and Funding Disclosure

REFERENCES

1. Non-Communicable Diseases. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases.
2. Ministry of Health of Indonesia. *Hypertension: Preventing and Controlling Hypertension To Avoid Damage to the Heart, Brain and Kidneys*. (2014).
3. Republic of Indonesia Ministry of Health. *Basic Health Research 2018*. (2019).
4. Black & Hawks. *Medical Surgical Nursing: Clinical Management of Expected Results*. (Salemba Emban Patria, 2014).
5. Xiaoli, C. & Wang, Y. Tracking Blood Pressure from Childhood to Adulthood: A Systematic Review and Meta Regression Analysis. *O'clock. Heart Assoc.* **117**, 3171–3180 (2008).
6. Par'i, HM. *Nutrition Teaching Materials: Assessment of Nutritional Status*. (RI Ministry of Health, 2017).
7. Khomsan, A. & Anwar, F. *Healthy Is Easy*. (Wisdom, 2008).
8. Carlson, W. *First Book on Hypertension (High Blood Pressure) and Diet*. (Keats, Pub Inc., 2016).
9. Come on. Thesis: Risk Factors for Hypertension in terms of Coffee Drinking Habits. (UNDIP, 2012).
10. Korneliani, K. & Meida, D. The Relationship of Obesity and Stress with the Incidence of Hypertension for Female Elementary School Teachers. *J. Health. Mass.* **7**, 111–115 (2012).
11. Zamorano & Maria, L. Body Mass Index Associated with Elevated Blood Pressure in Mexican School-Aged Adolescents. *Prev. med. (Baltim).* **48**, 543 – 548 (2009).
12. Kurniawaty, E. & Insan, AN. Effect of Coffee on Hypertension. *med. J. Lampung Univ.* **5**, (2016).
13. Ririanty, M. Determinants of Jember University Student "Drinking Coffee" Behavior and Its Impact on Blood Pressure. (UNEJ, 2013).
14. Maulidiyah, F. Analysis of Contributing Factors to the Risk of Hypertension in Airlangga University Students' Surabaya. (Airlangga University, 2018).
15. Airlangga University. *Guidelines for Implementing the UNAIR Achievement Credit System*. (Airlangga University, 2016).
16. Chobanian, A.V *et al.* Seventh Report of The Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. (2003) doi:10.1161/01.HYP.0000107251.49515.c2.
17. Castelnuovo, A. Di, Di Giuseppe, R., Iacoviello, L. & De Gaetano, G. Consumption of Cocoa, Tea and Coffee and Risk of Cardiovascular Disease. *euro. J. Intern. med.* **23**, 15–25 (2012).
18. Arisman. *Textbook of Obesity Nutrition, Diabetes Mellitus, & Dyslipidemia Concepts, Theories, and Applicable Treatments*. (EGC, 2014).
19. Akmal, H. & Puruhita, N. Differences in Intake of Energy, Protein, Physical Activity and Nutritional Status Between Elderly Participating and Not Participating in Elderly Fitness Exercise. (2012).
20. Sumayku, IM, Pandelaki, K. & Wongkar, M. The Relationship between Body Mass Index and Waist Circumference with Blood Pressure in Students of the Faculty of Medicine, University of Sam Ratulangi. *J. e-CliniC* **2**, (2014).
21. Puspitasari, AA Risk Factors for Hypertension at the Age of 20-44 Years at the Wireuna Health Center, Palu City. *J. Nutrition and Health.* **2**, 67–70 (2018).
22. Think, BS *Hypertension: Comprehensive Management*. (Airlangga University Press, 2015).
23. Pratiwi, OM & Wibisana, AA Relationship between Diet and Hypertension in the Elderly in Blokseger Hamlet, Tegalsari District, Banyuwangi Regency. *J. IKESMA* **14**, (2018).
24. Aristi, D. LA, Rasni, H., Susumaningrum, LA, Susanto, T. & Siswoyo, S. The Relationship between Consumption of High Sodium Foods and the Incidence of Hypertension in Farm Workers in the Work Area of the Panti Health Center, Jember Regency. *Bull. Researcher. Sist. healthy.* **23**, 53–60 (2020).
25. Huzaipah, AA Relationship between Diet and Physical Activity with the Incidence of Hypertension in Young Adults (26-45 Years) at the Arifin Achmad Regional General Hospital, Riau Province, 2018. (University of North Sumatra, 2019).
26. Martiani, A. & Lelyana, R. Risk Factors for Hypertension in terms of Coffee Drinking Habits

(Case Study in the Working Area of the Ungaran Health Center in January-February 2012). *J.Nutr. Col.* **1**, 78–85 (2012).

27. Chandra, VV & Halim, S. Effect of Coffee on Blood Pressure and Pulse of Tarumanagara University Students. *Tarumanagara Med. J.* **3**, 221–225 (2020).

28. Bistara, DN & Kartini, Y. The Relationship between Coffee Consuming Habits and Blood Pressure in Young Adults. *J. Health. Vocational* **3**, (2018).