The Relationship of Abdominal Circumference, Knowledge, Family Support, and Salty Food Consumption with Hypertension Incidence Among Pre-Elderly and Elderly in Cempaka Putih District 2022

Alicia Dwi Permata Putri[1*], Sintha Fransiske Simanungkalit[1], A'immatul Fauziyah[1], Iin Fatmawati[1]

[1] Nutrition Study Program, Universitas Pembangunan Nasional Veteran Jakarta, Jakarta, Indonesia
* Email corresponding author: aliciadwipermatap@upnvj.ac.id

Abstract: Hypertension is an increasingly important medical and public health problem. Hypertension or high blood pressure is defined when the systolic and diastolic blood pressures are equal to or above 140 mmHg and 90 mmHg (JNC VIII, 2014). If left untreated, hypertension can lead to cardiovascular diseases such as heart failure, coronary heart disease, and stroke. This study aims to determine the relationship between abdominal circumference, level of knowledge, family support, and the habit of consuming salty food with the incidence of hypertension in the pre-elderly and elderly in the Cempaka Putih Sub-district in 2022. This study used a cross-sectional study design conducted in March- April 2022 in the Cempaka Putih District Area with a total sample of 134 people. The sampling technique was using Cluster Random Sampling and data analysis using univariate test and bivariate test using Chi-Square. Collecting data using direct measurement, questionnaires, and SQ-Food Frequency Questionnaire. The results showed that 53.7% suffered from hypertension, 48% had a risky waist circumference, 90% had a good level of knowledge, 93% had good family support, and 57% often consumed salty foods. The conclusion of the study found that there was a relationship between abdominal circumference (p = 0.000) and the habit of consuming salty food (p = 0.000) with the incidence of hypertension and there was no relationship between the level of knowledge (p = 0.787) and family support (p = 0.283) on the incidence of hypertension in the pre-elderly and the elderly in the Cempaka Putih sub-district.
Key Words: abdominal circumference; family support, hypertension, knowledge, salty foods

1. INTRODUCTION

Hypertension is one of the non-communicable diseases that ranks as the main cause of death in the world and continues to increase, especially in developing countries based on data from the World Health Organization (2021). Hypertension is defined as systolic blood pressure reaching 140 mmHg or blood pressure reachings 90 mmHg, with repeated measurements and within five minutes in a calm and rested state (Kementrian Kesehatan, 2014).

Prevention needs to be done because hypertension is a major risk factor for stroke, chronic heart disease, and coronary heart disease (Singh, Shankar , & Singh, 2017). Based on data from the 2018 Riset Kesehatan Dasar (RISKESDAS), the prevalence of hypertension

is 34.11% of the population which has been measured nationally with criteria of more than and equal to 18 years. DKI Jakarta is the capital city area which is ranked 9th highest out of 34 provinces in Indonesia. The prevalence is divided into several age groups. The prevalence in the age group 65 to 74 was 63.2%, 55 to 64 years was 55.2%, then 45.3% for the age group 45 to 54 years. Even so, this percentage can be said to be a higher number than the percentage in other Asian countries such as Korea, Bangladesh, Thailand, and Nepal (WHO Regional Office for South-East Asia, 2011).

According to the 2018 Riset Kesehatan Dasar (RISKESDAS), the prevalence of hypertension in DKI Jakarta, especially Central Jakarta, for the category of Doctor's Diagnosis is 12.16%, Diagnosis/Drugs is 12.79%, and based on measurements is 39.05%. Central Jakarta is an area that has the highest prevalence of hypertension compared to other areas of DKI Jakarta Province based on these three categories.

Several factors influence the occurrence of hypertension. These factors are divided into two types, namely modifiable and non-modifiable factors. Factors that can be modified are nutritional status, daily intake (especially high salt intake), and smoking habits. While factors that cannot be modified such as race and family history of hypertension.

Being overweight or obese is one of the risk factors for several metabolic and degenerative diseases. Central obesity can be identified by measuring the circumference of the abdomen. The greater a person's body mass makes the blood needed to supply nutrients and oxygen to body tissues increases.

Lack of knowledge about hypertension is a major challenge in controlling hypertension. To reduce these, patients should be counseled on lifestyle changes (Hardiyanti & Yuliana, Hubungan Tingkat Pengetahuan dan Pola Konsumsi Natrium Dengan Tekanan Darah Pada Penderita Hipertensi Di Wilayah Kerja Puskesmas Cempaka, 2021) says that there is a tendency for someone who has less knowledge to suffer from hypertension.

The elderly in Indonesia receive economic and social support from their families as well as from the surrounding environment. The role of the family is considered important both for families who live together and who do not live together to maintain the health of the elderly, especially during the COVID pandemic. Elderly families are expected to pay attention to health protocols, ensuring the elderly's daily needs are met to prevent the elderly from being exposed to the disease.

Furthermore, the sensory sensitivity of the elderly will usually decrease, especially in the tongue so it will make the elderly tend to consume a lot of salt. resulting in increased blood pressure.

This study aims to determine the relationship between abdominal circumference, level of knowledge, family support, and the habit of consuming salty food with the incidence of hypertension in the pre-elderly and elderly in Cempaka Putih Sub-district, Central Jakarta.

2. METHODS

This research is quantitative research with a research design cross-sectional. The population in this study was pre-elderly and elderly in Cempaka Putih District. The sampling procedure carried out by the researcher was seen based on the inclusion and exclusion criteria. The inclusion criteria in this study are pre-elderly and elderly with the age category of 45-70 years who resided in the Cempaka Putih sub-district and registered on Posbindu and Posyandu for elderly in the Cempaka Putih sub-district, who were willing

to participate in the study without coercion. Meanwhile, the exclusion is respondents who have speech and hearing disorders, cannot stand, and cannot be communicated also respondents who have senile dementia (Regression in terms of remembering). The sampling method used in this research is Cluster Sampling. Data collection was carried out offline and using a door-to-door system which was carried out by measuring the abdominal circumference and blood pressure and followed by filling out questionnaires and SQ-FFQ.

Data analysis carried out in this study included univariate data analysis and bivariate data analysis. Univariate analysis was conducted to determine the frequency distribution of the respondent's characteristics including age and gender, abdominal circumference, knowledge, family support, consuming salty foods, and respondent's blood pressure, while bivariate analysis was conducted to determine the relationship between abdominal circumference, knowledge, family support and consumption habits of salty foods with the incidence of hypertension.

3. RESULTS AND DISCUSSION

Respondents who were involved in this research activity were 134 people.

Univariate Analysis

Table 1 Characteristics of Respondents

Respondents Characteristics	n	(%)
Genders		
Male	37	27.6
Female	97	72.4
Total	**134**	**100**
Age		
45 – 59 years old	57	42.5
60 – 70 years old	77	57.5
Total	**134**	**100**

Based on the results in table 1, respondents consisted of 72 people (72.4%) female and male respondents consisted of 37 people (27.6%). Based on these numbers, the number of respondents who are female is more than male respondents.

This result is in line with research from (Nurhidayati, Aniswaria, Sulistyowati, & S, 2018)which shows that the percentage of women is more than that of men, namely 56.5% women and 53.5% men. Riset Kesehatan Dasar (RISKESDAS) 2018 also stated that based on reports at the age of 65 years and over the prevalence of women with hypertension was 28.8, higher than men whose prevalence reached 22.8.

Women who are more than 45 years old or have gone through menopause have a higher risk of experiencing blood pressure (Lima, Wofford, & Reckelhoff, 2012). Menopausal women have effects that affect the body's work. This is due to decreased levels of the hormone Estrogen and FSH (Follicle Stimulating Hormone) in the body to regulate the homeostatic balance. One of the direct effects is a disruption in blood vessels. Loss of

these hormones can result in salt sensitivity and higher LDL (Low-Density-Lipoprotein), which can increase blood pressure and heart work (Suryonegoro, Elfa, & Noor, 2021)

Age is the length of a person's life calculated from the full year since the person was born to the last birthday. Respondent's age data is divided into two, namely pre-elderly (45 - 59 years) and elderly (60-70 years). According to table 1, the age of the largest respondents is 60 - 70 years or classified as elderly, with 77 respondents (57.5%) compared to pre-elderly which only consists of 57 respondents (42.5%). This result is in line with research (Linda, 2017)which shows that respondents with 50 years are more than <50 years old, namely 58.8% for 50 years and 41.2% for <50 years.

As a person gets older, there will be changes in the arteries in the body that make them stiffer and wider which results in a reduced capacity and recoil of the blood that is accommodated through the blood vessels. This causes the systolic blood pressure to rise (Nuraeni, 2019). Aging makes neurohormonal mechanisms such as renin-angiotensin decrease, and plasma aldosterone levels also decrease as a person ages. In addition, the presence of glomerulosclerosis and interstitial fibrosis increases vasoconstriction and vascular resistance so that there will be an increase in blood pressure (Linoakis, Mendrinos, Sanidas, Favatas, & Georgopoulou, 2012)

Hypertension also occurs due to atherosclerosis which has been around for years. Atherosclerosis is a condition of hardened arteries which is characterized by the accumulation of fatty deposits that are initiated by damage to endothelium cells in the arteries in the presence of oxidative stress (excess free radicals) which will react with LDL to make LDL oxidized, then will migrate with monocyte cells to the sub endothelium. These monocytes turn into macrophages which after that, phagocytize oxidized LDL to form foam cells, which then accumulate foam cells in blood vessels. Then, macrophages cause the proliferation of smooth muscle cells from blood vessels which results in the formation of plaques that cause blood vessels to narrow. (Erawati, 2018)

Table 2. Variable Distribution

Variable	n	(%)
Abdomen Circumference		
At Risk	69	51.5
No Risk	65	48.5
Total	**134**	**100**
Knowledge		
Less	14	10.4
Good	120	89.6
Total	**134**	**100**
Family Support		
Less	10	7.5
Good	124	92.5
Total	**134**	**100**
Habits of Consuming Salty Foods		
At Risk	76	56.7
No Risk	58	43.3

Total	**134**	**100**
Blood Pressure		
Hypertension	72	53.7
No Hypertension	62	46.3
Total	**134**	**100**

Based on the results in table 2, the respondents have the category of abdominal circumference who are at greater risk of as many as 69 people with a percentage of 51.5% and 65 people who are not at risk with a percentage of 48.5%. This means that respondents who are categorized as risky are more than those who are not at risk. Abdominal circumference at risk in this study can be caused by an unhealthy lifestyle such as a high-calorie diet, the habit of consuming sweet foods, and rarely moving and exercising.

This result is in line with research conducted by (Rahma & Gusrianti, 2019)obtained results that were seen based on the incidence of hypertension, someone with central obesity (excess abdominal circumference) was 53.8%, these results mean that there is a comparison of two to one for respondents who have central obesity.

Then, the results of the respondents' answers show good knowledge with a percentage of 89.6% or with a total of 120 respondents compared to respondents who have less knowledge, namely 14 people or 10.4%. The results of this study are in line with research conducted by (Limbong, Rumayar, & Kandou, 2018) which shows that 58.9% of respondents have good knowledge and 41.4% have poor knowledge. Another study conducted by (Heriyadi, Hasballah, & Tahlil, 2018) also found that 54.1% of the total respondents were highly knowledgeable while 45.9% lacked knowledge. In contrast, the research that (Mayasari, Waluyo, Jumaiyah, & Azzam, 2019) conducted showed that 83% of the total respondents had poor knowledge and 15.2% had good knowledge. The results of this study were obtained through the Hypertension Knowledge Level Scale Questionnaire (HK-LSQ) which showed that many respondents had good knowledge. Possibly because posbindu cadres often provide education about hypertension to respondents, which causes respondents to already know information about hypertension. Most of the respondents claimed to have received nutritional information about hypertension from several cadres who were on duty each time they opened the posbindu before COVID-19 and some respondents received nutrition information from their families at home.

Furthermore, respondents have more good family support, namely 92.5% and 7.5% for lack of family support. These results are in line with the research conducted (Yuniartika & Muhammad, 2020) with the results of good family support of 83.33% and less than 6.67%.

This data was taken using a questionnaire based on 4 (four) aspects of the family support instrument, namely informational, instrumental, emotional, and assessment support. After being analyzed, many respondents answered the answer choices "often" and "never". Respondents said that the health checkpoint is close so there is no need to be informed about when the respondent is seeking treatment or conducting a health check. Then, the same thing as education, family support from respondents is dominated by good indicators based on the results of filling out the questionnaire. This is probably because there are still many families who are given counseling about the importance of family and environmental support for health and still apply it in the respondent's family.

Then, the habit of consuming salty or sodium foods can trigger water retention, causing high flow conditions in the arteries and will increase blood volume. The increased blood volume will be pushed through the smaller space because the heart will pump blood more quickly. In this study, the results of the habit of consuming salty foods were obtained from filling out the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) in the past month.

Respondents in this study who have the habit of consuming salty food are 76 people (56.7%), while those who do not have the habit of consuming salty food are 58 people (43.3%). The high number of respondents who consume salty food is due to a large number of elderly who prefer this type of salty food, in addition to the reduced sensitivity of the sense of taste which results in a decrease in salty taste. This result can also be strengthened by a study made by (Siregar, Simanjutak, & Ginting, 2020) which found that most of the respondents consumed 40 respondents' sodium intake.

Table 3. Distribution of Systolic and Diastolic Blood Pressure

Blood Pressure	Mean	Deviation Standard
Systolic	136,41	15,751
Diastolic	86,89	8,755

Based on the results in table 3, the respondents in this study who had hypertension were 72 people (53.7%), while those without hypertension were 62 people (46.3%). The distribution of respondents who have hypertension is more than respondents who are not hypertensive. Based on table 2 above. The respondent's mean systolic blood pressure was 136.41 mmHg with a standard deviation of 15,751, while the average diastolic pressure was 86.89 mmHg with a standard deviation of 8,755.

These results are in line with the research conducted by (B, Akbar, Langingi, & Hamzah, 2021) which showed more respondents with hypertension than those without hypertension or 61.3% for hypertension and 38.7% for not hypertension. And in a study conducted by (Anggraini, Izhar, & Noerjoedianto, 2018) showed that respondents with hypertension were more than 62.89% and those without hypertension were 37.11%.

Bivariate Analysis

Bivariate analysis to determine the relationship between abdominal circumference, level of knowledge, family support, and habit of consuming salty food (as the independent variables) and blood pressure (as the dependent variable). The relationship between the two variables was analyzed by using the Chi-Square test analysis.

Table 4. Bivariate Analysis Results

	Blood Pressure						
	Hypertension		No Hypertension		Total		P-Value
	n	%	n	%	n	%	
Abdominal Circumference							
At Risk	58	43,3%	6	4,48%	64	48%	0.000

No Risk	14	10,45%	56	41,79%	70	52%	
Total	**72**	**53,73%**	**62**	**46,27%**	**134**	**100%**	
Knowledge							
Good	64	47,76%	56	41,79%	120	90%	
Less	8	5,97%	6	4,48%	14	10%	0.787
Total	**72**	**53,73%**	**62**	**46,27%**	**134**	**100%**	
Family Support							
Good	65	48,51%	59	44,03%	124	93%	
Less	7	5,22%	3	2,24%	10	7%	0.283
Total	**72**	**53,73%**	**62**	**46,27%**	**134**	**100%**	
Habits of Consuming Salty Foods							
At Risk	72	53,73%	4	2,99%	76	57%	
No Risk	0	0,00%	58	43,28%	58	43%	0.000
Total	**72**	**53,73%**	**62**	**46,27%**	**134**	**100%**	

Based on table 4, it is known that from a total of 64 respondents who have a risky abdominal circumference, 58 respondents are hypertensive and 6 respondents are not hypertensive. Meanwhile, from a total of 70 respondents who were not at risk, there were 14 hypertensive respondents and 56 respondents who were not hypertensive. Based on the bivariate test carried out, the P-value was 0.000. These results indicate that there is a significant relationship ($p<0.05$) between the abdominal circumference and blood pressure in pre-elderly and elderly people in the Cempaka Putih sub-district. This is supported by research conducted by (Arifin, Antara, & Albayani, 2019) which shows that there is a relationship between the abdominal circumference and the incidence of hypertension.

The existence of a relationship between the abdominal circumference and blood pressure in this study, one of which is abdominal circumference that exceeds the normal limit or can also be called central obesity can cause hypertension associated with a condition of hyperinsulinemia and damage to the structure of blood vessels. In central obesity, there is an increase in visceral fat that accumulates in the abdomen, if there is too much there will be a decrease in leptin sensitivity, and there are cytokines that infiltrate fat tissue which then increases intra-cell free fatty acids which can lead to insulin resistance and hyperinsulinemia which can affect the occurrence of obesity. sodium retention and vascular hypertrophy which can lead to hypertension (Mafaza, Adriani, & Wirjatmadi, 2016). Insulin resistance contributes to an increase in blood pressure through several mechanisms, such as increased tissue activity of angiotensin II (Ang II) and aldosterone, increased activity of the sympathetic nervous system, and oxidative stress. Stimulation of angiotensin II (Ang II) induces insulin resistance. Angiotensin II (Ang II) works through the angiotensin type I receptor by inhibiting insulin action through the formation of reactive oxygen by NADPH oxidase (Mancusi, Izzo, Gioia, Losi, & Barbato, 2020)

Research conducted by (Sari, Lipeoeto, & Herman, 2016) states that central obesity is an accumulation of fat in the abdomen. Intra-abdominal fat is a part that has an important role in increasing the blood pressure of someone who has a large abdominal circumference

because in central obesity there can be a decrease in a specific protein secreted by adipose tissue that is antiatherogenic (adiponectin) which can then lead to atherosclerosis. Atherosclerosis is a condition of arterial distensibility that causes blood pressure to increase and blood cannot expand when the blood passes through the arteries of the heart.

Then, based on table 4, the results obtained from a total of 120 respondents with good knowledge there were 64 respondents (47.47%) who had hypertension and 56 (41.79%) who did not. Meanwhile, from a total of 14 respondents who have less knowledge, there are 8 respondents (5.97%) with hypertension and 6 respondents (4.48%) without hypertension. Based on the bivariate test conducted, the p-value was 0.787. This shows that there is no relationship between the level of knowledge and blood pressure in the elderly and the elderly in the Cempaka Putih sub-district. The absence of a relationship between the level of knowledge and blood pressure can be caused by the distribution of the level of knowledge of the pre-elderly and the elderly being distributed in the good category, which is more than 50% so that the data is homogeneous. This is in line with research stated by (Zaenurrohmah & Rachmayanti, 2017)that most of the elderly have sufficient knowledge (70%) this is because health information is not obtained from one source only but from many sources such as formal education, health workers, media and so on.

Knowledge is obtained from the level of education and experience. The longer a person has hypertension, the more experience that person has with hypertension (Pramestuti & Silviana, 2016). In line with this statement, the more experience a person has, the more knowledge he has.

Furthermore, it can be seen that from a total of 124 respondents with good family support, 65 respondents had hypertension and 59 respondents did not. Then, it was also known that from a total of 10 respondents with less family support, there were 7 hypertensive respondents and 3 non-hypertensive respondents. Based on the bivariate test that has been carried out with Chi-Square, the p-value is 0.283. The results of this study are supported by research conducted by (Lolo & Nurlaela, 2018) which states that there is no relationship between family support and blood pressure.

The absence of a relationship between family support and blood pressure can occur due to the lack of implementation of functions in the family, such as controlling the health of people with hypertension. So, not only providing support according to the 4 aspects asked, but also how the respondent's family controls the respondent's health, especially the respondent's blood pressure.

In the elderly usually sense sensitivity will decrease, especially in the tongue so that it will make the elderly tend to consume a lot of salt which also results in increased blood pressure. The habit of consuming salty food is obtained by filling out the SQ-FFQ (Semi Quantitative-Food Frequency Questionnaire) which contains various types of salty food consumed by the respondent over the last 1 month.

In Table 4, it can be seen that from a total of 76 respondents who consumed salty foods at risk, 72 respondents had hypertension and 4 respondents did not have hypertension, while out of 58 respondents who were not at risk, all of them were not hypertensive. Based on the results of the bivariate test that has been carried out, the p-value is 0.000 (p<0.05), which means that there is a relationship between the habit of consuming salty foods and the incidence of hypertension. The results of this study are in line with those made by (Ramadhini, 2018) and (Fitri, Rusmikawati, Zulfah, & Nurbaiti, 2018)which state that there

is a relationship between the habit of consuming salty foods and the incidence of hypertension.

Consuming foods containing sodium or food is one of the various causes of hypertension. Water retention obtained from sodium absorbed into the blood vessels that come from high salt intake causes blood volume to increase, this causes an increase in blood pressure, then high sodium intake can also cause the excessive expenditure of natriuretic hormone and can indirectly lead to hypertension (Purwono, Sari, Ratnasari, & Budianto, 2020). This is in line with research (Ramadhini, 2018)which states that the increase in plasma volume (body fluids) and blood pressure is the effect of sodium intake on hypertension.

4. CONCLUSION

The conclusion obtained in the study is the results of the characteristics analysis of the respondents, the respondents totaled 134 people. Respondents suffering from hypertension based on measurement amounted to 72 people (54.7%). The two variables have a significant relationship with the incidence of hypertension which is Abdominal circumference and Habits of consuming salty foods. Meanwhile, the other two variables show that there is no relationship between knowledge and family support with the incidence of hypertension in the pre-elderly and the elderly in the Cempaka Putih sub-district.

Suggestions that researchers can do after conducting research among the community are expected to be able to increase awareness about hypertension with changes in their lifestyle and food consumption habits. Maintaining and controlling weight and regularly measuring the circumference of the stomach and maintaining the pattern of consumed food, especially salty foods.

CONFLICT OF INTEREST

The authors declare that there were no conflicts of interest in this study.

REFERENCES

Aburto, N. J., Hanson, S., Gutierrez, H., Lee, H., Elliot, P., & Capuccio, F. P. (2013). Effect Of Increased Potassium Intake On Cardiovascular Risk Factors And Disease: Systematic Review And Meta-Analyses. *BMJ (Clinical Research Ed.), 1378*, 346.

Amanda, D., & Martini, S. (2018). HUBUNGAN KARAKTERISTIK DAN OBESITAS SENTRAL DENGAN KEJADIAN HIPERTENSI. *Journal Berkala Epidemiologi, 6*(1), 43-50.

Anggraini, S. D., Izhar, M. D., & Noerjoedianto, D. (2018, September). HUBUNGAN ANTARA OBESITAS DAN AKTIVITAS FISIK DENGAN. *Jurnal Kesmas Jambi (JKMJ), 2*(2), 45-55. Retrieved 2022

Arifin, Z., Antara, G. Y., & Albayani, M. I. (2019). Hubungan Lingkar Perut Dan Tekanan Darah Karyawan STIKES Yarsi Mataram. *Jurnal Kesehatan Qamarul Huda, 7*(1), 13-17. Doi:Https://Doi.Org/10.37824/Jkqh.V7i1.2019.64

B, H., Akbar, H., Langingi, A. R., & Hamzah, S. (2021, April). ANALISIS HUBUNGAN POLA MAKAN DENGAN KEJADIAN. *Journal Health And Science : Gorontalo Journal Health & Science Community, 5*(1), 194 - 201.

BPS Kota Jakarta Pusat. (2021). *Kecamatan Cempaka Putih Dalam Angka 2021.* DKI Jakarta: BPS Statistics Of Central Jakarta Municipality.

Erawati. (2018, Desember). HUBUNGAN TEKANAN DARAH DENGAN KADAR KOLESTEROL LDL(Low Density Lipoprotein) PADA PENDERITA PENYAKIT JANTUNG KORONERDI RSUP.Dr.M.DJAMIL PADANG. *Jurnal Kesehatan Perintis, 5*(2). Doi:Https://Doi.Org/10.33653/Jkp.V5i2.146

Fitri, Y., Rusmikawati, R., Zulfah, S., & Nurbaiti, N. (2018). Asupan Natrium Dan Kalium Sebagai Faktor Penyebab Hipertensi Pada Usia Lanjut. *Action: Aceh Nutrition Journal,, 3*(2). Doi:10.30867/Action.V3i2.117

Haqiqi, I. A., Kinanti, R. G., & Andiana, O. (2021). HUBUNGAN AKTIVITAS FISIK DAN LINGKAR PERUT DENGAN KEJADIAN HIPERTENSI PADA PEREMPUAN DI MALANG RAYA. *Journal Sport Science, 11*.

Hardiyanti, D., & Yuliana, N. (2021). Hubungan Tingkat Pengetahuan Dan Pola Konsumsi Natrium Dengan Tekanan Darah Pada Penderita Hipertensi Di Wilayah Kerja Puskesmas Cempaka. *Jurnal Ilmu Kesehatan Insan Sehat, 9*.

Hardiyanti, D., & Yuliana, N. (2021). Hubungan Tingkat Pengetahuan Dan Pola Konsumsi Natrium Dengan Tekanan Darah Pada Penderita Hipertensi Di Wilayah Kerja Puskesmas Cempaka. *Jurnal Ilmu Kesehatan Insan Sehat, 9*.

Heriyadi, H., Hasballah, K., & Tahlil, T. (2018). Pengetahuan, Sikap, Dan Perilaku Diet Hipertensi Lansia Di Aceh Selatan. *Jurnal Ilmu Keperawatan, 6*(1), 57-69.

Indrayani, & Ronoatmodjo, S. (2017). Faktor - Faktor Yang Berhubungan Dengan Kualitas Hidup Lansia Di Desa Cipasung Kabupaten Kuningan Tahun 2017. *Jurnal Kesehatan Reproduksi, 9*(1), 69 - 78.

Kementrian Kesehatan. (2014). *Https://Pusdatin.Kemkes.Go.Id/Download*. Retrieved 2022, From Https://Pusdatin.Kemkes.Go.Id/: Https://Pusdatin.Kemkes.Go.Id/Download.Php?File=Download/Pusdatin/Infodatin/Infodatin-Hipertensi.Pdf

Lima, R., Wofford, M., & Reckelhoff, J. F. (2012). Hypertension In Postmenopausal Women. *Current Hypertension Reports, 14*(3), 254-260. Doi:Https://Doi.Org/10.1007/S11906-012-0260-0

Limbong, V. A., Rumayar, A., & Kandou, G. D. (2018). HUBUNGAN PENGETAHUAN DAN SIKAP DENGAN KEJADIAN HIPERTENSI DI WILAYAH KERJA PUSKESMAS TATELI KABUPATEN MINAHASA. *KESMAS, 7*(4).

Linda. (2017). Faktor Risiko Terjadinya Penyakit Hipertensi. *Jurnal Kesehatan Prima, 11*(2), 150 - 157.

Linoakis, N., Mendrinos, D., Sanidas, E., Favatas, G., & Georgopoulou, M. (2012). Hypertension In The Elderly. *World Journal Of Cardiology, 4*(5), 135-147. Doi:Https://Doi.Org/10.4330/Wjc.V4.I5.135

Lolo, L. L., & Nurlaela. (2018). HUBUNGAN DUKUNGAN KELUARGA DENGAN KEJADIAN. *Jurnal Fenomena Kesehatan, 1*, 141-147.

Mafaza, R. L., Adriani, M., & Wirjatmadi, B. (2016). ANALISIS HUBUNGAN ANTARA LINGKAR PERUT, ASUPAN LEMAK, DAN RASIO ASUPAN KALSIUM MAGNESIUM DENGAN HIPERTENSI. *Media Gizi Indonesia, 11*(2), 127-134. Doi:Https://Doi.Org/10.20473/Mgi.V11i2.127-134

Mancusi, C., Izzo, R., Gioia, G. D., Losi, M. A., & Barbato, E. (2020). Insulin Resistance The Hinge Between Hypertension And Type 2. *High Blood & Cardiovascular Prevention, 27*, 515 - 526.

Mayasari, Waluyo, A., Jumaiyah, W., & Azzam, R. (2019). FAKTOR-FAKTOR YANG BERHUBUNGANDENGAN KEJADIAN HIPERTENSI. *Journal Of Telenursing (JOTING), 1*(2), 344 - 353. Doi:Https://Doi.Org/10.31539/Joting.V1i2.849

Natfali, A. R., Ranimpi, Y. Y., & Anwar, M. A. (2017). Kesehatanspiritual Dan Kesiapan Lansia Dalam Menghadapi Kematian. *Buletin Psikologi, 25*(2), 124 - 135.

Nuraeni, E. (2019). HUBUNGAN USIA DAN JENIS KELAMIN BERESIKO DENGAN KEJADIAN HIPERTENSI DI KLINIK X KOTA TANGERANG. *Jurnal JKFT, 4*(1).

Nurhidayati, I., Aniswaria, A. Y., Sulistyowati, A. D., & S, S. (2018). Penderita Hipertensi Dewasa Lebih Patuh Daripada Lansia Dalam Minum Obat Penurun Tekanan Darah. *Journal Kesehatan Masyarakat, 13*.

Pramestuti, H. R., & Silviana, N. (2016). Tingkat Pengetahuan Pasien Hipertensi Tentang Penggunaan Obat Di Puskesmas Kota Malang. *Jurnal Farmasi Klinik Indonesia, 5*(1).

Purwono, J., Sari, R., Ratnasari, A., & Budianto, A. (2020). POLA KONSUMSI GARAM DENGAN KEJADIAN HIPERTENSI PADA LANSIA. *Jurnal Wacana Kesehatan, 5*.

Rahma, G., & Gusrianti. (2019). Hubungan Obesitas Sentral Dengan Hipertensi Pada Penduduk Usia 25-65 Tahun. *Jurnal Ilmu Kesehatan, 3*(2), 118-122. Doi:10.33757/Jik.V3i2.239

Ramadhini, D. (2018). Hubungan Kebiasaan Konsumsi Makanan Asin Dengan Kejadian Hipertensi Pada Lansia Di Desa Labuhan Labo Kota Padangsidimpuan Tahun 2018. *Jurnal Kesehatan Ilmiah Indonesia, 3*(2).

Sari, M. K., Lipeoeto, N. I., & Herman, R. B. (2016). Hubungan Lingkar Abdomen (Lingkar Perut) Dengan Tekanan Darah. *Journal Kesehatan Andalas, 5*(2), 456 - 461.

Singh, S., Shankar , R., & Singh, G. P. (2017). Prevalence And Associated Risk Factors Of Hypertension: A Cross-Sectional Study In Urban Varanasi. *International Journal Of Hypertension, 2017*(5491838). Doi:Doi:10.1155/2017/5491838

Singh, S., Shankar, R., & Singh, G. P. (2017). Prevalence And Associated Risk Factors Of Hypertension: A Cross-Sectional Study In Urban Varanasi. *International Journal Of Hypertension, 2017*(5491838). Doi:10.1155/2017/5491838

Siregar, P. A., Simanjutak, S. S., & Ginting, F. H. (2020). Aktivitas Fisik, Konsumsi Makanan Asin Dan Kejadian Hipertensi. *Jurnal Ilmiah Kesehatan, 2*(1), 1-8. Retrieved From Https://Media.Neliti.Com/Media/Publications/325955-Aktivitas-Fisik-Konsumsi-Makanan-Asin-Da-5199e633.Pdf

Suprayitno, E., Damayanti, C. N., & Hannan, M. (2019). Gambaran Status Tekanan Darah Penderita Hipertensi Di Desa. *Journal Of Health Science, 4*(2), 20 - 23.

Suryonegoro, S. B., Elfa, M. M., & Noor, M. S. (2021). LITERATURE REVIEW: HUBUNGAN HIPERTENSI PADA WANITA MENOPAUSE DAN USIA LANJUT TERHADAP KUALITAS HIDUP. *Homeostatis Jurnal Mahasiswa Pendidikan Dokter, 4.*

Wahyudi, W. T., Herlianita, R., & Pagis, D. (2020). Dukungan Keluarga, Kepatuhan Dan Pemahaman Pasien Terhadap Diet Rendah Garam Pada Pasien Dengan Hipertensi. *Holistik Jurnal Kesehatan, 14*, 1.

Wulansari, J., Ichsan, B., & Usdiana, D. (2013). Hubungan Pengetahuan Tentang Hipettensi Dengan Pengendalian Tekanan Darah Pada Pasien Hipertensi Di Poliklinik Penyakit Dalam RSUD Dr. Moewardi Surakarta. *Biomedika, 5*(1).

Yuniartika, W., & Muhammad, F. (2020). Family Support On The Activities Of Elderly Hypertension Patients In Elderly Gymnastics Activities. *Jurnal Ners, 14*(3), 354 - 357. Doi:Https://Doi.Org/10.20473/Jn.V14i3.17213

Zaenurrohmah, D. H., & Rachmayanti, R. D. (2017). Relationship Between Knowledge And Hypertension History With Blood Pressure Control In Elderly. *Jurnal Berkala Epidemiologi, 5*(2). Doi:Https://Doi.Org/10.20473/Jbe.V5I22017.174-184