Analysis of Factors Associated with Blood Pressure in Patients with Uncontrolled Hypertension at Health Center I West Denpasar

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Article Info:	ABSTRACT
	According to the NHANES, blood pressure that is not normalized is defined as systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg, where the patient is unconscious, conscious, but not treated or treated with antihypertensive drugs. Riskesdas data in 2018 found that the number of people with controlled hypertension was 13.3% and 32.3% with uncontrolled hypertension. Factors that can cause uncontrolled blood pressure are uncontrollable and controllable, namely salt consumption, coffee consumption, and obesity. Analyzing the factors associated with blood pressure in patients with uncontrolled hypertension at Health Center I West Denpasar. This study used a cross-sectional analytic survey approach, involving 57 people using the accidental sampling method. Statistical analysis using Chi-square. The results of the chi-square analysis showed that the salt consumption factor was $p=0.000$, the coffee consumption factor was $p=0.041$, and the obesity factor was $p=0.022$. The factor that is most closely related to the increase in blood pressure is coffee consumption with an OR value of 0.224 times. Health workers need to provide information about DASH (Dietary Approaches to Stop Hypertension) in hypertensive patients to help reduce increased blood pressure in addition to taking antihypertensive drugs regularly. Keywords: factors; blood pressure; uncontrolled hypertension

INTRODUCTION

High blood pressure is a systolic pressure of 130 mm Hg or higher, or a diastolic pressure of 80 mm Hg or higher, which remains high over time. The danger when high blood pressure increases and can cause the risk of heart attack and stroke. So make sure people with hypertension have regular blood pressure checks and treat them (American Heart Association (AHA), 2021).

Hypertension is also known as a silent killer because of uncontrolled blood pressure (Bali Provincial Health Office, 2022). According to NHANES, uncontrolled blood pressure is defined as systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg, where the patient is unconscious, conscious but not treated or treated with antihypertensive drugs (Sakhuja et al., 2021).

The results of Riskesdas data in 2013, the number of hypertension sufferers was found to be 15 million, 50% were found to have uncontrolled blood pressure (Artiyaningrum, Budi., 2016). Based on the 2018 Riskesdas data, it was found that the number of people with controlled hypertension was 13.3% and 32.3% uncontrolled hypertension (Ministry of Health RI, 2019). Chairman of the Indonesian Association of Hypertension Doctors dr. Erwinanto, Sp. JP(K), FIHA said that if a person suffers from hypertension and it is not controlled, it will be the main single contributor to heart disease, stroke, and kidney failure. Every increase in blood pressure of 20/10 mmHg will increase the risk of coronary heart disease 2 times higher (Rokom, 2021).

Profile data from the Denpasar City Health Office for 2021. Based on information from 11 Puskesmas in Denpasar City, hypertension sufferers aged ≥ 15 years with the highest cases located at West Denpasar Health Center I have the highest percentage of hypertension sufferers. (18,354 cases), while the South Denpasar Health Center IV had the lowest prevalence (4,708 cases) (Dinas Kesehatan Kota Denpasar, 2022).

Hypertension sufferers who experience increased blood pressure need to control risky behaviors such as smoking, unhealthy diet (low consumption of vegetables and fruit, excessive consumption of salt), obesity, lack of physical activity,

alcohol consumption, and stress. The success of controlling blood pressure to reach the target has been shown to reduce the incidence of complications, such as stroke by 30-40% and the incidence of coronary heart disease by 20% (Rokom, 2021).

Based on the results of previous research by Feyissa Lemessa & Miressa Lamessa, 2021, it was found that there were still many uncontrolled blood pressures in hypertension sufferers, namely from the number of respondents who used as many as 300 people, hypertension sufferers who had uncontrolled blood pressure were 170 respondents (56.7%)) compared to controlled blood pressure, namely a number of 130 (43.3%).

Apart from the uncontrollable factors, there are also controllable factors, namely salt consumption, obesity, and coffee consumption. One of the things that can increase blood pressure for people with hypertension is salt consumption. The prevalence of hypertension is closely related to salt consumption. High amounts of sodium cause an increase in blood pressure, cardiac output, and plasma volume, resulting in water retention in the body, an increase in blood volume, and an increase in blood pressure. Someone who consumes more salt than recommended, namely ≤1-2 grams or the equivalent of 1 teaspoon by the Ministry of Health (2021) will increase blood pressure from narrowing of blood vessels due to fat. People who are overweight may have salt sensitivity which can also increase blood pressure (Kautsar, Syam and Salam, 2014).

According to previous research, based on the results of research conducted by Febby Hendra Dwi Anggara and Nanang Prayitno (2013), it was found that the incidence of hypertension was 19 people (61.3%) of 23 hypertensive patients who consumed sodium, where the results of data analysis were pvalue = 0.000, it can be concluded that there is a significant relationship between salt consumption and blood pressure (Anggara, Febby Haendra Dwi., Prayitno, 2013).

This is also in line with Budi Artiyaningrum's research where a substantial correlation between salt intake and the prevalence of uncontrolled hypertension was found. With a pvalue of 0.001, out of 44 respondents, 28 (63.6%) consumed high sodium. According to the OR analysis, uncontrolled hypertension occurs 4.173 times more frequently than people consuming regular salt intake (Artiyaningrum, Budi., 2016).

There are 2 billion people worldwide suffering from obesity, which has an impact on public health worldwide and in Indonesia. More than 1 billion people worldwide will be obese by 2030, including 1 in 5 women and 1 in 7 men. In the Indonesian region, within 10 years there has been an increase in obesity from 2007 (10.5%) to an increase in 2018 (21.8%).

Obesity is a factor in the occurrence of non-communicable diseases such as hipressure. Obesity is a problem caused by changes in diet from traditional to modern, migration and decreased physical activity. In hypertensive individuals, obesity can increase blood pressure (Kemenkes, 2023).

Based on research findings by Rizki Yulia and Firdawsyi Nuzula, it was found from the results of their discussion that obesity with a BMI > 25 had the most dominant influence, namely pvalue = 0.028 and OR = 2.848 with the incidence of uncontrolled hypertension of 30 respondents 23 (76.7%) had BMI > 25 (P and Nuzula, 2019).

This was also proven by the research of Febby Hendra Dwi Anggara, et al, 2013 which showed that obesity and the prevalence of hypertension correlated significantly, with a p value = 0.000, where as many as 23 people with hypertension, 20 people (76.9%) were obese. Where hypertensive patients who are overweight will be at risk of 2 to 6 times experiencing hypertension (Anggara, Febby Haendra Dwi., Prayitno, 2013).

In people with hypertension, drinking coffee can increase blood pressure. due to caffeine's ability to prevent the production of adenosine (a hormone that regulates blood vessels to stay wide), coffee's caffeine content causes blood vessels to narrow. In addition, caffeine stimulates the release of more cortisol and adrenaline from the adrenal glands. To prevent an increase in blood pressure in people with hypertension, sufferers need to limit coffee consumption, namely ≤ 2 cups of coffee a day (Warni, Sari and Agata, 2020).

The results of M. Ramadhani Firmasyah and Rustam's research, 2020, between the blood pressure of hypertension sufferers and coffee intake at the Palembang Health Center in 2016 showed that there was a significant relationship with the incidence of increased blood pressure with a pvalue = 0.020, out of 68 respondents there were 46 (67.6%) consuming coffee (Firmansyah, 2020).

Based on the profile data from the Denpasar City Health Office, there were 175,821 cases from 11 existing puskesmas, where at the West Denpasar Health Center I, the highest number of hypertension sufferers was 18,354 cases. With the high incidence of cases of hypertension in the West Denpasar Health Center I area, researchers wanted to carry out research related to the analysis of factors related to blood pressure in uncontrolled hypertension sufferers at West Denpasar Health Center I.

In addition, at the West Denpasar Health Center I, research has never been conducted in this regard. So that people with uncontrolled hypertension can understand what is related to the incidence of increased blood pressure. To reduce the risk of complications, death from disease, and health problems, due to variable factors selected based on

previous research findings, namely salt consumption, coffee consumption and obesity are presented from the results of respondents who seek treatment at the West Denpasar Health Center I, so that the cause of uncontrolled pressure can be identified. blood in patients with uncontrolled hypertension who visited the West Denpasar Health Center I for routine checks.

METHOD

This study uses an analytic cross-sectional research design that examines the dynamics of the relationship between risk variables and their effects through data collection by observation or closed questionnaires at once (Siyoto, 2015). In this study, observations were made to analyze variables related to blood pressure in patients with uncontrolled hypertension at Health Center I West Denpasar.

The population for this study used data on hypertension sufferers who underwent routine checks in December 2022 as many as 67 people as the population for this research sample. The inclusion criteria in this study were: all hypertensive patients who carry out routine control at the West Denpasar Health Center I, patients diagnosed with hypertension, patients who are willing to become respondents, while the exclusion criteria in this study were patients who had co-morbidities such as diabetes, kidney, and strokes. The research instrument used a questionnaire. The questionnaire used in this study had previously been tested on 30 prolanis patients in the city of Semarang regarding the factors associated with uncontrolled hypertension with valid results (Astuti, Azam and Rahayu, 2021).

The sample size in this study uses the sample formula from Isaac and Michael (Sugiyono, 2015). Based on the calculation results of the sample size, the sample size used in this study was obtained as many as 57 people. This study used a non-random sampling method called accidental sampling. Data analysis in this study used the Chi Square test and the prevalence Odds Ratio (OR) results. This research has conducted ethical tests at the Denpasar Ministry of Health Poltekkes with Number: LB.02.03/EA/KEPK/0352/2023.

RESULT

Participants had a mean age of 47.36±16.17 years. Half the participants were men (50%). Less than half of the participants had a primary school degree (44.4%). Most participants were married (82.2%). More than half of the participants had a history of surgery (56.7%). Less than half of the participants slept ≥8 hours before hospitalization (43.3%). Most participants had no sleep problems (88.9%) and were not on sleeping pills (98.8%). Most participants stated that their sleep was adversely affected in the hospital (90%). More than half of the participants noted that sleep was adversely affected by people entering and out of their rooms (Table 1).

A total of 57 respondents in this study. Characteristics based on table 1, the results showed that most of the respondents aged over 61 years suffered from uncontrolled hypertension at the West Denpasar Health Center I with a percentage of 68.4%.

Table 1. Frequency Distribution of Characteristics of Uncontrolled Hypertension Based on Age at Health Center I West Denpasar

Age	Frequency (n)	Percentage (%)
40-55 Years old	7	12.3
55-60 Years old	11	19.3
≥ 61 Years old	39	68.4
Total	57	100

Based on the results of Table 2, the sex characteristics of the majority of respondents were female as many as 39 respondents (68.4%) in patients with uncontrolled hypertension at Health Center I West Denpasar.

Table 2. Frequency Distribution of Characteristics of Uncontrolled Hypertension Based on Gender at Health Center I West Denpasar

Sex	Frequency (n)	Percentage (%)
Male	18	31.6
Female	39	68.4
Total	57	100

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Based on the results of table 3, that the characteristics of blood pressure, that most respondents with uncontrolled hypertension had uncontrolled blood pressure of 42 respondents (73.7%).

Table 3. Frequency Distribution of Blood Pressure Characteristics in Patients with Uncontrolled Hypertension at Health Center I West Denpasar

Blood pressure	Frequency (n)	Percentage (%)
Not controlled (≥ 140/90)	42	73.7
Controlled (≤ 140/90)	15	26.3
Total	57	100

Based on Table 4, the results showed that the sample of salt consumption in the good category (consumption of salt ≤ 1 – 2 teaspoons) with uncontrolled blood pressure was 6 people (10.6%) and with controlled blood pressure there were 11 people (19.3%). %), whereas in the category of bad consumption (consumption of salt ≥ 3 teaspoons) with uncontrolled blood pressure there were 36 people (63.2%) and in controlled blood pressure there were 4 people (7%), samples of coffee consumption were not categorized (not or coffee consumption 1-2 cups/day) with uncontrolled blood pressure as many as 16 people (28.1%) and with controlled blood pressure as many as 11 people (19.3%), while in the yes category (coffee consumption > 2 cups/day) days) on uncontrolled blood pressure as many as 26 people (45.6%) and on controlled blood pressure as many as 4 people (7.0%), and the results showed that the BMI sample was not obese (IMT < 25) with no blood pressure 12 people (21.1%) controlled blood pressure and 10 people (17.5) controlled blood pressure, while 30 people (52.6%) were in the obesity category (BMI ≥ 25) and 5 people (5 people) controlled blood pressure (8.8%).

Table 4. Chi-Square Analysis of Factors Associated with Blood Pressure in Hypertension Patients at Health Center I West Denpasar

Variable		Blood pressure				p	OR
		Not controlled		Controlled			
		N	%	N	%		
Salt Consumption	Good ≤ 1-2 teaspoon	6	10.5	11	19.3	0.000	0.061
	Bad≥ 3 teaspoon	36	63.2	4	7.0		
Coffee Consumption	No (No or consumption < 1-2 cup/day)	16	28.1	11	19.3	0.041	0.224
	Yes (>2 cup/day)	26	45.6	4	7.0		
BMI	Not Obese (BMI < 25)	12	21.1	10	17.5	0.022	0.200
	Obesity (BMI ≥ 25)	30	52.6	5	8.8		

DISCUSSION

Based on the results of a study conducted by 57 respondents with hypertension at the West Denpasar Health Center I, the most age category of respondents in this study was the age range ≥ 61 years (68.4%). This study is in line with the findings of Darussalam and Warseno's research, where individuals with hypertension who are older than 60 have uncontrolled hypertension than those younger than 60 years as many as 114 respondents (60%) of 191 respondents (Darussalam and Warseno, 2019).

Based on the results of the characteristics of the sex category found at the West Denpasar Health Center I, it was found that women had more uncontrolled hypertension compared to men with a percentage of 68.4% (39 respondents). This is in line with the research findings of Felicia Risca Ryandini & Ade Kristianti 2021, which found that the proportion of women with high blood pressure was 32 out of 62 respondents (Ryandini and Kristianti, 2021).

In addition, univariate blood pressure results in hypertensive patients who had uncontrolled blood pressure were found in 42 respondents (73.7%). This was also stated by the findings of Feyissa Lemessa & Miressa Lamessa, 2021, it was found that there were still many uncontrolled blood pressures in hypertension sufferers, namely from the number of respondents used as many as 300 people, hypertensive patients who had uncontrolled blood pressure a total of 170 respondents (56.7 %) (Feyissa and Miressa, 2021). From the research conducted by Eka Babasari & Dimas Pramita

Nugraha, it was found that the results of uncontrolled blood pressure in hypertension sufferers were 96 respondents, the number of respondents who had uncontrolled blood pressure was 80 (83.3%) (Bebasari and Nugraha, 2018).

The trigger for uncontrolled blood pressure in hypertension sufferers can be influenced by several factors, including factors that cannot be changed, such as age and gender. Apart from these factors, some factors can be changed to control blood pressure, such as managing daily lifestyle (Warni, Sari, and Agata, 2020).

The results of a bivariate test conducted at the West Denpasar Health Center I, to analyze the relationship between salt consumption, coffee consumption, and obesity with blood pressure. The results of the salt consumption factor on blood pressure found that 36 (63.2%) respondents consumed salt in the bad category, compared to controlled blood pressure, 4 (7.0%) respondents consumed salt in the bad category. In the category of good salt consumption with uncontrolled blood pressure there were 6 (10.5%) respondents and in controlled blood pressure there were 11 (19.3%) respondents. Many people with uncontrolled hypertension were found at the West Denpasar Health Center I, who had an unhealthy daily lifestyle, which led to an increase in uncontrolled blood pressure.

The results of statistical tests using the chi square test at a significant level of $p = <0.05$ obtained results of $p = 0.000$. It can be concluded that there is a relationship between salt consumption and blood pressure in uncontrolled hypertension sufferers at the West Denpasar Health Center I. These findings are in line with the findings of Budi Artiyaningrum's study, which obtained significant analysis results between salt intake and the prevalence of uncontrolled hypertension, resulting in a p value of 0.001 (Artiyaningrum, Budi., 2016).

In addition to the research conducted by Budi Artiyaningrum, these results are also in line with the findings of Febby Hendra D. A & Nanang Prayitno that people with hypertension consume more salt with frequent intake (61.3%) compared to infrequent (9.1%), from the results statistical tests found a significant relationship between salt intake and $p = 0.000$ (Anggara, Febby Haendra Dwi., Prayitno, 2013), as well as the results of research by Siti Permata Sari Lubis, et al. entitled Analysis of Uncontrolled Hypertension at UPT Puskesmas Exemplary City of Medan in 2021 found the results of salt consumption with uncontrolled hypertension p-value = 0.032, it can be concluded that there is an effect of salt consumption on the incidence of uncontrolled hypertension (Permata Sari Lubis, Siregar and Simanjuntak, 2022).

The results of the relationship between coffee consumption and blood pressure were found by 16 (28.1%) respondents with the no category (no or consuming 1-2 cups of coffee/day), while in controlled blood pressure the results of coffee consumption with the not category were obtained as many as 11 (19.3%) of respondents. The results for the yes category (coffee consumption ≥ 3 cups/day) for uncontrolled blood pressure were 26 (45.6%) and for controlled blood pressure were 4 (7.0%) respondents.

The results of the chi square analysis obtained results at a significant level of $p = <0.05$ obtained results of $p = 0.041$, so it can be concluded that there is a relationship between coffee consumption and blood pressure in uncontrolled hypertension sufferers at the West Denpasar Health Center I, the results of this study are in line with the results of research conducted by M. Ramadhani Firmasyah and Rustam in 2020 concerning the relationship between coffee consumption and blood pressure in patients with hypertension at the Palembang Health Center in 2016 found a statistically significant relationship with the incidence of increased blood pressure, with a p value = 0.020 (Firmansyah, 2020).

In addition to the results of research by M. Ramadhani Firmasyah and Rustam, the findings of Atnesia Ajeng, et al. The results obtained using the independent T test obtained a p-value = 0.003, so it can be concluded that there is a significant difference between coffee consumption behavior and blood pressure at the Kosambi Health Center, Tangerang Regency (Ajeng, Yoyoh and Suryatama, 2020).

The results of the study of the relationship between obesity based on BMI and blood pressure obtained the results of 12 (21.1%) respondents who had uncontrolled blood pressure in the non-obese category (BMI <25), the results of respondents who had blood pressure in the non-obese category were obtained as many as 10 (17.5%) respondents. While the results of uncontrolled blood pressure with the category of obesity (BMI ≥ 25) obtained results of 30 (56.2%), controlled blood pressure found as many as 5 (8.8%) respondents.

The results of the analysis using the chi-square test with a significant level of $p = <0.05$, it can be concluded that the obesity factor on uncontrolled blood pressure has a relationship with a $p = 0.022$ in patients with uncontrolled hypertension at Puskesmas I West Denpasar, this is in line with findings of a 2019 study by Rizki Yulia P, obesity significantly affects the prevalence of uncontrolled hypertension with a p value = 0.003 (P and Nuzula, 2019).

The Eka Bebasari & Dimas Pramita Nugraha study found in 2018 found no statistically significant differences between hypertensive patients with regular blood pressure and those with uncontrolled blood pressure in terms of BMI, where the average BMI results at controlled blood pressure obtained results of 24, 2, while uncontrolled blood pressure was 24.8 (p>0.05) (Bebasari and Nugraha, 2018).

So it can be concluded from the three lifestyle factors studied such as salt consumption, coffee consumption, obesity based on BMI on blood pressure in uncontrolled hypertension sufferers at the West Denpasar Health Center I obtained the results from the chi square analysis test that there was a significant relationship.

Based on the results of Preference Odds Ratio (OR), the results obtained from the use of the chi-square test, where the salt consumption factor obtained OR = 0.061, so that it can be concluded in uncontrolled hypertension sufferers who routinely consume more than 3 teaspoons of salt will increase the occurrence of an increase in blood pressure. blood pressure by 0.061 times compared to patients who consume less than 3 teaspoons of salt, on the coffee consumption factor the value of OR = 0.224 is obtained, so it can be concluded that uncontrolled hypertension sufferers who consume more than 2 cups of coffee will increase blood pressure by 0.224 times compared to who consume less than 2 cups of coffee.

Based on the Odds Ratio, the obesity factor based on BMI obtained OR = 0.200. It can be concluded that people with uncontrolled hypertension who are overweight will increase their blood pressure by 0.200 times compared to those who are not overweight. From the results of this analysis, it can be concluded that coffee consumption has the greatest influence on increasing uncontrolled blood pressure in hypertensive patients at Health Center I West Denpasar.

CONCLUSION

Based on the results of the analysis, it was found that the age category of respondents with an age range of ≥ 61 years was 68.4%, the results of the gender category found that women are more predominant with non-disorder hypertension than men. as much as 68.4%, and blood pressure results in hypertensive patients whose blood pressure was not disabled were found to be 73.7%. The results of the salt consumption factor, the coffee consumption factor, and the obesity factor on blood pressure are related to the occurrence of unbalanced blood pressure. The Odds Ratio (OR) result that is most closely related to an increase in blood pressure is coffee consumption with OR = 0.224 where in uncontrolled hypertension sufferers who regularly consume more than 2 cups of coffee will increase the occurrence of an increase in blood pressure by 0.224 times. Suggestion: It is hoped that future researchers can develop this research by measuring other factors that can influence unsettling blood pressure in hypertensive patients.

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