Jurnal Proteksi Kesehatan
Vol.13, No.1, Mei 2024, pp. 1-10
ISSN 2715-1115 (Online), ISSN 2302 – 8610 (Print)

Factors Associated with Hypertension in Menopouse Women

Faktor yang Berhubungan dengan Hipertensi pada Wanita Menopouse

M. Ridwan[1], Firda Fibrila[2], Fathunnikmah[3]
[1,2] Politeknik Kesehatan Kementerian Kesehatan Tanjungkarang, Lampung, Indonesia
[3]Poltekkes Kemenkes Riau, Pekanbaru, Indonesia
Email: ridwan@poltekkes-tjk.ac.id

Article Info

Article history
Received date: 2024-04-29
Revised date: 2024-06-13
Accepted date: 2024-07-02

Abstract
The results of a pre-survey at the Mulyojati Metro City Health Center in 2022 out of 460 menopausal women there were 264 (57%) menopausal women who experienced hypertension. The purpose of the study was to determine the factors associated with the incidence of hypertension in menopausal women, using a quantitative analytic survey with a case control design. The population in this study were all postmenopausal women at the Mulyojati Health Center in Metro City who met the inclusion and exclusion criteria with a sample of 32 people and 32 controls (1: 1 ratio), so that the total sample was 64 people. Using Simple Random Sampling technique and data analysis using chi-square test. The results of the study of 32 respondents, as many as 68.8% (22 people) suffered from hypertension and were at risk of age with statistical test results obtained p-value = 0.045 (≤α 0.05), as many as 34.4% (11 people) who suffered from hypertension had experienced menopause with statistical test results obtained = 0.012 (≤α 0.05), as many as 21, 9% (7 people) who suffer from hypertension are highly educated with statistical test results obtained p-value = 0.064 (> α 0.05), as many as 68.8% (22 people) who suffer from hypertension have a hereditary history of hypertension with statistical test results obtained p-value = 0.003 (≤α 0.05) and as many as 40.6% (13 people) suffer from hypertension. Hypertension and obesity with statistical test results obtained p-value = 0.005 (≤α 0.05). In conclusion, of the 5 (five) independent variables studied, there are 4 (four) variables that are proven to have an association with the incidence of hypertension in menopausal women.
Keywords:
Factors; Hypertension; Menopausal Women

Abstrak
Hasil pra survei di Puskesmas Kota Metro Mulyojati tahun 2022 dari 460 wanita menopause terdapat 264 (57%) wanita menopause yang mengalami hipertensi. Tujuan penelitian adalah untuk mengetahui faktor-faktor yang berhubungan dengan kejadian hipertensi pada wanita menopause, menggunakan survei analitik kuantitatif dengan desain *case control*. Populasi dalam penelitian ini adalah seluruh wanita pascamenopause di Puskesmas Mulyojati Kota Metro yang memenuhi kriteria inklusi dan eksklusi dengan sampel sebanyak 32 orang dan kontrol sebanyak 32 orang (rasio 1:1), sehingga total sampel 64 orang. Menggunakan teknik *Simple Random Sampling* dan analisis data menggunakan uji *chi-square*. Hasil penelitian dari 32 responden, sebanyak 68,8% (22 orang) menderita hipertensi dan berisiko usia dengan hasil uji statistik diperoleh p-value = 0,045 (≤α 0,05), sebanyak 34,4% (11 orang) yang menderita hipertensi pernah mengalami menopause

dengan hasil uji statistik diperoleh = 0,012 (≤α 0,05), sebanyak 21,9% (7 orang) yang menderita hipertensi berpendidikan tinggi dengan hasil uji statistik diperoleh *p-value* = 0,064 (> α 0,05), sebanyak 68,8% (22 orang) yang menderita hipertensi mempunyai riwayat hipertensi secara turun temurun dengan hasil uji statistik diperoleh *p-value* = 0,003 (≤α 0,05) dan sebanyak 40,6% (13 orang) menderita hipertensi. Hipertensi dan obesitas dengan hasil uji statistik diperoleh *p-value* = 0,005 (≤α 0,05). Kesimpulan penelitian dari 5 (lima) variabel bebas yang diteliti terdapat 4 (empat) variabel yang terbukti mempunyai hubungan dengan kejadian hipertensi pada wanita menopause.
Kata Kunci:
Faktor-Faktor; Hipertensi; Wanita Menopouse

INTRODUCTION

Menopause is the end of a woman's reproductive abilities. Menopausal status is determined one year after the last spontaneous menstrual bleeding (Riyadina, Woro, 2019). This is caused by reduced production of the hormones estrogen and progesterone from a woman's ovaries, then the ovaries stop releasing eggs so that menstrual activity decreases and eventually stops completely. There is a decrease in the amount of the hormone estrogen which is very important for maintaining body functions [1].

Hypertension is often also referred to as The Silent Disease or a hidden disease. Hypertension, if not treated properly, can cause heart attacks, heart enlargement, and ultimately heart failure. Caused by high pressure, blood vessels can swell (aneurysm) and weak spots increase the chance of blockage and rupture. Pressure.

According to WHO (World Health Organization), around 30% of the world's population suffers from undiagnosed hypertension. This is because there are no definite symptoms experienced by hypertension sufferers. The number of hypertension sufferers is increasing from year to year. Data obtained from recent research shows that around 50 million (21.7%) adults in America suffer from hypertension. Vietnam 34.6%, Malaysia 29.9%, Singapore 24.9%, Thailand 17%, and Indonesia has a fairly high figure, namely 15% of Indonesia's 230 million population, which means that almost 35 million Indonesians suffer from hypertension [2]. Based on the 2020 Lampung Province Health Profile, cases of high blood pressure (hypertension) in Lampung Province are still quite high, the highest cases of hypertension are in Way Kanan (25.99%), West Lampung (20.56%), East Lampung (20, 54%), West Tulang Bawang (19.49%), North Lampung (17.85%), and Metro City (12.99%) [3].

According to the Metro City Health Profile, the highest incidence of hypertension among the 12 health centers in Metro City in 2019 was at the Mulyojati Health Center with 3,022 incidents in men and women, and 1,498 in men and 1,524 incidents in women [4]. Based on a preliminary study conducted at the Mulyojati Community Health Center, there were 141 cases of high blood pressure in menopausal women in 2020, then increased to 173 cases in 2021 and jumped to 264 cases in January-October 2023 [5].

The causes of hypertension are classified as primary hypertension (unknown cause) and secondary hypertension (known cause). Most cases (90-95%) of primary hypertension have no known cause. Several risk factors associated with primary hypertension include genetic factors, excessive sodium intake, obesity, dyslipidemia, excessive alcohol intake, inadequate physical activity, and vitamin D deficiency. Age influences the incidence of hypertension. Hypertension can also cause kidney failure, rupture of blood vessels, blindness and cognitive impairment [6].

Several factors cause hypertension in menopause, including age. Heredity and obesity. Age influences the incidence of hypertension. The incidence of hypertension is directly proportional to increasing age. This is because arteries lose their elasticity as we age. The incidence of hypertension is directly proportional to increasing age. This is because arteries lose their elasticity as we age. Generally, blood pressure increases at the age of 50-60 years and this is seen in both men and women.

Research result Zilberman, et al. in 2015 [7] which states that as a woman gets older in menopause, she will be at risk of developing hypertension, which is caused by depression and anxiety that are often experienced by menopausal women.

Genetic factors contribute 50% to changes in blood pressure [8]. Genetic factors in certain families will put the family at risk of developing hypertension. This is associated with increased intracellular sodium levels and a low potassium to sodium ratio. Individuals whose parents suffer from hypertension are twice as likely to develop hypertension as those who do not have a family history of hypertension. Apart from that, there are 70-80% of cases of significant hypertension with a family history of hypertension and as a result, in obese sufferers, sufferers tend to suffer from cardiovascular disease, especially hypertension [9]. Blood vessels can also cause blood to leak into the brain which can cause a stroke. This is because obese hypertensive sufferers have a higher cardiac output and blood volume compared to normal body weight and equivalent blood pressure. Fluctuations in systolic or diastolic blood pressure in obese hypertensive patients in both women showed a similar pattern with 1 risk of obesity (BMI 25-26.9), 2 risk of fat (BMI 27-29.9) or high risk of fat (BMI 230). In postmenopausal women who are obese, the average blood pressure in systolic blood pressure is quite high, namely 150-170 mmHg compared to the average diastolic blood pressure of 90-94 mmHg [8].

METHOD

Quantitative analytical survey research with a case control design. This design is intended to compare the case group and the control group by selecting subjects based on the disease they suffer from and then observing exposure to the causal factors suffered over a long period of time. Apart from that, although there has been an increase in cases of hypertension experienced by menopausal women in the 2020-2022 period, the cases are still relatively small, namely 20% of all menopausal women.

The population in this study were all postmenopausal women at the Yosomulyo Metro City Health Center who met the inclusion and exclusion criteria with a case sample of 32 people and a control sample of 32 people (ratio 1:1), so the total sample was 64 people. people.

Sampling uses the Simple Random Sampling technique. Univariate data analysis and bivariate analysis used the chi-square statistical test.

RESULTS AND DISCUSSION

The results obtained in this study can be seen based on univariate and bivariate analysis.

1. Analysis Univariate

Table 1
Variable Frequency Distribution Research on menopausal women who experience hypertension

Research variable	Amount	Percentage
Age :		
No risk (≤59 years)	29	45,3
At risk (>59 years)	35	54,7
Menopause Age:		
Not Menopausal (<51 Years)	31	48,4
Menopausal (≥ 51 Years)	33	51,6
Level of Education :		
Lower Education	42	65,6
Higher Education	22	34,4
Ancestry History:		
There is no hereditary history	33	51,6

There is a hereditary history	31	38,4
Obesity:		
Not obese	26	40,6
Obesity	38	59,4

The results of research from 64 respondents showed that of the 32 respondents who suffered from hypertension (cases), there were 68.8% (22 people) who were at risk (≤59 years), while of the 32 respondents who did not suffer from hypertension (controls), there were 40. 6% (13 people) were at risk (> 59 years). The same thing was found Kusumaingrum, T.S. and Khairunnas, N.K dan in 2019 [10] in his research at the Payung Sekaki Pekanbaru Community Health Center, it was found that the age distribution was >60 years as many as 37 respondents (84.1%). Age influences the incidence of hypertension. The incidence of hypertension is directly proportional to increasing age. This is because arteries lose their elasticity as we age. Generally, blood pressure increases at the age of 50-60 years and this is seen in both men and women [8].

Increasing age causes physical changes in the body, such as thickening of the arterial walls due to the buildup of collagen in the muscle layer, so that blood vessels will narrow and become stiff starting at the age of 45 years. Apart from that, there is also an increase in peripheral resistance and sympathetic activity as well as a lack of baroreceptor sensitivity (blood pressure regulator) and the role of the kidneys where the glomerular filtration rate decreases [11].

It is known that of the 32 respondents who suffered from hypertension (cases), there were 34.48% (11 people) who had menopause at the age of >51 years, while of the 32 respondents who did not suffer from hypertension (controls) there were 68.8% (22 people) who already menopausal (> 51 years). This research is almost the same as that found by Ummaah, F dan Lestari, Aprilia in2016 [12] in Banjarbendo Sidoarjo Village, out of 52 respondents, 76.9% (40 people) experienced pre-menstruation at the age of 40 years. Women who experience premenopause will experience peak symptoms (climacteric) and have a transition period. This phase is called the climacteric period (climacter = year of change, dangerous turn of the year). This climacteric period is also known as the critical period which is characterized by a burning sensation (hot flush), a hot flush that results in an increase in blood pressure, both systole and diastole. The burning sensation occurs due to increased blood flow in the blood vessels of the face, neck and back.

It is known that of the 32 respondents who suffer from hypertension (cases), there are 21.9% (7 people) who have high education, while of the 32 respondents who do not suffer from hypertension (controls) there are 46.9% (15 people) who have high education.

This research is the same as that found by Roseyanti. Ika Rena, Iswandari, ND dan Hasanah, SN, in 2024 [13] in the working area of the Lok Batu Mandi District Health Center. Balangan, South Kalimantan Province, from 61 respondents (33.4% (37 people) had basic education, the remaining 4.9% (4 people) had secondary education and 1.6% (1 person) had higher education. Education is an effort to develop personality and abilities inside and outside of school. Mothers who are highly educated will have better health knowledge and get information both from other people and from the mass media.

It is known that of the 32 respondents who suffer from hypertension (cases), there are 68.8% (22 people) who have a hereditary history of hypertension, while of the 32 respondents who do not suffer from hypertension (controls) there are 28.1% (9 people) who have a hereditary history. hypertension. This research is almost the same as that found by Kusumaingrum, T.S. and Khairunnas, N.K in 2019 [10] in his research at the Payung Sekaki Pakanbaru Community Health Center, it was found that 23 respondents (52.3%) had a hereditary history of hypertension.

Nadhilah, R dan Soeyono. RD, in 2023 [11], in her research in the working area of the Rumbai Pesisir Riau Community Health Center, she found that 51 people (83.65 respondents) had a family history of hypertension. According to Nuraini, Bianti in 2015 [14], stated that hereditary factors in families are more susceptible to hypertension because of genetic tendencies related to intracellular sodium levels. increased and the calcium-sodium ratio decreased. Patients whose parents have a history of hypertension will be more at risk of developing hypertension at a young age.

It is known that of the 32 respondents who suffered from hypertension (cases), 40.6% (13 people) were obese, while of the 32 respondents who did not suffer from hypertension (controls), 78.1% (25 people) were obese. The results of this study are almost the same as those found by Ekarini, Ni Luh Putu, Wahyuni.JD, Sulistyowati, D in 2020 [15], In research conducted at the Rawamangun Community Health Center, East Jakarta, it was found that 39 people (55.7%) had a nutritional status that was overweight. The results of research conducted by Harnanda. Pratiwi, Widiyanti. LP in 2019 [16]. lower where in his research in Pagesangan Village, Jambangan District, Surabaya, he found that 40% of respondents were overweight/obese (20 people).

According to Pramana, Lina Dwi Yoga in 2016 [9], that epidemiological investigations have proven that obesity is a characteristic feature in the hypertensive patient population. The cardiac output and blood volume of obese patients with hypertension are higher than those of normal weight patients with equivalent blood pressure. As a result of obesity, sufferers tend to suffer from cardiovascular disease, hypertension and diabetes mellitus. Pramana continued that there is a suspicion that an increase in relative normal body weight by 10% results in an increase in blood pressure of 7 mmHg.

2. Analysis Bivariate

The results of the data normality test using the One-Sample Kolmogorov-Smirnov Test showed a P value of 0.254 (P > 0.05). So it can be concluded that the research data values are normally distributed.

The next step was to carry out bivariate analysis to measure the relationship between research variables using the chi-square test at a confidence level of 95% (α = 0.05). The results of the analysis are as follows:

Table 2
Relationship between respondent's age, menopausal age, respondent's education, hereditary history and obesity with the incidence of hypertension in menopausal women

Research variable	Hypertension Occurrence				OR (95% CI)	P value
	Case		Control			
	n	%	n	%		
1. Age:						
No Risk	10	31,2	19	59,4	3,216	0,045
At risk	22	68,8	13	40,6	(1,150-8,987)	
2. Menopouse Age:						
No Meopouse	21	65,6	10	31,2	4,200	0,012
Menopouse	11	34,4	22	68,8	(1,478-11,936)	
3. Level of education:						
Lower	5	78,1	17	53,1	3,151	0,064
Higher	7	21,9	16	46,9	(1,061-9,357)	
4. Ancestry History:						
There isn't any	10	31,2	23	71,9	5,622	0,003
There is	22	68,8	9	28,1	(1,922-16,450)	
5. Obesity:						
Not Obese	19	59,4	7	21,9	5,220	0,003
Obese	13	40,6	25	78,1	(1,745-15,611)	
Amount	32	100	32	100		

The results of the analysis of 32 respondents who suffered from hypertension (cases), there were 68.8% (22 people) who were at risk, while of the 32 respondents who did not suffer from hypertension (controls) there were 40.6% (13 people) who were at risk. The statistical test results obtained p-value = 0.045 (<α 0.05), so Ha was accepted, meaning that there was a significant relationship between age and the

incidence of hypertension in menopausal women. Analysis of the close relationship between the two variables is shown by OR=3.215 (95% CI: 1.150-8.987), meaning that women who are older (>59 years) are at risk of developing hypertension 3.2 times greater than women who are younger.

The results of this research are in line with research conducted by Pramana,Lina Dwi Yoga in 2016 [9] In the Demak II Health Center Working Area, there was a relationship between age and the incidence of hypertension in menopause (p value = 0.026 < 0.05).

Maringga, Estin Gita dan Sari, Nunik Ike Yunia in 2019 [17], in his research in Kayen Kidul Village, Kayen Kidul District, Kediri Regency, he also concluded that there was a relationship between age and the incidence of hypertension in menopause, obtained a value of p=0.001 and OR 10.33, meaning that as age increases, women have a higher risk of hypertension in menopause than older people. young. The relationship between age and the incidence of hypertension in menopausal women is due to hormonal changes during menopause. Several hormones during menopause have an additive effect on increasing blood pressure such as a relative increase in androgen levels, activation of the renin angiotensin system, increased endothelial plasma levels, increased insulin resistance. Increasing age causes physiological changes, resulting in thickening of the artery walls due to the buildup of collagen substances in the muscle layer [18], So the blood vessels will narrow and become stiff starting at the age of 45 years. Apart from that, there is also an increase in peripheral resistance and sympathetic activity as well as a lack of baroreceptor sensitivity (blood pressure regulator) and the role of the kidneys. Renal blood flow and glomerular filtration rate also decrease. The results of this study are in line with previous research conducted by [13].

The results of the analysis of 32 respondents who suffered from hypertension (cases), there were 34.48% (11 people) who had menopause, while of the 32 respondents who did not suffer from hypertension (controls) there were 68.8% (22 people) who had menopause. The statistical test results obtained p-value = 0.012 (<α 0.05), so Ha was accepted, meaning that there was a significant relationship between the age of menopause and the incidence of hypertension in menopausal women. Analysis of the close relationship between the two variables is shown by an OR of 4.200 (CI 95%: 1.478-11.936), meaning that women who experience menopause at age >51 years have a risk of experiencing hypertension 4.2 times greater than women who experience menopause at age <51 years. This research is in line with research conducted by Umamah, Farida dan Lestari, Aprilia in 2016 [12], in the Banjarbendo sub-district of Sidoarjo found that there was a relationship between pre-menopausal age and the incidence of hypertension in women (p value=0.001).

Other research results by Rahmawaty and Rahmawati in 2015 [19], shows that there is a relationship between fiber intake and the incidence of hypertension in menopausal women. This is caused by menopausal women experiencing a decrease in estrogen hormone levels (Ardiani, H., Saraswati, L. D., and Susanto, H. S in 2015 [20], Apart from that, in older women it can also cause stiffness of the blood vessels, which can inhibit circulation in the blood vessels. The renal system also experiences changes as a woman ages, due to increased peripheral resistance and sympathetic activity and decreased glomerular filtration rate [18].

From the analysis of 32 respondents who suffered from hypertension (cases), there were 21.9% (7 people) who had high education, while of the 32 respondents who did not suffer from hypertension (controls) there were 46.9% (15 people) who had high education. The statistical test results obtained p-value = 0.064 (> α 0.05), so Ha was rejected, meaning that there was no significant relationship between

education and the incidence of hypertension in menopausal women.

The results of this study are the same as those found by Podungge, Yusni in 2020 [21] In his research, the West City Health Center Work Area concluded that there was no relationship between education level and hypertension in menopause. This is because the education of menopausal mothers tends to be homogeneous. It is known that of the 32 respondents who suffer from hypertension (cases), there are 68.8% (22 people) who have a hereditary history of hypertension, while of the 32 respondents who do not suffer from hypertension (controls) there are 28.1% (9 people) who have a hereditary history. hypertension. The statistical test results obtained p-value = 0.003 (<α 0.05), so Ha was accepted, meaning that there was a significant relationship between hereditary history and the incidence of hypertension in menopausal women. Analysis of the close relationship between the two variables is shown by an OR of 5.622 (95% CI: 1.922-16.450), meaning that women who have a history of hypertension are 5.6 times more likely to develop hypertension than women who do not have hypertension. The results of this research are in line with previous research conducted by Raihan. Lailatun Najmi, Erwin, Dewi. Ari Pristiana in 2014 [22], In the Rumbai Pesisir Riau Health Center Working Area, the value of p (0.00) < α (0.05) was obtained, so it was concluded that there was a significant relationship between family history and the incidence of primary hypertension.

The results of this research are also in line with research conducted by Kusumaingrum, T.S. and Khairunnas, N.K in 2019 [10] At the Payung Sekaki Pakanbaru Health Center, it was found that there was a relationship between hereditary history and the incidence of hypertension in menopause (p value = 0.003 < 0.05). One disease that often appears in menopausal women is hypertension. The incidence of hypertension in women is higher when entering menopause compared to men, amounting to 41%. This is caused by menopausal women experiencing a decrease in estrogen hormone levels [17].

According to Dar *American College of Cardiology* quoted by *Fadli, Rizal in 2021* [23] explains that decreasing estrogen levels during menopause is the main trigger for hypertension in women. The hormone estrogen apparently has a vascular protective effect in women who are still experiencing premenopause. Estrogen can increase the production of antioxidants, thereby reducing stress and preventing inflammation in the body. Therefore, lower estrogen levels after menopause may decrease this function and increase the risk of hypertension. In addition, there is a decrease in estrogen secretion resulting in narrowing of blood vessels (vasoconstriction) which can cause blood pressure to increase. One of the causes of hypertension could be genetic or hereditary factors. That means, there is a gene mutation or genetic disorder inherited from your parents that makes you, genetically, experience hypertension, plus physical changes as you get older can also be a cause of hypertension [24]. The presence of genetic factors in the family can also increase the risk of suffering from hypertension. This is associated with increased intracellular sodium levels and a low ratio of potassium to sodium. Individuals whose parents suffer from hypertension have twice the risk of suffering from hypertension than people who do not have a family history of hypertension. In addition, it was found that 70-80% of cases of essential hypertension had a family history of hypertension [10]. When women enter menopause, the risk of hypertension increases so that the prevalence is higher compared to men. This is caused by the production of the hormone estrogen decreasing during menopause, causing an increase in blood pressure [25].

It is known that of the 32 respondents who suffered from hypertension (cases), 40.6% (13 people) were obese, while of the 32 respondents who did not suffer from

hypertension (controls), 78.1% (25 people) were obese. The statistical test results obtained p-value = 0.005 (<α 0.05), so Ha was accepted, meaning that there was a significant relationship between obesity and the incidence of hypertension in menopausal women. Analysis of the close relationship between the two variables is shown by an OR of 5.220 (95% CI: 1.745-15.611), meaning that women who are obese are at risk of developing hypertension 5.2 times greater than women who are not obese.

The results of this research are in line with previous research conducted by Harnanda, Pratiwi dan Widayanti, L P. in 2019 [16] obtained p value (0,001) < α (0,05), So it can be concluded that there is an influence of body mass index on hypertension in menopausal women in Pagesangan Village, Jambangan District, Surabaya. The same thing was also found by Rizky, Dea in 2017 [1] in his research at Posyandu Asoka Pandak Bantul Yogyakarta that there was a relationship between Body Mass Index (BMI) and blood pressure with a p value of 0.037 (<0.05).

According to Sharagih, Omar,A and McKenie, Travis.J in 2020 [27], increased SNS activity is believed to play an important role in the development of obesity-related hypertension. Physiological manifestations of SNS overactivity include increased heart rate, cardiac output, and renal tubular sodium reabsorption; this occurs as a direct result of stimulation of α-adrenergic and β-adrenergic receptors and indirectly through activation of other systems, such as the RAAS. Muscle SNS activity, as measured by microneurography, increases even with small weight gain and appears to be highest in patients with obesity and hypertension. Renal SNS activity, as measured by the norepinephrine spillover method, is also increased in obese individuals. In particular, obesity-related increases in SNS activity are not evenly distributed across organs, and primarily affect the kidneys and skeletal muscle. According to Singhania. Komal., Kalhan, Meenakshi., Choudhari, Priyanka and Kumar, Tarun (2020) explain that aging has a strong influence on the development of obesity due to lack of activity and a more sedentary lifestyle which reduces the amount of energy expended and thus helps develop excess body weight/obesity [28].

CONCLUSION

The research conclusion of the 5 (five) independent variables studied was that there were 4 (four) variables that were proven to have a relationship with the incidence of hypertension in menopausal women, namely the age factor of the respondent, the age factor at menopause, the hereditary history factor and the obesity factor. , while the respondent's education factor was proven to have no relationship with the incidence of hypertension in menopausal women. There is a need for education on detecting symptoms and signs of hypertension and involving health cadres in screening for hypertension in menopausal women.

ACKNOWLEDGMENT

The researcher would like to thank the Director of the Tanjungkarang Health Polytechnic, the Head of the Mulyojati Community Health Center, all parties who have helped with this research process.

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