

SJEPS Vol. 2, Issue 4, Page: 01-08,  
March 2020, ISSN: 2676-2722  
Impact Factor (SJIF): 8.113  
Journal DOI: 10.15373/22501991  
International Peer Reviewed &  
Refereed Journal with Indexed  
Journal Platforms

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## Analysis of the Correlation between the Level of Adherence on Anti-Hypertensive Drugs Usage and JNC (Joint National Committee) VIII Blood Pressure Targets

Rizal

### Abstract

Adherence in doing a therapy for hypertensive patients is an important thing to note seeing that hypertension is a disease which cannot be cured but can only be controlled. The success of controlling blood pressure for hypertensive patients is influenced by adherence factor in taking anti-hypertensive drugs. This research aims to analyze correlation between the level of adherence on anti-hypertensive drugs usage and JNC VIII blood pressure targets. The research design used was observational cross sectional which the subjects are hypertensive patients who are older than or equal to 18 years old in the outpatient's installation of Robert Wolter Monginsidi Manado Hospital and Kotabunan Bolaang Mongondow Health Centre in the period of October to December 2019. Level of adherence on Anti-Hypertensive drugs usage was assessed by MMAS-8 questionnaire (Morisky 8-Item Medication Adherence Scale). Total patients in this research are 175 in which 83.43% are classified having low adherence level (MMAS score <6) and 16.57% classified having moderate to high adherence level (MMAS score 6-8). Furthermore, 9.71% of blood pressure target based on JNC VIII is on target and 90.29% is not on target (blood pressure uncontrolled). Based on the respondent characteristic, level of education, length of treatment had significant relation ( $p < 0.05$ ) over the patients' adherence level in taking anti-hypertensive drugs and JNC VIII blood pressure targets. The correlation between adherence level based on MMAS scale (146 patients are classified in the low level, 22 patients are classified in the moderate level, and 7 patients are classified in the high level) with JNC blood pressure targets (17 patients are on target and 158 are not on target) showed the significant correlation with  $p$  value: 0.000 and correlative coefficient is 0.772 (strong correlation). Based on the result above, it is suggested that each hospital and health center requires its pharmacists to do pharmaceutical practices, and each pharmacy must not provide medication services without the presence of pharmacist.

**Keywords:** Hypertension, Adherence, JNC

## 1.0 INTRODUCTION

Hypertension is a global health problem which urgently needs to be solved seeing the fairly high prevalence rate. Conventionally, hypertension is the time when systolic blood pressure is  $\geq 140$  mmHg and diastolic blood pressure is  $\geq 90$  mmHg on the repeated measurement (Hoffman, B., 2007). Hypertension is one of the main factors of coronary heart disease, stroke, heart failure, terminal kidney disease (Morisky, D.E., 2008). The percentage of hypertension case in developed countries is about 37.3% and by the time, the impact of hypertension will affect the developing countries due to the overpopulation factor. It is predicted that in 2025 the hypertension cases will be increased. In 2000, it had been reported that the number of hypertensive patients is increased from 918 million to 1.56 billion. Then in 2025, It is predicted that  $\frac{3}{4}$  of world's population with hypertension will be centralized in developing countries. In Indonesia, the cases of hypertension tent to be increased. Basic Health Research 2013 reported that hypertension prevalence in Indonesia gotten by assessing  $\geq 18$  years old adult is about 25.8 %. Then in 2018 it was reported that hypertension prevalence increased from 25.8 % to 34.1% (Kemenkes RI, 2013). North of Sulawesi Regional Health Public Office reported the percentage of hypertension prevalence is 38.36% by 2.436.921 total populations (Dinkes Sulut, 2017).

Cardiovascular disease is the main cause of the death in Indonesia, then 20-35% of the death cases caused by hypertension. Clinical manifestation of hypertension is organ damage which caused heart and kidney disease,

stroke and other complications. Moreover, one of the targets of hypertension therapy is to keep the patients' blood pressure controlled to suppress morbidity and mortality rates. There are so many ways to be done in order to make patients' hypertension therapy achievable. One of the ways is conducting a pharmaceutical practice which is done by pharmacists (Jiang B, et al., 2014; Ewald DR, Haldeman LA, 2016). Pharmaceutical practice aims to improve the quality of life of the patients, not only by providing them medication service but also providing them information, counseling and education for the patients, monitoring the result of patients' hypertension therapy in order to make the patients obedient (Whelton PK, et al., 2017). There are two main factors in controlling patient's blood pressure.

Those are prescription of hypertensive drugs and patients' adherence in doing therapy. Adherence in doing therapy is the main factor in controlling patient's blood pressure. The main requirement to achieve the effectiveness of therapy and improving the quality of patient's life is adherence (Gwardy, SF., 2013; Burnier, M., 2019). Low adherence level in chronic disease medication becomes the global problem. Low adherence level for the patients who consume anti-hypertensive drugs related to the higher risk of heart disease and cerebrovascular. There are only 50 % of adults obedient in taking their hypertension treatment (Peacock, E., Marie, K., 2017; Burner, M., 2019). Research which is done by Sinurya, R., et al (2018) reported that more than 50% of hypertensive patients in the first level health facilities in Bandung had low level of adherence in taking their medications (Sinuraya, R., et al., 2018). Blood pressure targets according to JNC VIII therapy regulation for hypertensive patients without diabetes or *chronic kidney disease* (CKD) in the age of  $\geq 60$  years old is 150/90 mmHg whereas in the age of  $\leq 60$  is 140/90 mmHg (James PA, et al, 2014). This research aims to analyze the correlation on anti-hypertensive drugs usage and blood pressure target of JNC VIII

## 2.0 RESEARCH METHOD

The research design used was Observational Cross Sectional using hypertensive patients in outpatient installation Robert Wolter Monginsidi Manado Hospital and Kotabunan Bolaang Mongondow Health Center. This research was done in two months started from October to December 2019. Inclusion criteria are patients with diagnosis of hypertension, male or female in the age of  $\geq 18$  years old, signing informed consent. The exclusion criteria are pregnant women and the patients rejected to participate in the research. Total samples are 173 patients. Hypertensive patients who had been listed and diagnosed with hypertension and fulfilled the inclusion criteria will fill out the questionnaire sheet containing demographic data, hypertension history, and the question of anti-hypertensive drugs adherence usage level.

Data analysis from questionnaire was done by assessing adherence level through Morisky 8-Item Medication Adherence Scale (MMAS) questionnaire (Morisky, DE., et al, 2008) and doing statistical analysis through chi square test for dichotomous variable comparability test, Kruskal Wallis for polychotomous variable comparability test, pearson test to examine the correlation between adherence and the independent variable using IBM SPSS 20

### 2.1 Result

Total respondents participating in this research were 175 respondents with characteristic distribution and correlation between adherence level and blood pressure target according to JNC VIII, table and graphic of adherence level and JNC VIII blood pressure target, validity and reliability of the questionnaires are shown in the following table:

**2.1.1 Tabel 1. Distribution of correlation on respondent characteristic and the level of adherence on the anti-hypertensive drugs usage**

Characteristics	Total Sample <i>N</i> = 175 <i>N</i> (%)	MMAS Category (Score Range)		Significance ( <i>P</i> )
		Low (< 6); <i>N</i> = 146 <i>N</i> (%)	Moderate/ High (6-8); <i>N</i> = 29 <i>N</i> (%)	
Age				0,418
- $\geq 60$	92 (52,6)	79 (54,1)	13 (44,8)	
- < 60	83 (47,4)	67 (45,9)	16 (55,2)	
Sex				1,000
- Male	70 (40)	58 (39,7)	12 (41,4)	
- Female	105 (60)	88 (60,3)	17 (58,6)	

Education Level				0,001
- Primary School	52 (29,7)	48 (32,9)	4 (13,8)	
- Junior High School	51 (29,1)	43 (29,5)	8 (27,6)	
- Senior High School	55 (31,4)	47 (32,1)	8 (27,6)	
- University	17 (9,7)	8 (5,5)	9 (31,0)	
Period of Hypertension				0,351
- ≤ 5 years	86 (49,1)	71 (48,6)	15 (51,7)	
- 5 – 9 years	65 (37,2)	57 (39,1)	8 (27,6)	
- ≥ 10 years	24 (13,7)	18 (12,3)	6 (20,7)	
Family of Hypertension History				1,000
- Yes	85 (48,6)	71 (48,6)	14 (48,3)	
- No	90 (51,4)	75 (51,4)	15 (51,7)	
Routine Physical Exercise				1,000
- Yes	59 (33,7)	49 (33,6)	10 (34,5)	
- No	116 (66,3)	97 (66,4)	19 (65,5)	
Active Smokers				0,511
- Yes	55 (31,4)	44 (30,1)	11 (37,9)	
- No	120 (68,6)	102 (69,9)	18 (62,1)	
Alcoholic				0,149
- Yes	16 (9,1)	11 (7,5)	5 (17,2)	
- No	159 (90,9)	135 (92,5)	24 (82,8)	
Diabetes Diagnosis				0,407
- Yes	24 (13,7)	21 (14,4)	3 (10,3)	
- No	151 (86,3)	125 (85,6)	26 (89,7)	
Kidney Diagnosis				0,457
- Yes	9 (5,1)	7 (4,8)	2 (6,9)	
- No	166 (94,9)	139 (95,2)	27 (93,1)	
Length of Treatment				0,002
- < 3 Years	119 (68,0)	107 (73,3)	12 (41,4)	
- ≥ 3 Years	56 (32,0)	39 (26,7)	17 (58,6)	
Anti-hypertensive Drugs Used				0,530
- Singular	109 (62,3)	89 (61,0)	20 (69,0)	
- Combination	66 (37,7)	57 (39,0)	9 (31,0)	
Routine Control				0,216
- Yes	159 (90,9)	131 (89,7)	28 (96,6)	
- No	16 (9,1)	15 (10,3)	1 (3,4)	

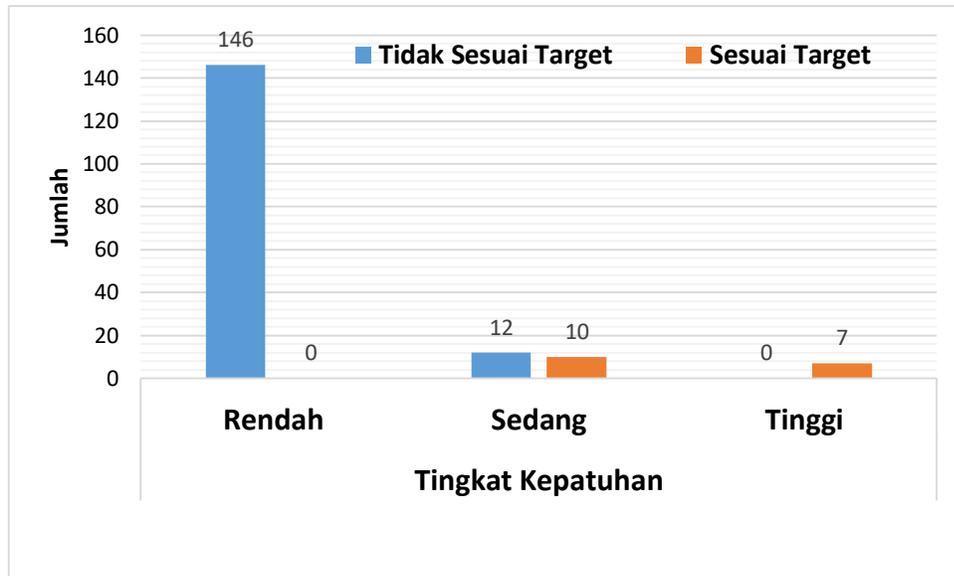
2.1.2: Table 2. Distribution of the correlation on respondent characteristic and blood pressure target of JNC VIII

Characteristics	Blood Pressure Target			Significance (P)
	Total Sample N = 175 N (%)	Not On Target N= 158 N (%)	On Target N= 17 N (%)	
Age				0,620
- ≥ 60	92 (52,6)	82 (51,9)	10 (58,8)	
- < 60	83 (47,4)	76 (48,1)	7 (41,2)	
Sex				0,606
- Male	70 (40)	62 (39,2)	8 (47,1)	
- Female	105 (60)	96 (60,8)	9 (52,9)	
Education Level				0,013
- Primary School	52 (29,7)	50 (31,6)	2 (11,8)	

- Junior High School	50 (28,6)	47 (29,7)	3 (17,6)	
- Senior High School	56 (32,0)	49 (31,0)	7 (41,2)	
- University	17 (9,7)	12 (7,6)	5 (29,4)	
Period of Hypertension				0,316
- ≤ 5 years	86 (49,1)	77 (48,7)	9 (52,9)	
- 5 – 9 years	65 (37,1)	61 (38,6)	4 (23,5)	
- ≥ 10 years	24 (13,7)	20 (12,7)	4 (23,5)	
Family Hypertension History				0,801
- Yes				
- No	85 (48,6) 90 (51,4)	76 (48,1) 82 (51,9)	9 (52,9) 8 (47,1)	
Routine Physical Exercise				0,792
- Yes				
- No	59 (33,7) 116 (66,3)	54 (34,2) 104 (65,8)	5 (29,4) 12 (70,6)	
Active Smokers				0,413
- Yes	55 (31,4)	48 (30,4)	7 (41,2)	
- No	120 (68,6)	110 (69,6)	10 (58,8)	
Alcoholic				0,477
- Yes	16 (9,1)	14 (8,9)	2 (11,8)	
- No	159 (90,9)	144 (91,1)	15 (88,2)	
Diabetes Diagnosis				0,421
- Yes	24 (13,7)	21 (13,3)	3 (17,6)	
- No	151 (86,3)	137 (86,7)	14 (82,4)	
Kidney Diagnosis				0,610
- Yes	9 (5,1)	8 (5,1)	1 (5,9)	
- No	166 (94,9)	150 (94,9)	16 (94,1)	
Length of Treatment				0,000
- < 3 Years	119 (68,0)	116 (73,4)	3 (17,6)	
- ≥ 3 Years	56 (32,0)	42 (26,6)	14 (82,4)	
Anti-hypertensive Drugs Used				0,437
- Singular				
- Combination	109 (62,3) 66 (37,7)	100 (63,3) 58 (36,7)	9 (52,9) 8 (47,1)	
Routine Control				0,180
- Yes	159 (90,9)	142 (89,9)	17 (100)	
- No	16 (9,1)	16 (10,1)	0 (0,0)	

2.1.3: Tabel 3. Correlation between the level of adherence and blood pressure target of JNC VIII

		Blood Pressure Target of JNC VIII		Total	Correlative Coefficient (R)	P Value
		Appropriate	Inappropriate			
Adherence Level	Low	0 0,0%	146 100,0%	146	0,772	0,000
	Moderate	10 45,5%	12 54,5%	22		
	High	7 100%	0 0,0%	7		
Total		17	158	175		



**Chart 1. Graphic of the correlation between level of adherence and blood pressure target of JNC VIII**

**Tabel 4. Questionnaire validity and reliability**

No	Questions	Corrected item – Total Correlation	Chronbach's Alpha
1	Do you sometimes ever skip taking your anti-hypertensive drugs?	0,622	0,732
2	Because of some reasons people usually skip taking their medication. Can you please remember over two weeks, which day did you skip taking anti-hypertensive drugs ?	0,674	0,724
3	Have you ever stopped taking your medication without confirming to doctor because the side effect that you felt when taking anti-hypertensive drugs?	0,536	0,735
4	When you travel to somewhere or leave the house. Do you sometimes leave your medication?	0,451	0,747
5	Did you take your anti-hypertensive drugs yesterday?	0,435	0,750
6	When you feel better, did you ever stop taking anti-hypertensive drugs ?	0,687	0,722
7	Taking medicine for everyday is a real discomfort for some people. Have you ever been bothered by your obligation to take anti-hypertensive drugs?	0,602	0,729
8	How often do you get difficult to notice the drugs usage?	0,626	0,734
<i>Chronbach's alpha &gt; 0,6</i>			
<i>Corrected item – Total Correlation &gt; 0,3 (Corrected correlative coefficient); r table 0,2826</i>			

**2.1 Tabel 5. The percentage of respondents' level of adherence according to MMAS questionnaire**

No	Questions	The Percentage of the Number of Respondents
1	Do you sometimes ever skip taking your anti-hypertensive drugs?	20 %
2	Because of some reasons people usually skip taking their medication. Can you please remember over two weeks, which day did you skip taking anti-hypertensive drugs ?	9 %
3	Have you ever stopped taking your medication without confirming to doctor because the side effect that you felt when taking anti-hypertensive drugs?	8 %

4	When you travel to somewhere or leave the house. Do you sometimes leave your medication?	19 %
5	Did you take your anti-hypertensive drugs yesterday?	5 %
6	When you feel better, did you ever stop taking anti-hypertensive drugs ?	8 %
7	Taking medicine for everyday is a real discomfort for some people. Have you ever been bothered by your obligation to take anti-hypertensive drugs?	10 %
8	How often do you get difficult to notice the drugs usage?	22 %

### 3.0 DISCUSSION

Adherence in doing a therapy for hypertensive patients is an important thing to note seeing that hypertension is a disease which cannot be cured but can only be controlled. The success of controlling blood pressure for hypertensive patients is influenced by adherence factor in taking anti-hypertensive drugs. Meta analytical research about the relation between adherence and mortality level showed positive correlation with the result of the treatment. The research was done to 175 patients in two health facilities. Demographic data showed that high prevalence of hypertensive patients who are in the age of > 60 years old, female, moderate to low level of education levels and rarely having physical exercise

Assess the adherence level by using MMAS questionnaire which is valid to assess the adherence level in taking anti-hypertensive drugs. The validity and reliability of MMAS questionnaire used in this research had been tested to 35 total respondents with corrected correlative coefficient validity value (corrected item-total correlation) above 0.3 with r table is 0.2826. Alpha cronbrach value of eight question items is > 0.7 which means that 8 question items are reliable. Data on the level of adherence on anti-hypertensive drugs usage showed that 83.43% classified in low level of adherence (MMAS score < 6) and 16.57% classified in moderate to high level of adherence (MMAS score 6-8). Furthermore, the level of education and length of the treatment have significant correlation ( $p < 0.05$ ) toward the patients' adherence level in taking anti-hypertensive drugs.

Education background has significant positive correlation. Patients who have higher level of education tent to be obedient in taking anti-hypertensive drugs. This might be related to better knowledge and insight in comparison to the patients who have lower level of education. After knowing the correlation between the education background and level of adherence, it is highly suggested medical practitioners need to pay more attention to this variable in giving information and education related to hypertension and its medication.

Blood pressure target according to latest guide of JNC VIII showed that from 175 subjects of the research, there were only 9.71% on target and 90.29% not on target (uncontrolled blood pressure). Based on the respondent characteristic, education level and length of the treatment have significant correlation ( $p < 0.05$ ) toward blood pressure target of JNC VIII.

Correlation between adherence level according to MMAS scale (low level 146 patients, moderate level 22 patients, and high level 7 patients) with JNC VIII blood pressure (on target 17 patients and not on target 158 patients) showed significant correlation with p value: 0.000 and correlative coefficient 0.772 (strong correlation). Findings showed that strong correlation between adherence level and blood pressure targets, thus findings also showed that patients' adherence level in taking anti-hypertensive drugs categorized in low level. Furthermore, the data showed that most of the patients do routine control in the health facilities. This indicates that low education for the parents in health facilities. There are some studies showed that intervention in front of education and counseling. Either it is done by the pharmacist or other medical practitioners are able to improve the patients' level of adherence in taking medication and the success of blood pressure control level.

### 4.0 CONCLUSION

Result of the study could be concluded that there is an effect on the level of adherence on anti-hypertensive drugs usage over blood pressure targets of JNC VIII with correlative coefficient value (R): 0.772 (strong correlation),  $p: 0.000$ . There are so many ways to be done to improve the level of adherence on the usage of anti-hypertensive drugs in order to decrease the hypertension mobility and mortality rate. Hospitals and health center obliged their pharmacists to do clinical pharmacy practice due to the fact that the practice is still minimum especially in North of Sulawesi. Moreover, the pharmacies must not provide the medication services without the presence of the pharmacists. Then for all the lecturers, it is necessary to focus on the community service by giving education about hypertension to the society. It could be in the form of further research about the correlation of pharmacist education and the level of adherence on anti-hypertensive drugs usage.

#### Acknowledgements

We thank the support of Institute of Health Science STIKES Muhammadiyah Manado, Robert Wolter Monginsidi Manado Hospital and Kotabunan Bolaang Mongondow Health Centre.

#### Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

#### Sources of Funding

This study was funded by Institute of Health Science STIKES Muhammadiyah Manado, North Sulawesi, Indonesia

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