Journal of Creativity Student
http://journal.unnes.ac.id/journals/jcs

Hypertension Treatment Education on Medication Adherence and Control to Health Care Facilities in Indonesia

Ani Nur Fauziah*, Siti Harnina Bintari, Evi Widowati, Widya Hary Cahyati

Universitas Negeri Semarang

*Corresponding Author: aninurfauziah@students.unnes.ac.id

Abstract
Hypertension is a leading cause of cardiovascular disease, stroke and premature death. It is a serious public health problem. Reports show that only 54% of adults with hypertension are diagnosed, 42% receive treatment, and 21% can control their hypertension. These statistics show how important it is to increase awareness and control of hypertension. This study aims to evaluate the effectiveness of hypertension treatment education on medication adherence and control to health care facilities in Indonesia. This study is a cross-sectional analytical study using secondary data from the Indonesian Health Survey (SKI) 2023. The independent variable is hypertension treatment education, the dependent variable is adherence to taking medication and control to health care facilities. Bivariate data analysis used simple linear regression test. the results hypertension education is effective on the regularity of taking anti-hypertensive drugs with statistical test results obtained p-value 0.002, as well as hypertension education is also effective on routine control to health care facilities with p-value 0.000. In addition, the factors of age, education, employment and sosioeconomic status affect the regularity of taking antihypertensive drugs with p-value <0.05. Hypertension treatment education is effective on the regularity of taking medication and control to health care facilities in Indonesia. The characteristics of age, education, employment and socioeconomic status affect the regularity of taking antihypertensive drugs.

Keywords: hypertension education, medication adherence

INTRODUCTION

Hypertension, as a high-prevalence chronic disease, has become an important risk factor for many diseases (eg, stroke, renal disease) and a major contributor to the global burden of disease (Sci, 2023). Approximately one-third of older adults with hypertension fail to achieve their blood pressure (BP) control goals (Hamrahian, 2020). The reasons for the low rate of hypertension control are related to high-risk lifestyles such as poor dietary habits and low levels of physical activity (PA).

Hypertension is a leading cause of cardiovascular disease, stroke and premature death. It is a serious public health problem. Reports show that only 54% of adults with hypertension are diagnosed, 42% receive treatment, and 21% can control their hypertension. These statistics show how important it is to increase awareness and control of hypertension. The percentage of adults suffering from hypertension in 2019 in the WHO European region decreased compared to 1990. In contrast, the percentage of adults with hypertension increased in the WHO South-East Asia region from 29% to 32%; including countries such as India, New Zealand, China, Republic of Korea, Philippines, Malaysia, Vietnam, and Japan. The WHO Western Pacific Region from 24% to 28%; including countries such as Australia, New Zealand, China, Republic of Korea, Philippines, Malaysia, Vietnam, and Japan and in the WHO South-East Asia region from 29% to 32%; including countries such as India, Nepal, Indonesia, and Thailand (Kario et al., 2024)

The prevalence and burden of hypertension is rising globally, especially in low- and middle-income countries, due to the aging population, urbanization, and changes in social and environmental risk factors (Mills et al., 2017). In Indonesia, according to the 2023 Indonesian Health Survey (SKI) and the 2011-2021 non-communicable disease (NCDs) cohort study, hypertension is the fourth highest risk factor for death at 10.2%. The 2023 IHS data showed that 59.1% of the causes of disability (seeing,

hearing, walking) in the population aged 15 years and over were acquired diseases, of which 53.5% were non-communicable diseases (NCDs), especially hypertension (22.2%).

In 2019, the Indonesian Ministry of Health increased Educational Information Communication (IEC) related to smart and compliant behaviour in the community, increased public self-awareness through routine blood pressure measurement and increased access to Primary Health Care Facility (FKTP) services, NCDs (Non-Communicable Disease) Services, Hypertension Complications and Community Strengthening through Posbindu for Early Detection and Risk Factor Monitoring (Kemenkes, 2019).. High blood pressure management programme with the motto PATUH: Check your health regularly and follow your doctor's advice. Treat your disease with proper and regular medication. Make sure to eat a balanced nutritious diet. Do safe physical activities. Avoid tobacco smoke, alcohol and other carcinogens. However, these activities are still within the recommended limits to be implemented and have not yet become a culture for hypertensive patients.

Medication non-adherence is a health problem that occurs at all ages, but is more common in older people (Khayyat et al., 2017). In addition, it is also associated with poor blood pressure control and increased hospitalisation as well as the development of severe complications and morbidity that can impact quality of life(Wang et al., 2023). Timely, regular, and long-term adherence to treatment can reduce symptoms, control disease progression, prevent complications, and reduce mortality. It has been observed that adherence to hypertension treatment increases with age. However, different studies on this topic yield different results. For example, some studies showed higher adherence in the age groups of 65-69 years (26.6%) and 60-64 years (23.1%)(S. Chen et al., 2022).

Adherence to hypertension treatment is multifaceted and determined by a variety of interacting factors. Acceptance of chronic illness can influence medication adherence, although the relationship is relatively complex(Pluta et al, 2020). The degree of acceptance of a particular illness reflects an individual's ability to acknowledge the condition, adapt emotionally, and cope effectively with challenges. Knowledge about hypertension and treatment has also been reported to be associated with treatment adherence (Tebelu et al, 2023). Knowledge assessed included the individual's understanding of the pathophysiology of hypertension in brief, pharmacological and non-pharmacological therapeutic treatments and the consequences of uncontrolled hypertension (Andala, 2024).

This study aims to evaluate the effectiveness of providing hypertension treatment education on medication adherence and control to health care facilities in Indonesia. If hypertension is not controlled, it can lead to stroke and become a burden to the family. Therefore, it is very important to establish interventions aimed at preventing the onset of the disease and reducing the impact of the disease on health so that it does not become more severe.

METHOD

This study is a cross-sectional analytical study using secondary data from the 2023 Indonesian Health Survey (SKI) (Kemenkes, 2023). The independent variable is hypertension treatment education, the dependent variable is adherence to taking medication and control to health care facilities. Bivariate data analysis used simple linear regression test and data processing used IBM spss 25 programme.

RESULT & DISCUSSION

This study aims to determine hypertension treatment education on the regularity of taking medication and control to health care facilities in Indonesia.

Hypertension Treatment Education on the Regularity of Taking Antihypertensive Drugs and Control to Health Care Facilities in Indonesia

Table 1. Proportion of people aged ≥15 years with hypertension who received treatment education and took hypertension medication based on doctor's diagnosis by province

No	Province	Receive Hypertension Treatment Education	Taking Anti-hypertensive Medication			N-weighted
			Regularly	Irregularity	Not taking the medication	
1	Aceh	63,4	40,11	50,8	9,1	1.000

No	Province	Receive Hypertension Treatment Education	Taking Anti-hypertensive Medication			N-weighted
			Regularly	Irregularity	Not taking the medication	
2	Sumatra Utara	65,7	43,7	41,3	15,1	1.545
3	Sumatra Barat	76,4	43,5	39,4	17,1	975
4	Riau	70,3	40,6	43,0	16,4	1.037
5	Jambi	71,9	44,0	47,3	8,7	458
6	Sumatra Selatan	69,0	46,9	39,6	13,4	1.479
7	Bengkulu	70,1	40,2	43,7	16,1	338
8	Lampung	61,3	36,3	42,0	21,7	1.632
9	Bangka Belitung	70,2	53,6	35,4	11,1	321
10	Kepulauan Riau	74,0	59,8	29,3	10,9	368
11	DKI Jakarta	81,4	63,1	25,4	11,5	3.312
12	Jawa Barat	63,1	46,2	35,5	18,3	11.952
13	Jawa Tengah	54,6	39,8	37,3	23,0	6.397
14	DI Yogyakarta	68,5	52,9	24,0	23,1	1.162
15	Jawa Timur	62,8	45,7	36,1	18,2	8.349
16	Banten	74,5	44,6	39,6	15,8	2.760
17	Bali	79,9	62,9	26,9	10,2	848
18	Nusa Tenggara Barat	54,7	37,9	46,6	15,5	868
19	Nusa Tenggara Timur	67,3	48,1	33,2	18,7	780
20	Kalimantan Barat	71,8	46,4	39,6	14,0	1.013
21	Kalimantan Tengah	71,7	42,0	49,7	8,3	522
22	Kalimantan Selatan	65,1	46,3	40,9	12,8	807
23	Kalimantan Timur	67,8	48,6	35,7	15,7	1.043
24	Kalimantan Utara	77,2	53,2	32,6	14,2	125
25	Sulawesi Utara	84,5	69,0	21,9	9,2	792
26	Sulawesi Tengah	69,9	48,8	36,8	14,4	599
27	Sulawesi Selatan	67,1	53,3	34,6	12,1	1.506
28	Sulawesi Tenggara	55,7	40,6	42,7	16,7	331
29	Gorontalo	70,3	52,5	36,4	11,0	237
30	Sulawesi Barat	62,1	47,1	40,0	12,8	219
31	Maluku	66,0	58,4	31,7	9,9	194
32	Maluku Utara	56,0	49,6	36,7	13,7	137
33	Papua Barat	74,4	46,6	40,7	12,6	79
34	Papua Barat Daya	68,8	53,4	28,4	18,2	85
35	Papua	69,4	43,2	35,8	21,1	156
36	Papua Selatan	61,1	48,4	26,3	25,3	64
37	Papua Tengah	64,7	43,7	41,1	15,2	102
38	Papua Pegunungan	71,4	20,9	62,4	16,7	79
	INDONESIA	65,8	46,7	36,4	16,9	53.668

Source: Indonesia Health Survey (SKI) 2023

Table 1 explains that Jawa Tengah Province as the lowest province that received hypertension treatment education at 54.60% and the highest was Sulawesi Utara Province with an achievement of 84.50%. The highest regularity of taking medication was Sulawesi Utara Province at 69.00% while the lowest was Papua Pegunungan Province with an achievement of 20.90%. The average number of hypertensive patients who received hypertension treatment education in Indonesia was 65.8%.

Table 2. Proportion of Hypertension Recheck/Control to Health Care Facilities in the Population Aged ≥15 Years with Hypertension based on Doctor's Diagnosis by Province in Indonesia

No	Province	Receive Hypertension Treatment Education	Hypertension re-examination to a health care facility			N-weighted
			Routines	Occasionally	Not control	
1	Aceh	63,4	37,8	52,5	9,7	1.000
2	Sumatra Utara	65,7	38,1	46,4	15,5	1.545
3	Sumatra Barat	76,4	43,8	39,3	16,9	975
4	Riau	70,3	42,5	42,3	15,2	1.037
5	Jambi	71,9	40,8	50,4	8,8	458
6	Sumatra Selatan	69,0	44,2	42,9	13,0	1.479
7	Bengkulu	70,1	37,9	46,3	15,7	338
8	Lampung	61,3	35,0	45,4	19,6	1.632
9	Bangka Belitung	70,2	49,0	37,4	13,6	321
10	Kepulauan Riau	74,0	57,1	31,8	11,1	368
11	DKI Jakarta	81,4	55,8	27,5	16,7	3.312

No	Province	Receive Hypertension Treatment Education	Hypertension re-examination to a health care facility			N-weighted
			Routines	Occasionally	Not control	
12	Jawa Barat	63,1	40,7	38,3	21,0	11.952
13	Jawa Tengah	54,6	39,0	36,8	24,3	6.397
14	DI Yogyakarta	68,5	50,8	23,7	25,5	1.162
15	Jawa Timur	62,8	41,8	37,5	20,7	8.349
16	Banten	74,5	45,4	37,0	17,6	2.760
17	Bali	79,9	59,7	29,6	10,7	848
18	Nusa Tenggara Barat	54,7	37,5	47,4	15,1	868
19	Nusa Tenggara Timur	67,3	40,5	39,2	20,3	780
20	Kalimantan Barat	71,8	44,2	43,4	12,4	1.013
21	Kalimantan Tengah	71,7	40,5	47,4	12,2	522
22	Kalimantan Selatan	65,1	44,3	43,9	11,8	807
23	Kalimantan Timur	67,8	47,3	34,1	18,6	1.043
24	Kalimantan Utara	77,2	51,3	37,8	10,9	125
25	Sulawesi Utara	84,5	57,4	31,8	10,8	792
26	Sulawesi Tengah	69,9	43,2	39,2	17,6	599
27	Sulawesi Selatan	67,1	48,3	38,4	13,3	1.506
28	Sulawesi Tenggara	55,7	38,3	46,0	15,7	331
29	Sulawesi Gorontalo	70,3	47,4	38,5	14,1	237
30	Sulawesi Barat	62,1	39,5	46,5	13,9	219
31	Maluku	66,0	49,3	37,8	13,0	194
32	Maluku Utara	56,0	39,8	44,7	15,5	137
33	Papua Barat	74,4	42,2	40,3	17,4	79
34	Papua Barat Daya	68,8	45,8	38,4	15,8	85
35	Papua	69,4	42,7	35,8	21,5	156
36	Papua Selatan	61,1	42,9	38,8	18,3	64
37	Papua Tengah	64,7	41,6	38,0	20,4	102
38	Papua Pegunungan	71,4	20,4	25,7	53,9	79
	INDONESIA	65,8	43,1	38,2	18,7	53.668

Source: Indonesia Health Survey (SKI) 2023

Table 2 describes that the highest achievement of routine control of hypertension treatment to health care facilities is Bali Province at 59.70 %. The lowest is Papua Pegunungan Province at 20.40%. The average number of people with hypertension who have regular control in Indonesia is only 43.1%.

Table 3 Simple linear regression statistical test results of Hypertension Treatment Education on the regularity of taking antihypertensive drugs and control to health facilities

Description	R	R^2	*p* - value
Take medication regularly	0.490	0.240	0.002*
Routine control	0.561	0.315	0.000*

Table 3 can show the results of providing hypertension education is effective on the regularity of taking anti-hypertensive drugs with statistical test results obtained *p*-value 0.002, as well as the provision of hypertension education is also effective on routine control to health care facilities with *p*-value 0.000.

This study aims to determine the provision of hypertension treatment education on the regularity of taking medication and control to health care facilities in Indonesia. From the results of statistical tests, the provision of hypertension education is effective with the regularity of taking medication with a p-value of 0.002. This is supported by research with the results of the impact of health education helping important improvements in the understanding of elderly people about the nature and treatment of hypertension (Y. Chen et al., 2020).

The main objectives of health education are to cultivate health-related behaviors and autonomous responsibility, encourage realistic health behavior perception, improve people's self-care ability, promote effective utilization of health facilities, and improve the quality of health care services. These interventions also have a positive effect on effective prevention of health care. Therefore, the application of health education can help especially elderly people suffering from hypertension to obtain adequate and accurate therapy. increase their knowledge about hypertension, thereby increasing their awareness about seeking medical help when symptoms appear (Gruman et al., 2010)

Trials conducted in developed and developing countries. countries (Australia, Indonesia, Iran, Nepal, South Korea, the United States, and Turkey) have shown that structured health education is a suitable intervention in a health promotion system. (McLean et al., 2016). Health education

interventions are cost effective in terms of design and logistics, and can increase knowledge excellence and cognition, change behavior, and improve physical condition (Albert & Davia, 2011).

The same study found that knowledge about hypertension and hypertension management had improved after hypertension education. Participants showed behavioral changes in hypertension management as measured by monitoring their blood pressure at home regularly and taking medication as prescribed (Bush et al., 2023).

The results also showed that the provision of hypertension education was also very effective in influencing the rash of control to health care facilities with a p-value of 0.000. Participants who have a higher level of knowledge about hypertension tend to adhere more to lifestyle recommendations and antihypertensive treatment regimens (Adinkrah et al., 2020).

In a study of 400 African Americans from Los Angeles, Bazargan et al. also noted that individuals with greater knowledge of the importance of treatment were almost seven times more likely to adhere to treatment (Bazargan et al., 2017).

The Characteristics of Patients with Hypertension on the Regularity of Taking Antihypertensive Drugs

Table 4. Proportion of Getting Medication Education and Taking Hypertension Medication in the Population Age ≥15 Years with Hypertension based on Doctor's Diagnosis by characteristics

Province	Receive Hypertension Treatment Education	Taking Anti-hypertensive Medication			N-weighted
		Regularly	Irregularity	Not taking the medication	
Age Groups					
15-24	39,2	19,7	28,7	51,6	460
25-34	53,8	27,5	42,6	29,9	2557
35 -44	60,0	37,9	37,9	24,2	6829
45-54	66,3	44,8	38,7	16,5	13.449
55 -64	69,1	50,5	35,7	13,9	15.314
65 -74	68,3	53,9	32,7	13,5	10.696
75+	65,4	49,5	36,0	14,6	4362
Education					
Never been to school	56,1	38,1	43,5	18,4	3508
Not graduated from elementary school / MI	60,7	42,1	41,1	16,8	5137
Graduated elementary school / MI	61,4	43,3	39,3	17,4	19.161
Graduated from junior high school / MTs	67,3	45,1	37,7	17,1	7850
Graduated from senior high school / MA	70,8	51,6	31,3	17,1	12.775
Graduated D1/D2/D3/PT	79,2	59,7	26,9	13,4	5.236
Employment					
Not working	66,7	48,8	35,6	15,6	23.220
School	61,8	38,0	27,6	34,4	348
PNS/ TNI/ Polri/ BUMN/ BUMD	78,7	56,8	32,8	10,3	2274
Private employee	70,9	47,3	32,3	20,4	3749
Self-employed	66,7	46,1	35,9	18,0	7456
Farmer / farm laborer	57,9	37,6	42,7	19,7	8774
Fisherman	64,2	37,0	43,7	19,4	259
Laborer/driver/PRT	59,6	41,7	37,5	20,7	3741
other	69,8	54,2	33,7	12,0	4117
Economic status					
Bottom	54,9	36,1	41,7	22,2	7305
Lower middle	58,7	40,9	40,6	18,5	8958
Middle	62,8	43,2	39,7	17,2	10.814
Upper middle	68,0	48,1	35,7	16,2	12.556
Top	76,4	57,3	29,1	13,5	14.031

Source: Indonesia Health Survey (SKI) 2023

Table 4 can be seen that the majority of the population aged ≥15 years with hypertension who routinely take medication are 55 - 64 years old at 53,9 %, based on the level of education D1 / D2 / D3 / PT is 59,7 %. According to work is civil servants / TNI / POLRI / BUMN / BUMD with the result of 56,8 %. Based on economic status is the top economy at 57,3%.

Table 5. Simple linear regression statistical test results of the characteristics of patients with hypertension on the regularity of taking antihypertensive drugs

Description	R	R^2	*p* - value
Age	0.958	0.917	0.001*
Education	0.984	0.968	0.000*
Employment	0.870	0.757	0.002*
Eoncomic status	0.956	0.992	0.015*

Table 5 shows that age, education, employment and economic status affect the regularity of taking antihypertensive drugs with *p*-value <0.05.

This study obtained the results of the influence of age on the regularity of taking antihypertensive drugs which is a form of treatment compliance.In previous studies comparing older patients' adherence to their medication based on age, the results have been inconsistent due to the variety of research methodologies used (Chowdhury et al., 2013). However, this study found that the older the age, the higher the likelihood of falling into the non-adherent group. The average age of the participants in this study was 73 years, which falls into a relatively older age group among those aged 65 years or older. According to previous studies, the analysis showed that medication adherence in the older population follows a U-shape, and that non-adherence to medication gradually decreases with age but then increases again after the age of 75 (Burnier et al., 2020). This can be explained by a pattern similar to the findings of this study (Lee et al., 2022). It has been found that the older the individual, the better their adherence to hypertension treatment (Fhon et al., 2024).

Education level factors also affect the regularity of taking antihypertensive drugs. This study is supported by the results of research in China confirming the relationship between educational status and mortality in hypertensive patients from rural areas in China (Yu et al., 2022). Patients with college/university education were found to have significantly higher adherence rates than those with primary or vocational education. Similar significant differences were found between patients with high school education and those with primary education. One can assume that better educated patients are more knowledgeable about their disease and more aware of the need to undergo treatment so they cooperate better with the care team and tend to adhere well to their therapy (Pobrotyn et al., 2023)

The type of work also affects the regularity of taking antihypertensive drugs with a p-value of 0.002. The employment status of hypertensive patients in the elderly affects treatment compliance. Patients who are not working tend to be more compliant than patients who are working. Retired status is associated with better adherence to pharmacologic treatment for hypertension. Previous studies have shown that employees are less likely to adhere to antihypertensive treatment, whereas retirees with hypertension show higher adherence (Fhon et al., 2024). Another study showed that there was an association between employment status and medication adherence with a value of p=0.035 (p < 0.05). Respondents who do not work tend to be more compliant with treatment than respondents who work. This is because respondents who work are more busy so they do not have much time to check themselves at the health center. Respondents who work also take medicine not in accordance with the doctor's recommendations because of the busy activities carried out every day that make respondents forget to take medicine (Rasajati et al., 2015).

The results of statistical tests also obtained the influence of socioeconomic status on the regularity of taking antihypertensive drugs with a p-value of 0.015. the higher the income, the better the compliance with taking medication and vice versa (Adinkrah et al., 2020). Socio-economic factors that influence co-morbid patients' medica tion adherence is their access to health insurance, employment status, cultural beliefs, and social networks. Insufficient insurance coverage can hinder patients' ability to afford prescribed medications, leading to financial barriers (Rohatgi et al., 2021)

The main objectives of health education are to cultivate health-related behaviors and autonomous responsibility, encourage realistic health behavior perception, improve people's self-care ability, promote effective utilization of health facilities, and improve the quality of health care services. These interventions also have a positive effect on the effective prevention of health care. Therefore, the implementation of health education can help people with hypertension to obtain adequate and accurate therapy, increase their knowledge about hypertension, thereby increasing their awareness regarding seeking medical help when symptoms appear.

CONCLUSION

Hypertension treatment education is effective on the regularity of taking medication and control to health care facilities in Indonesia. The characteristics of age, education, employment and socioeconomic status affect the regularity of taking antihypertensive drugs.

DECLARATION OF CONFLICTING INTERESTS

The authors declare that there is no conflict of interest in this research or the publication of this research.

REFERENCES

Adinkrah, E., Bazargan, M., Wisseh, C., & Assari, S. (2020). Adherence to hypertension medications and lifestyle recommendations among underserved african american middle-aged and older adults. *International Journal of Environmental Research and Public Health*, *17*(18), 1–15. https://doi.org/10.3390/ijerph17186538

Andala, S. et al. (2024). Knowledge and acceptance associated with medication adherence among hypertension individuals in Aceh province, Indonesia. *Heliyon*, *10*(7), e29303. https://doi.org/10.1016/j.heliyon.2024.e29303

Bazargan, M., Smith, J., Yazdanshenas, H., Movassaghi, M., Martins, D., & Orum, G. (2017). Non-adherence to medication regimens among older African-American adults. *BMC Geriatrics*, *17*(1), 1–12. https://doi.org/10.1186/s12877-017-0558-5

Burnier, M., Polychronopoulou, E., & Wuerzner, G. (2020). Hypertension and Drug Adherence in the Elderly. *Frontiers in Cardiovascular Medicine*, *7*(April), 1–9. https://doi.org/10.3389/fcvm.2020.00049

Bush, K., Patrick, C., Elliott, K., Morris, M., Tiruneh, Y., & McGaha, P. (2023). Unsung heroes in health education and promotion: How Community Health Workers contribute to hypertension management. *Frontiers in Public Health*, *11*(3). https://doi.org/10.3389/fpubh.2023.1088236

Chen, S., Conwell, Y., Xue, J., Li, L., Zhao, T., Tang, W., Bogner, H., & Dong, H. (2022). Effectiveness of integrated care for older adults with depression and hypertension in rural China: A cluster randomized controlled trial. *PLoS Medicine*, *19*(10). https://doi.org/10.1371/journal.pmed.1004019

Chen, Y., Li, X., Jing, G., Pan, B., Ge, L., Bing, Z. T., Yang, K., & Han, X. (2020). Health education interventions for older adults with hypertension: A systematic review and meta-analysis. *Public Health Nursing*, *37*(3), 461–469. https://doi.org/10.1111/phn.12698

Chowdhury, R., Khan, H., Heydon, E., Shroufi, A., Fahimi, S., Moore, C., Stricker, B., Mendis, S., Hofman, A., Mant, J., & Franco, O. H. (2013). Adherence to cardiovascular therapy: A meta-analysis of prevalence and clinical consequences. *European Heart Journal*, *34*(38), 2940–2948. https://doi.org/10.1093/eurheartj/eht295

Fhon, J. R. S., Gómez-Luján, M. del P., Caetano, G. M., Cáceda-Ñazco, G. S., Santos-Neto, A. P. dos, & Leitón-Espinoza, Z. E. (2024). Factors associated with adherence to antihypertensive agents in the older adult. *Revista Cuidarte*, *15*(2), 1–14. https://doi.org/10.15649/cuidarte.3474

Gruman, J., Rovner, M. H., French, M. E., Jeffress, D., Sofaer, S., Shaller, D., & Prager, D. J. (2010). From patient education to patient engagement: Implications for the field of patient education. *Patient Education and Counseling*, *78*(3), 350–356. https://doi.org/10.1016/j.pec.2010.02.002

Hamrahian, S. M. (2020). Medication Non-adherence: a Major Cause of Resistant Hypertension. *Current Cardiology Reports*, *22*(11), 1–7. https://doi.org/10.1007/s11886-020-01400-3

Kario, K., Okura, A., Hoshide, S., & Mogi, M. (2024). The WHO Global report 2023 on hypertension warning the emerging hypertension burden in globe and its treatment strategy. *Hypertension Research*, *47*(5), 1099–1102. https://doi.org/10.1038/s41440-024-01622-w

Kemenkes. (2019). *Buku pedoman manajemen penyakit tidak menular*. 2.

Kemenkes. (2023). *Survey Kesehatan Indonesia (SKI) Dalanm Angka*.

Khayyat, S. M., Khayyat, S. M. S., Hyat Alhazmi, R. S., Mohamed, M. M. A., & Hadi, M. A. (2017). Predictors of medication adherence and blood pressure control among Saudi hypertensive patients attending primary care clinics: A cross-sectional study. *PLoS ONE*, *12*(1), 1–12. https://doi.org/10.1371/journal.pone.0171255

Lee, S., Jeong, K. H., Lee, S., & Park, H. (2022). A Study on Types of Medication Adherence in Hypertension among Older Patients and Influencing Factors. *Healthcare (Switzerland)*, *10*(11). https://doi.org/10.3390/healthcare10112322

McLean, G., Band, R., Saunderson, K., Hanlon, P., Murray, E., Little, P., Mcmanus, R. J., Yardley, L., & Mair, F. S. (2016). Digital interventions to promote self-management in adults with hypertension systematic review and meta-analysis. *Journal of Hypertension*, *34*(4), 600–612. https://doi.org/10.1097/HJH.0000000000000859

Mills, K. T., Bundy, J. D., Kelly, T. N., Reed, J., Kearney, P., Reynolds, K., Chen, J., & He, J. (2017). Global Disparities. *Physiology & Behavior*, *176*(3), 139–148. https://doi.org/10.1161/CIRCULATIONAHA.115.018912.Global

Pluta, A. et al. (2020). Acceptance of illness and compliance with therapeutic recommendations in patients with hypertension. *International Journal of Environmental Research and Public Health*, *17*(18), 1–14. https://doi.org/10.3390/ijerph17186789

Pobrotyn, P., Chudiak, A., Uchmanowicz, B., Drobnik, J., & Gajda, R. (2023). Adherence problems in elderly patients with hypertension. *Medical Research Journal*, *1*(8), 34–42. https://doi.org/10.5603/mrj.a2023.0004

Rasajati, Q. P., Raharjo, B. B., & Ningrum, D. N. A. (2015). Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Pengobatan Pada Penderita Hipertensi Di Wilayah Kerja Puskesmas Kedungmundu Kota Semarang. *Unnes Journal of Public Health*, *4*(3), 16–23.

Rohatgi, K. W., Humble, S., McQueen, A., Hunleth, J. M., Chang, S. H., Herrick, C. J., & James, A. S. (2021). Medication adherence and characteristics of patients who spend less on basic needs to afford medications. *Journal of the American Board of Family Medicine*, *34*(3), 561–570. https://doi.org/10.3122/JABFM.2021.03.200361

Sci, B. E. (2023). Report on Cardiovascular Health and Diseases in China 2022: an Updated Summary. *Biomedical and Environmental Sciences*, *36*(8), 669–701. https://doi.org/10.3967/bes2023.106

Tebelu et al. (2023). Hypertension self-care practice and its associated factors in Bale Zone, Southeast Ethiopia: A multi-center cross-sectional study. *Journal of Pharmaceutical Policy and Practice*, *16*(1). https://doi.org/10.1186/s40545-022-00508-x

Wang, W., Luan, W., Zhang, Z., & Mei, Y. (2023). Association between medication literacy and medication adherence and the mediating effect of self-efficacy in older people with multimorbidity. *BMC Geriatrics*, *23*(1), 1–9. https://doi.org/10.1186/s12877-023-04072-0

Yu, S., Guo, X., Li, G. X., Yang, H., Zheng, L., & Sun, Y. (2022). Low educational status correlates with a high incidence of mortality among hypertensive subjects from Northeast Rural China. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.951930