



Determinant of Medication Adherence Among Patients with Hypertension: A Cross-Sectional Study

Sri Andala^{1,2}, Hizir Sofyan³(✉), Kartini Hasballah⁴, and Marthoenis⁵

- ¹ Graduate School of Mathematic and Applied Science, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia
- ² STIKes Muhammadiyah Lhokseumawe, Lhokseumawe 24300, Indonesia
- ³ Departement of Statistics, Faculty of Math and Science, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia
Hizir@unsyiah.ac.id
- ⁴ Departement of Farmakologi, Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia
- ⁵ Departement of Psychiatry and Mental Health Nursing, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia

Abstract. Hypertension means the increase of systolic and diastolic blood pressure upper 140 mmHg and 90 mmHg, respectively. Hypertension is a major problem in health that can be caused sudden death in patients. Globally the percentage of adherence towards HTN pharmacological treatment is poor due to the faint nature of the signs and symptoms. This study aims to investigate the factors that can be defined as medication adherence in patients with hypertension, primarily the relation between acceptance and knowledge of disease related to hypertension towards patient adherence. In this study, 429 participants men and women who were diagnosed with essential hypertension voluntarily participate. The number of participants for men was 85 and for women was 344. This study uses the MMA-8, HK-LS, and acceptance of illness scale (AIS) questionnaires. The significance of correlations between variables was analyzed using the Gamma test. The result shows that suggesting a significant correlation with a moderate power between disease acceptance with medication adherence in patients with hypertension.

Keywords: Medication · Adherence · Hypertension

1 Introduction

Hypertension is a major problem of health globally with a serious and detrimental impact because it can cause various complications and even death [1, 2]. Globally 1.39 billion individuals suffer from hypertension, and it is expected to reach 1.56 billion by 2025, of which more than half are in low to middle-income countries [3]. Data from Indonesia in 2018 showed that as many as 8.8% or around 23 million Indonesians suffer from hypertension. In Aceh province, it was recorded that around 9.32% of the population suffered from hypertension based on a doctor's diagnosis [4].

Globally, 46.5% of hypertensive patients are aware of their condition, 36.5% of whom are taking antihypertensive drugs, and only 13.8% of whom have controlled blood pressure [5]. Hypertension control problems are not exclusive to low-income countries but also high-income countries, although there are differences in proportions between high- and low-income countries in awareness (67.0% vs. 37.9%), medication consumption (55.6% vs. 29.0%), and blood pressure control (28.4% vs. 7.7%) as well as improvements and increases in the last decade [5]. The facts previously described indicate that the problem of hypertension lies not only in health resources but also in patient compliance and awareness of treatment.

In many nations, adherence towards HTN pharmacological treatment is poor due to the faint signs and symptoms. The uncontrollable high blood pressure (BP) may lead to the rising prevalence of heart and chronic kidney disease, and also stroke. That is all known as complications of high BP. With poor adherence, patients' benefits from HTN medicines are reduced [6, 7]. Non-compliance may be unintentional (forgetting, for instance) or intentional [8]. Many factors influence intentional nonadherence to hypertension treatments, including poor understanding of hypertension treatment, expensive drug prices thus it less affordable by patients, local beliefs, culture, and social norms, the occurrence of drug side effects, use of complementary drugs, access to health services, levels of education, family support, and motivation. If a treatment plan is to be enhanced, it is imperative to comprehend the factors that affect patient adherence [6, 7]. Previous research has suggested a potential correlation between acceptance and chronic disease outcomes. Given the growing body of evidence linking psychological factors to physical health, investigating the role of acceptance in hypertensive patients presents an intriguing avenue of research with the potential to enhance our understanding of disease management and overall patient well-being [8–10]. The study aims to investigate and determination of the factors that are defining adherence to medication among hypertension patients, primarily the relation between disease acceptance and knowledge related to hypertension to patient adherence.

2 Methods

2.1 Subjects

The study group voluntarily participated by 429 individuals, with a total of men was 85 and women was 344, whose diagnosed with essential hypertension. The study was undertaken at six Community Health Centers in Lhokseumawe, Aceh, Indonesia, from March 2022 to April 2022. In this study, the participants belonging to the inclusion criteria are as follows: individuals aged < 45 years old, individuals diagnosed with essential hypertension with blood pressure measurement of > 140/90 mmHg, and voluntary participation consent. The exclusion criteria for this study were individuals who were diagnosed with secondary hypertension, individuals with emergent hypertension with a blood pressure of \geq 180 mmHg, and individuals with a history of cerebrovascular and cardiovascular complications (heart failure, stroke, transient ischemic attack, coronary heart disease).

2.2 Instruments

The study was conducted using a validated questionnaire to assess adherence to medication, hypertension knowledge, and disease acceptance.

Hypertension Knowledge. This study used the hypertension knowledge–level scale (HK-LS) to determine the extent of hypertension knowledge of the subjects. This questionnaire contains 22 items that assess the subject’s knowledge regarding the definition of hypertension medication. Each correct answer was given 1 point with a maximum score of 22 [12]. Scores <17 were interpreted as low hypertension knowledge, and scores > 17 were interpreted as high hypertension knowledge [12].

Adherence. To determine the subjects’ adherence to antihypertensive medication, the Morisky medication adherence scale (MMAS-8) was applied. This questionnaire contains eight items that assess adherence. A score below 6 points (< 6 points) designates drug compliance at a low level, a score range within 6 < 8 points designates drug compliance at a moderate level, and a score of 8 points designates adherence and compliance at a high level [13].

Disease Acceptance. To determine the patients’ acceptance of hypertension level, the Acceptance of Illness Scale (AIS) was used [14]. There are 8 points in this scale that describe the consequences of poor health and their current condition was reported in a five-point scale. Where a score < 20 points were considered low, 20–30 was considered moderate, and > 30 points were considered high [14].

2.3 Statistical Analysis

IBM SPSS Statistics 24 was used as statistical analysis in this study. Data of demographic and baseline were representative of the population size (n) and percentage (%). The correlations between variables used in this study were analyzed using the Gamma coefficient correlation test at $p < 0.05$.

Study protocol. The Ethics Committee approved this research of the Faculty of Nursing, Syiah Kuala University (approval letter No. 113020301221). All participants in this study gave written consent and voluntarily participated.

3 Result and Discussion

In this study, 429 participants were interviewed and assessed. The response rate of participants is 100%. The respondent’s mean age was 56,7 years and the standard deviation (SD) was ± 10.60 . The study population comprised 85 men (19,8%) and 344 women (80,2%). The respondent predominantly was within the 56–65 years age group (34,3%), followed by the 46–55 years age group (31,9%) and > 65 years age group (21,9%), respectively. Almost half of the respondents (47,1%) had finished high school, followed by junior high (36,8%), elementary (11,2%), and college (4,9%), respectively. These results concur with prior studies from Alkhamis et al. and Mekonnen et al., who reported that the participant’s average age was $53 \pm 12,4$ years and $54,5 \pm 13,5$ years [15, 16]. The general characteristics of the study group are presented in Table 1.

3.1 General Characteristics of the Study Population

The adherence level of respondents was predominantly moderate (76%), followed by low (12,1%) and high (11,9%) in close range. Contrary to these results, the previous study by Alsofyani et al. Mekonnen et al. and Tilea et al. reported a high level of adherence in their study with the proportion of 86,1%, 67%, and 69,8%, respectively [7, 16, 17]. The rate of adherence in this study was lower than that reported in previous studies. It is suggested that the rates are lower because our study was conducted in the primary care

Table 1. The General Characteristics of The Study Population

Category	Frequency (n)	Percent (%)
Gender		
Male	85	19,8
Female	344	80,2
Age		
< 45	51	11,9
46–55	137	31,9
56–65	147	34,3
> 65	94	21,9
Education		
Elementary	48	11,2
Junior High School	158	36,8
High School	202	47,1
College	21	4,9
Acceptance		
Low	134	31,2
Moderate	263	61,3
High	32	7,5
Adherence		
Low	52	12,1
Moderate	326	76,0
High	51	11,9
Hypertension Knowledge		
Low	314	73,2
High	115	26,8
Total	429	100.0

center, compared to the previous study, which was conducted in secondary or tertiary hospitals of developed countries that enrolled participants with relatively higher income and education status, demographic differences and access to the health care facilities could also account for a lower adherence rate in this study [6, 7, 16, 17].

Over half of the respondents had a low level of hypertension knowledge (73,2%) despite a majority of respondents having high school as their educational background. The majority of subjects had moderate acceptance of the disease (61,3%), and only a minority of respondents had high acceptance of the disease (Table. 2) (7,5%).

Most respondents were in the moderate compliance group, namely 201 moderate adherence respondents in the moderate disease acceptance category and 240 moderate adherence respondents in the low hypertension knowledge category. Based on statistical tests using the Gamma Correlation Coefficient, the p -value = 0.001 ($p < 0.05$) was observed between disease acceptance and medication adherence with a correlation coefficient value of 0.316, suggesting a significant correlation with a moderate power between disease acceptance with medication adherence in patients with hypertension. These results were in line with previous publications reporting that a significant and positive association was determined between acceptance of the illness and adherence to medication in patients with chronic diseases [18].

Each person has a unique perspective on the disease, its somatic side effects, resulting dysfunction, and associated issues.[19–21] This attitude is mainly influenced and directed by a person's character qualities and sickness. Denial, underestimating, acceptance, or overestimating the condition are all common reactions to a diagnosis. A higher level of sickness acceptance is linked to better coping with the condition and reduced psychological distress in patients who embrace their illness and self-motivate themselves to engage in therapy [19–21]. Despite the many hazards, limitations, and issues related to health loss, acceptance of the illness allows people to function regularly [19–21]. Patients can exercise sufficient self-control and can engage in health-promoting actions to enhance their quality of life and longevity because they are aware of the origins of their illness, its effects, and any potential complications, resulting in high levels of medication adherence [19–21].

On the other side, the p -value = 0.138 ($p > 0.05$) was observed between hypertension knowledge and medication adherence, suggesting no significant correlation between hypertension knowledge with adherence to medication in patients with hypertension. This result differs from the previous study in Indonesia that reports there is a significant association between knowledge and medication adherence in patients with essential hypertension, where respondents with a high level of knowledge tend to be more obedient than respondents with a moderate and low level of knowledge [22]. The basis of the difference in results may be attributed to the different classifications of adherence used to assess the patients. In our study, we divided adherence into three categories (poor, moderate, and high adherence), while in another study, it was divided into two categories (non-compliance and compliance).

A separate analysis of demographic characteristics also showed no significant correlation between age, gender, and educational background to medication adherence (p -value of 0.518, 0,376, and 0.731, respectively). These findings are in line with Nashinongo et al. and Al-Sofyani et al. study which reports that no correlation was

Table 2. Relationship between adherence to treatment and various characteristics among hypertensive patients

Category	Adherence			Total	P-Value
	Low	Moderate	High		
Age					
< 45	5	43	3	51	0,518
45–55	13	106	18	137	
56–65	19	109	19	147	
> 65	15	68	11	94	
Total	52	326	51	429	
Gender					
Male	14	61	10	85	0,376
Female	38	265	41	344	
Total	52	326	51	51	
Education					
Elementary	3	39	6	48	0,731
Junior High	25	116	17	158	
High School	21	155	26	202	
College	3	16	2	21	
Total	52	326	51	429	
Acceptance					
Low	23	101	10	134	0,001
Moderate	28	201	34	263	
High	1	24	7	32	
Total	52	326	51	429	
Hypertension Knowledge					
Low	34	240	40	314	0,138
High	18	86	11	115	
Total	52	326	51	429	

found between hypertension patients with sociodemographic characteristics for example sexuality or gender, educational level, or employment status, and adherence to anti-hypertensive medication. There is also reported that no correlation was found between adherence and any chronic comorbidities [7, 23]. Whereas, according to Halim et al. there is a significance of correlation between age and gender in the patient’s adherence [24]. The obtained results were different owing to the different classifications of age and adherence. In our study, we divided adherence into three categories (poor, moderate,

and high adherence), while in another study, it was divided into two categories (non-compliance and compliance). Nevertheless, compared to younger patients who typically have obligations linked to their jobs and other responsibilities, this age group has a higher medication adherence due to the presence of a caregiver who assisted them in helping and remind for taking their pills [24].

It was observed in this study that there is a substantial correlation between disease acceptance and following through in patients with hypertension. These findings undermine the importance of focusing on disease acceptance as a crucial aspect of hypertension management in enhancing treatment adherence. Several strategies reported by prior studies, for example, acceptance and commitment therapy (ACT) or other measures like social support, have the potential to better manage disease acceptance [25, 26]. However, determining the optimal methods of choice requires further exploration and rigorous clinical trials to determine their effectiveness in this context.

There were several limitations to this study. First, our study design is cross-sectional, which is vulnerable to bias, specifically recall bias. Second, other confounding factors than demographic characteristics that were not workable to collect in our study may influence the adherence to the medication. This study has several strengths. First, a large of participants are included in this study. As a result, our study's findings seem noteworthy. Second, participants of this study were recruited from various facilities in the region. To our knowledge, no prior studies have been conducted in this population, highlighting the dearth of research exploring the correlation within this unique demographic group. The results of the current study can be used in a family medicine therapeutic setting.

4 Conclusion

Correlation analysis shows a correlation between disease acceptance and adherence to medication in patients with hypertension and an influence on adherence to pharmacological treatment. There were no correlations between patients' knowledge of hypertension and sociodemographic characteristics, including gender and educational level to the adherence to antihypertensive medication. It is advised that healthcare practitioners evaluate the medication adherence of hypertension patients and identify the root causes should non-adherence are found. Hypertension patients should receive regular counseling and health education during their routine follow-ups. This is the first study to investigate the prevalence of medication adherence, disease acceptance, and hypertension knowledge in the Lhokseumawe Regency, Aceh Province, Indonesia.

Acknowledgements. This research was supported by the Directorate of Higher Education of the Ministry of Research Technology and Higher Education Republic of Indonesia.

References

1. Adogu, P.O.U., Ubajaka, C.F., Emelumadu, O. F.: Epidemiologic Transition of Diseases and Health-Related Events in Developing Countries: A Review. *Am. J. Med. Med. Sci.* 150–157 (2015).

2. Andala S.: Tugas kesehatan keluarga mengenal diet hipertensi pada lansia. *J. Ilmu Keperawatan* 2(1),91–99 (2015).
3. Unger, T., et al: 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension* 75(6), 1334–1357 (2020).
4. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI.: Hasil Riset Kesehatan Dasar tahun 2018. (2018).
5. Mills, K. T. et al.: Global Disparities of Hypertension Prevalence and Control: A Systematic Analysis of Population-Based Studies From 90 Countries. *Circulation* 134(6), 441–50 (2016).
6. Choi, H. Y., et al.: Factors Affecting Adherence to Antihypertensive Medication. *Korean J. Fam. Med* 39(6), 325–332 (2018).
7. Alsifyani, M. A., Aloufi, A. O., Al Qhtani, N. S., Bamansour, S. O., Almathkori, R. S.: Factors related to treatment adherence among hypertensive patients: A cross-sectional study in primary healthcare centers in Taif city. *jfcm*, (2022).
8. Jankowska-Polańska, B., Kasprzyk, M., Chudiak, A., Uchmanowicz, I.: Relation between Illness Acceptance and Quality of Life in Patients with Chronic Obstructive Pulmonary Disease (COPD). *Adv Respir Med* 84(1), 3–10 (2015).
9. Wilski, M., Gabryelski, J., Broła, W., Tomasz, T.: Health-related quality of life in multiple sclerosis: Links to acceptance, coping strategies and disease severity. *Disabil Health J* 12(4), 608–614 (2019).
10. Pluta, A., Sulikowska, B., Manitius, J., Posieczek, Z., Marzec, A., Morisky, D. E.: Acceptance of Illness and Compliance with Therapeutic Recommendations in Patients with Hypertension. *Int J Environ Res Public Health* 17(18), 6789 (2020).
11. Ramadlan, E., Setyawati, I., Aisah, D., Pawestri, S.: Factors affecting medication adherence in hypertension patients: A literature review. *Bali Med. J* 10(3),1364–1370 (2021).
12. Erkoç, S. B., Isikli, B., Metintas, S., Kalyoncu, C.: Hypertension knowledge-level scale (HK-LS): A study on development, validity and reliability. *Int. J. Environ. Res. Public Health* 9(3), 1018–1029 (2012).
13. Morisky, D. E., DiMatteo, M. R.: Improving the measurement of self-reported medication nonadherence: response to authors. *J. Clin. Epidemiol* 64(3), 255–7 (2011).
14. Leong, W. C., Azmi, N. A., Wee, L. H., Rajah, H. D. A., Chan C. M. H.: Validation and reliability of the Bahasa Malaysia language version of the Acceptance of Illness Scale among Malaysian patients with cancer. *PLoS One* 16(9), (2021).
15. Alkhamis, A. M., Alsalman, A. J., Al Khamis, M., Alkhamis, A., Alotaibi, N. M.: Prevalence of Nonadherence to Antihypertensive Medications among Adults Attending Primary Healthcare Clinics in Al-Hasa Region: A Cross-Sectional Study. *Dr. Sulaiman Al Habib Med. J* 1(1–2), 36 (2019).
16. Mekonnen, H. S., Gebrie, M. H., Eyasu, K. H., Gelagay, A. A.: Drug adherence for antihypertensive medications and its determinants among adult hypertensive patients attending in chronic clinics of referral hospitals in Northwest Ethiopia. *BMC Pharmacol Toxicol* 18(1), 27 (2017).
17. Tilea, I., Petra, D., Voidazan, S., Ardeleanu, E., Varga, A.: Treatment adherence among adult hypertensive patients: a cross-sectional retrospective study in primary care in Romania. *Patient Prefer Adherence* 12, 625–635 (2018).
18. Turen, S., Yilmaz, R. A., Gundogdu, S.: The Relationship with Acceptance of Illness and Medication Adherence in Type 2 Diabetes Mellitus Patients. *Int. J. Caring Sci* 14(3), 1824 (2021).
19. Jankowiak, B., Kowalewska, B., Krajewska-Kułak, E., Milewski, R., Turosz, M. A.: Illness acceptance as the measure of the quality of life in moderate psoriasis. *Clin. Cosmet. Investig. Dermatol* 14, 1139–1147 (2021).

20. Pluta, A., Sulikowska, B., Manitus, J., Posieczek, Z., Marzec, A., Morisky, D. E.: Acceptance of Illness and Compliance with Therapeutic Recommendations in Patients with Hypertension. *Int. J. Environ. Res. Public Health* 17(18), 6789 (2020).
21. Collet, J. P., et al.: 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. *Eur. Heart J* 42(14), 1289–1367 (2021).
22. Septyadina, U., Gunawan, S.: The Relationship Between Knowledge and Medication Adherence in Diabetes Mellitus Patients in Toboali Hospital, South Bangka Selatan,” vol. 41, no. Ticmih, pp. 73–77, (2021).
23. Nashilongo, M., et al.: Assessing Adherence to Antihypertensive Therapy in Primary Health Care in Namibia: Findings and Implications. *Cardiovasc. Drugs Ther.* 31(5–6), 565–578 (2017).
24. Abdelhalim, H. N., Zahrani, A. I., Shuaibi, A. M.: Factors affecting treatment compliance of patients on antihypertensive therapy at National Guard Health Affairs (NGHA) Dammam Primary Health Care Clinics (PHCC). *J. Fam. Community Med* 26(3), 168–172 (2019).
25. Kostova, Z., Caiata-Zufferey, M., Schulz, P. J.: The impact of social support on the acceptance process among RA patients: A qualitative study. *Psychol Health* 29(11), 1283–1302 (2014).
26. Graham, C. D., Gouick, J., Krahé, C., Gillanders, D.: A systematic review of the use of Acceptance and Commitment Therapy (ACT) in chronic disease and long-term conditions. *Clin Psychol Rev* 46, 46–58 (2016).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

