Systematic Review: Factors Affecting Treatment Adherence of Elderly Hypertension Patients

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Abstract: Hypertension remains a significant public health problem, contributing to the onset of cardiovascular disease, stroke, and premature death. Medication adherence is a real support for the treatment success. However, it is often neglected in older people and will have a negative impact on their condition.This study aims to identify what factors are associated with treatment compliance of elderly hypertensive patients based on empirical studies in the last five years. This type of research uses a systematic review method and reference sources derived from research journals sourced from three databases namely Google Scholar, PubMed and ResearchGate from 2019 to 2024. Of the 331 journals identified, 16 journals were included in the synthesis data. The convergent integrated analysis framework suggested by Joanna Briggs Institute (JBI) for systematic reviews was adopted for the data synthesis of the included studies Adherence to hypertension treatment in the elderly is influenced by multi-factors with different variations between settings and individual characteristics. Several factors were identified, namely modifiable factors ((1) social and economic related factors: Education, income, occupation, (2) factors related to health workers and systems: support from health workers, (3) factors related to patient therapy: duration of treatment, number of drugs and motivation for treatment, (4) factors related to patient's disease: depressive symptoms and weight management, (5) patient-related factors: family support, health insurance, living environment, attitude, knowledge, intention, benefits, (6) factors related to disease management: counseling and community-based health programs and non-modifiable factors (factors related to patient's disease: duration of suffering, comorbidities and history of stroke, and patient-related factors: age).This research is limited to the study of correlation studies (majority cross-sectional) so in the future more comprehensive research is needed to be related to the analysis of factors related to hypertension treatment compliance. Qualitative study designs can be added (mixed-method) to produce more in-depth analysis results.

Keywords: Influencing factors, Adherence, Hypertension, Elderly

INTRODUCTION

Indonesia is beginning to be faced with an aging population structure. The elderly population has increased from 4.5 percent to 9.9 percent and is projected to continue to increase to one-fifth of the total population of Indonesia by 2045. The province with the highest number of elderly people is Yogyakarta (16.69 percent) then East Java and Central Java (Badan Pusat Statistik, 2023)

Indonesia is trying to improve its status as a developed country with the main goal of becoming a "Golden Indonesia 2045", but the increase in the overall elderly population may be a problem in the future. If it is predicted and prepared well, then this will not be a burden. Contrarily, it can be a driving force for the achievement of the second demographic bonus that supports Indonesia's goal of becoming a developed country.

Elderly people experience changes in the cardiovascular system that can be caused by the weakening of the body's cells and decreased immunity making them more susceptible to diseases such as high blood pressure. Hypertension is the disease with the largest risk factors in Southeast Asia, East Asia, and Oceania. The best attempt to overcome this problem is blood pressure measurement. Indonesia found that of the 69,307 people tested in 2017, 34.5% had high blood pressure, 20% did not receive treatment, and 63% of those on antihypertensive treatment showed uncontrolled blood pressure. One of the most common chronic diseases in the elderly is hypertension (Turana et al., 2020).

Hypertension remains a significant public health problem, contributing to the onset of cardiovascular disease, stroke, and premature death. According to the report, only 54% of adults with hypertension are diagnosed, 42% receive treatment, and only 21% of hypertension is controlled. These statistics underscore the need to increase awareness and management of hypertension. Looking at the situation by region, the percentage of adults with hypertension in 2019 decreased in the WHO European region compared to 1990, but increased in the Asian region, particularly in the WHO Western Pacific Region (from 24% to 28%; including countries such as Australia, New Zealand, China, the Republic of Korea, the Philippines, Malaysia, Vietnam, and Japan) and in the WHO Southeast Asia region (from 29% to 32%; including countries such as India, Nepal, Indonesia, and Thailand)(Kario et al., 2024).

Based on Riskesdas 2018, the prevalence of hypertension based on the results of measurements in the population aged ≥18 years is 34.1%, the highest in South Kalimantan (44.1%), while the lowest in Papua is (22.2%). Hypertension occurs in the age group of 31-44 years (31.6%), age 45-54 years (45.3%) and age 55-64 years (55.2%). From the prevalence of hypertension of 34.1%, it is known that 8.8% are diagnosed with hypertension and 13.3% of people diagnosed with hypertension do not take medication and 32.3% do not regularly take medication. This shows that most people with Hypertension do not know that they are Hypertension so they do not get treatment. For hypertensive patients,

patient compliance in taking medication regularly is very important to control blood pressure. In addition, adherence is also a real support for the success of treatment. If the patient does not comply with taking medication, it may have a negative effect on his condition. In addition, the number of illnesses, deaths, and deaths (Cahyani, 2018). Hypertension still accounts for the largest proportion of non-communicable diseases in Central Java, which is 76.5%(Badan Pusat Statitik Provinsi Jawa Tengah, 2022) and based on the report of the Surakarta City Health Office in July 2024 regarding the number of elderly hypertension sufferers, the initial survey data was 27,467 people.

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 and the development of severe complications and morbidity that can impact the 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 show higher adherence in the age groups of 65-69 years (26.6%) and 60-64 years (23.1%) (Chen et al., 2022)

Adherence to hypertension treatment has many aspects and is determined by various interacting factors. Given this, researchers are interested in studying the factors that influence treatment adherence in elderly hypertension patients.

METHOD

This type of research uses a systematic review method and reference sources derived from journals. The process of searching for journals to get the final selected journal was carried out with the following steps: In the literature search method, we combined several keywords based on the research question: (a) hypertension ;(b) treatment; (c) adherence and (d) elderly.We also combined some keywords with the conjunction AND. We screened for duplicate titles and then identified whether the abstract met the study's inclusion criteria. We used the following inclusion criteria in our literature search strategy: (a) Population: Included studies were those that sampled older adults who were older than 60 years or whose average sample size was older than 60 years. (b) Intervention : Both interventional and non-interventional studies were included in the inclusion criteria. (c) Comparation: Medication adherence is one of the outcome measures (d) Outcomes

:Studies that have analysed the determinants of medication adherence in the elderly with high blood pressure.We used the following exclusion criteria in our literature search strategy: studies published before 2019 and studies not full text.

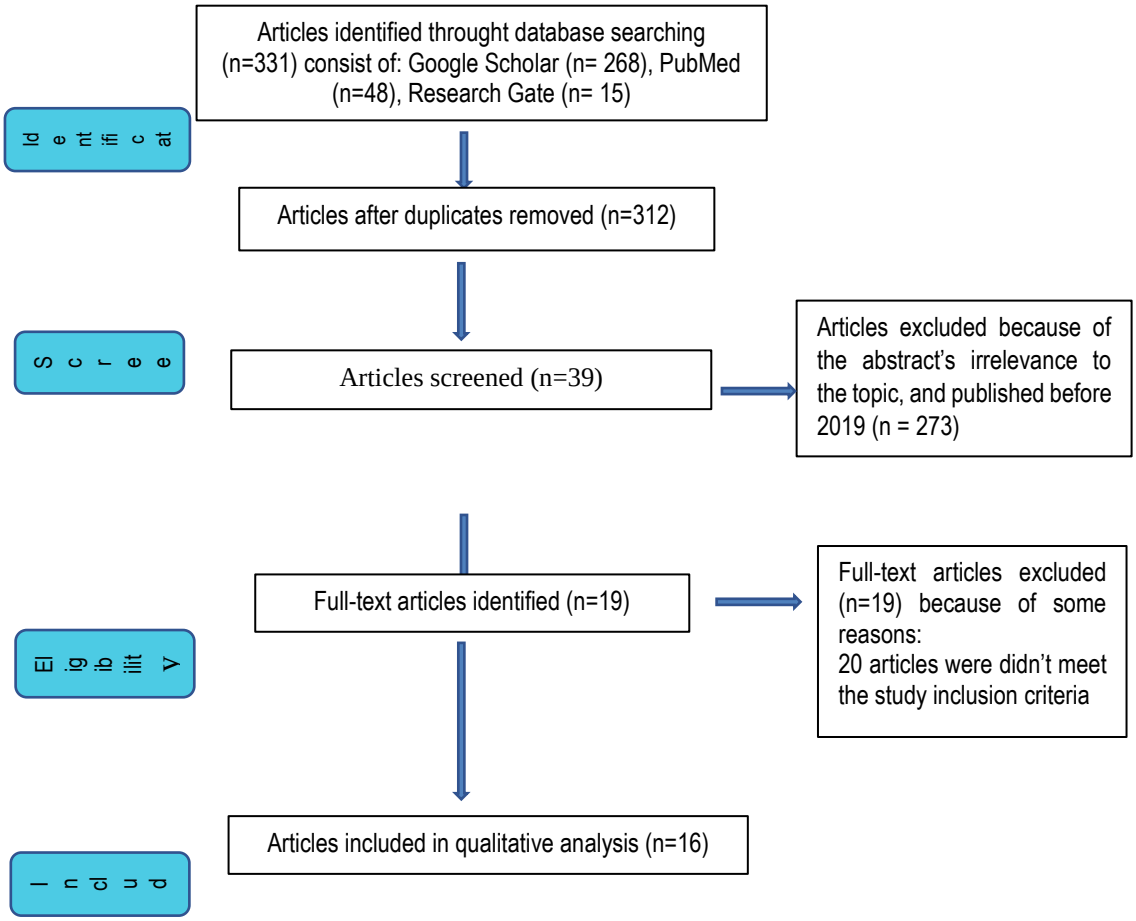


Figure 1 PRISMA flowchart showing the search and selection of studies

The convergent integrated analysis framework suggested by Joanna Briggs Institute (JBI) for systematic reviews was adopted for the data synthesis of the included studies (Institute, 2020).

RESULTS

The search results show that there are 331 studies from 3 databases (Google Scholar, PubMed, and Research Gate) based on the keywords used. The breakdown of the search results is as follows: Google Scholar (n=268), PubMed (n=48), and Research Gate (n=15). The screening

process resulted in 312 research articles that met inclusion criteria. Of these, 19 articles passed to the full-text screening stage for additional analysis. Finally, 16 research articles were selected that met the inclusion criteria and were further analysed in this review. The PRISMA screening process is shown in Figure 1. The results of the literature review can be observed in the following table:

Table 1. Characteristics of articles of literature findings

No	Author	Year	Research Type	Research Location	Research subject	Measurement tools
1	(Siswati et al., 2023)	2023	Cross sectional.	Jombang Indonesia	54	Questionnaire
2	(Dolo et al., 2021)	2021	Cross sectional	Palu Indonesia	100	Questionnaire, tensimeter and stetoskop.
3	(Alam & Jama, 2020)	2020	kualitatif	Makassar Indonesia	21	interview, observation, and documentation methods.
4	(Hoai Thuong et al., 2022)	2022	Cross sectional.	Vietnam	537	1. Medication adherence: morisky medication adherence scale 2. Non-pharmacological compliance with ministry of health guidelines
5	(Lee et al., 2022)	2022	Cross sectional	Tiongkok	5175	China Health and Retirement Longitudinal Study (CHARLS) data,
6	(Son et al., 2019)	2019	Case control	Korea Selatan	2300	Korea Health Panel 2020 Data (Version 2.0.1)
7	(Fhon et al., 2024)	2024	Cross sectional	La LibertadPeru	324	Forms
8	(Sheilini et al., 2022)	2022	Cross sectional	Karmataka India	800	Demographic proforma, clinical proforma and Morisky Medication

No	Author	Year	Research Type	Research Location	Research subject	Measurement tools
						Adherence Scale (MMAS-8)
9	(Pobrotyn et al., 2023)	2023	Cross sectional	Polandia	100	WHOQOL-AGE , GDS dan ACDS
10	(Adinkrah et al., 2020)	2020	Cross sectional	Los Angeles	338	Blood Pressure Self-Care Scalean
11	(Gusty et al., 2022)	2022	Cross sectional	Padang Indonesia	383	hypertension knowledge level scale
12	(Zhang et al., 2020)	2020	Analitik	Hubei Cina	212	Survey instrument
13	(Theofilou, 2022)	2022	Cross sectional	Yunani	73	SEAMS
14	(Liu et al., 2023)	2023	Analitik	Tiongkok	5175	Survey Studi CHARLS
15	(Visuddho et al., 2023)	2023	Cross sectional	Malang Indonesia	37	Questionnaire MMAS-8
16	(Pan et al., 2023)	2023	Cross sectional	Nanchong Tiongkok	400	Questionnaire

Most of the studies applied a cross-sectional study design to identify the relationship between variables, namely factors that influence the treatment of hypertension patients in the elderly, with a total of (n = 14) or 87.50%. Six studies identified were conducted in health services and 10 studies were conducted in the community.

Generally, adherence is described as the behaviour by which a patient takes medication, follows instructions, and/or changes his or her lifestyle (Brown et al., 2016). However, the definition of adherence in each study was determined based on the limitations of the adherence measurement scale implemented. Most studies utilised sociodemographic and socioeconomic predictors believed to influence medication adherence in older adults with hypertension. These factors were identified through questionnaires developed by each researcher.

Factors Related to Treatment Adherence of Elderly Hypertension Patients

This review shows that hypertension treatment adherence in the elderly is influenced by various factors, including: Social and economic factors (education level, income, and occupation), factors related to health workers and systems (support from health workers), factors related to patient therapy (duration of treatment, number of drugs, and motivation to seek treatment), factors related to the patient's disease (length of time suffering from hypertension, having comorbidities, depressive symptoms, history of stroke, chronic, physical activity and weight control), factors

related to the patient's disease (history of stroke, chronic, physical activity and weight control), history of stroke, chronicity, physical activity and weight management), patient-related factors (family support, having health insurance, age, living environment, perception of health, lifestyle, attitude, knowledge, intention and perceived benefits), factors related to disease management (counselling and community-based health programmes).

These results support previous research suggesting that factors influencing adherence in one region and for a particular disease may differ from those in another region and disease. Differences in environmental conditions, sociodemographic and socioeconomic circumstances, along with local cultural influences, may be contributing factors (Onigbogi, 2019).

Table 4.2. Factors Affecting Treatment Adherence of Elderly Hypertension Patients

No	Author	Affected Factor (p-value)	Unaffected Factor (p-value)
1	(Siswati et al., 2023)	Health worker support (0.045)	1. Knowledge (0.228) 2.Experience (0.140) 3.Family Support (0.910) 4.Affordability of Health Services (0.269)
2	(Dolo et al., 2021)	Family Support (0.018)	1. Age (0.597) 2. Gender (0.622) 3. Education (0.576) 4. Occupation (0.117) 5. Knowledge (0.999) 6. Affordability of health services (0.207) 7. Role of health workers (1.000)
3	(Alam & Jama, 2020)	Knowledge Family support Motivation for treatment Role of health workers	
4	(Hoai Thuong et al., 2022)	1. Duration of Hypertension (0.004) 2. Co-morbidities (0.050) 3. Health Insurance (0.001)	Gender (0.137)
5	(Lee et al., 2022)	1. Age (0.004) 2. Living Environment (0.005) 3. Depressive Symptoms (0.009)	Gender (0.179)
6	(Son et al., 2019)	Community-based health programmes (0.015)	
7	(Fhon et al., 2024)	1. Age (0.006) 2. Employment status (0.03) 3. Stroke history (0.01) 4. Depression Symptoms (0.01)	1. Gender (0.77) 2. Marital Status (0.28) 3. Education (0.10) 4. Living alone (0.84) 5. Smoking (0.14)

No	Author	Affected Factor (p-value)	Unaffected Factor (p-value)
			6. Alcohol (0.35)
8	(Sheilini et al., 2022)	Number of drugs (0.024)	1. Age (0.688) 2. Gender (0.892) 3. Education (0.220) 4. Occupation (0.234) 5. Family Type (0.693) 6. Living with a Partner (0.473) 7. Income (0.570) 8. Insurance (0.142) 9. Medical Expenses (0.175) 10. Duration of treatment (0.253) 11. Comorbidities (0.217
9	(Pobrotyn et al., 2023)	1. Education (0.021) 2. Income (0.038)	1. Gender (0.35) 2. Place of Residence (0.224) 3. Married Status (0.195) 4. Living with Family (0.109) 5. Comorbidities (0.07) 6. Weight (0.125)
10	(Adinkrah et al., 2020)	1. Age (0.007) 2. Education (0.015) 3. Depression Symptoms (0.003)	1. Gender (0.219) 2. Place of residence (-0.059) 3. Finance (- 0, 097) 4. Care (0.100)
11	(Gusty et al., 2022)	1. Physical Activity (0.000) 2. Weight Prevention (0.000)	1. Medicine (0.705) 2. Diet (0.098)
12	(Zhang et al., 2020)	1. Lifestyle (0.000) 2. Medication (0.003) 3. Attitude (0.001	1. Gender (0.891) 2. Age (0.277) 3. Income (0.828) 4. Physical Health (0.597) 5. Mental Health (0.532)
13	(Theofilou, 2022)	1. Age (0.000) 2. Duration of Hypertension (0.016) 3. Years since diagnosis (0.000)	1. Gender (0.332) 2. Education (0.152) 3. Marital Status (0.349)
14	(Liu et al., 2023)	Health Education	
15	(Visuddho et al., 2023)	1. Duration of Hypertension (0.010) 2. Hypertension Knowledge (0.018) 3. Attitude (0.021)	1. Age (0.241) 2. Education (0.626) 3. Insurance (0.933)
16	(Pan et al., 2023)	1. Behavioural Intention (0.001) 2. Perceived Benefits (0.001)	1. Attitude (0.353) 2. Vulnerability (0.201) 3. Severity (0.150)

DISCUSSION

Table 2 shows that medication adherence in older people with hypertension is multifactorial and complex. All domains of adherence outlined by the WHO were commonly found in most studies (Onigbogi, 2019). However, this generalisation needs to be done with caution as most studies used varying definitions of adherence. In the WHO guidelines, factors related to medication adherence in older adults with hypertension do not appear as independent factors, but are related to other factor domains, as can be observed in table 3.

Table 3 Categories of Factors Affecting Compliance of Elderly Hypertension Patients

No	Categories of medication adherence factors according to WHO	Factors affecting treatment adherence of elderly hypertensive patients (p-value)	Author
1	Socio-economic Related Factors	1. Education (0.021)(0.015)	((Pobrotyn et al., 2023); (Adinkrah et al., 2020)
		2. Income (0.038)	(Pobrotyn et al., 2023)
		3. Employment status (0.03)	(Fhon et al., 2024)
2	Factors related to health workers and systems	Healthcare Worker Support (0.045)	((Siswati et al., 2023); (Alam & Jama, 2020)
3	Factors related to patient therapy	1. Year of starting treatment (0.016)(0.03)	((Theofilou, 2022); (Zhang et al., 2020)
		2. Number of Drugs (0.024)	(Sheilini et al., 2022)
		3. Motivation for treatment	(Alam & Jama, 2020)
4	Factors related to the patient's illness	1. Duration of Hypertension (0.004)(0.010)(0.000)	(Hoai Thuong et al., 2022); (Visuddho et al., 2023); (Theofilou, 2022)
		2. Co-morbidities (0.050)	(Hoai Thuong et al., 2022)
		3. Depressive Symptoms (0.049) (0.01)(0.003)	((Lee et al., 2022); (Fhon et al., 2024); (Adinkrah et al., 2020)
		4. Stroke History(0.01)	(Fhon et al., 2024)
		5. Weight Prevention(0.000)	(Gusty et al., 2022)
5		1. Family support (0,018)	(Dolo et al., 2021)

	Factors Related to the Patient	2.	Health insurance (0,001)	(Hoai Thuong et al., 2022)
		3.	Age (0,007) (0,006) (0,004)	(Adinkrah et al., 2020); (Lee et al., 2022): (Fhon et al., 2024)
		4.	Living Environment (0,005)	(Lee et al., 2022)
		5.	Attitude (0,021)	(Visuddho et al., 2023)
		6.	Hypertension knowledge (0,018)	(Visuddho et al., 2023)
		7.	Behavioural intention (0.001)	(Pan et al., 2023)
		8.	Perceive benefits (0.001)	(Pan et al., 2023)
6	Factors related to disease management	1.	Health education	(Liu et al., 2023)
		2.	Community based health programmes (0.015)	(Son et al., 2019)

Based on the table above, the factors that influence medication adherence in elderly people with hypertension can be grouped as follows:

Socio-economic Related Factors

In several studies on the determinants of adherence, there are factors related to social and economic aspects. Social and economic factors that influence medication adherence in elderly people with hypertension were found in four studies (Table 3). These factors include education level, income, and employment status.

Education was investigated in seven studies; however, only two of these studies identified a significant impact of this factor on medication adherence among older adults with hypertension (Pobrotyn et al., 2023);(Adinkrah et al., 2020). 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). This is supported by a study with a sample of 220 patients aged 60 years and above and found a similar relationship between adherence and education (Okuno et al., 2001).

The income factor was examined in four studies, but only one study revealed that this factor has a positive and significant effect on medication adherence in elderly people with hypertension (Pobrotyn et al., 2023). The higher the income, the better the compliance with taking medication, and vice versa (Adinkrah et al., 2020).

Employment status was investigated in three studies, one of which found that employment status in older people with hypertension can affect medication adherence. Patients who were not

working tended to be more adherent than those who were employed. Retired status was associated with better adherence to pharmacological 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 an association between employment status and medication adherence, reporting a p-value of 0.035 ($p < 0.05$). Respondents who did not work tended to be more compliant with their treatment than those who worked. This is due to the busy schedules of respondents who work, thus limiting their time to visit the health centre for examination. In addition, working respondents often do not follow the doctor's treatment instructions due to their busy daily routines, causing them to forget to take their medication (Rasajati et al., 2015).

Factors related to health workers and systems

There is relatively limited research focusing on health workforce and health system factors compared to other factors. In this review, three studies were identified that addressed factors related to health workers. Of these, two studies stated the effect of health worker support on treatment compliance in elderly people with hypertension (Siswati et al., 2023); (Alam & Jama, 2020), while one study showed no effect of health worker support on treatment compliance in elderly people with hypertension (Dolo et al., 2021).

The factor that greatly influences compliance is the support of health workers with a p-value = 0.045. Health workers are an important part of the treatment process; their presence alone can provide peace of mind for patients. Any words from health workers can serve as medicine, as they can provide positive suggestions. Therefore, health workers need to continue to improve their ability to communicate therapeutically with patients (Siswati et al., 2023).

Factors related to patient therapy

Patient therapy-focussed factors were examined in seven studies, and four of them revealed significant associations with medication adherence in elderly people with hypertension. These factors were the length of treatment, number of drugs and motivation to treat. (Theofilou, 2022)(Zhang et al., 2020)(Sheilini et al., 2022) (Alam & Jama, 2020)

Factor duration of treatment was examined by four studies with details of two studies there was an influence (Theofilou, 2022)(Zhang et al., 2020) while the other two studies found no effect of length of treatment on treatment compliance for elderly hypertensive patients (Sheilini et al., 2022)(Gusty et al., 2022).Disease and length of treatment are other factors that can affect adherence. In this study, the disease, as well as the length of treatment, showed a negative

association with the level of adherence, which means that more years of diagnosis and treatment are not good factors for adherence. This finding can be explained by the fact that patients appear very tired after years of therapy, and they face difficulties regarding their adherence. Nonetheless, other similar studies have shown that a diagnosis exceeding 10 years correlates with higher adherence scores (Theofilou, 2022).

The factor of the number of drugs was only investigated by one study and concluded that this factor significantly influenced the medication adherence of elderly hypertensive patients (Sheilini et al., 2022). Consistent with the findings of the current study, research conducted in Hong Kong and Nigeria revealed that the high number of prescribed drugs was a significant predictor of non-adherence (Li et al., 2016)

The factor of treatment motivation has only been studied by one study and the results have an influence on the compliance of elderly hypertensive patients (Alam & Jama, 2020). The results of in-depth interviews conducted by researchers with elderly informants with hypertension show that there is still a lack of motivation among them to comply and undergo routine hypertension treatment. This is due to a lack of awareness that inadequate treatment of hypertension can lead to more severe complications. The motivation of people with hypertension to undergo treatment can vary, both low and high, depending on various factors that influence a person's motivation to undergo treatment properly(Alam & Jama, 2020).

Factors related to the patient's illness

Factors related to the patient's illness were investigated in most of the studies in this review, with 14 studies discussing their influence on medication adherence in elderly people with hypertension. The 11 studies that discussed influential factors in this category were duration of hypertensive disease, comorbidities, depressive symptoms, history of stroke and weight management (Table.3).

The factor of duration of hypertensive disease was associated with adherence individuals with longer duration of hypertension tend to be less adherent to treatment (Hoai Thuong et al., 2022). Illness and duration of treatment are other factors that can affect adherence. In this study, the disease, as well as the length of treatment, showed a negative relationship to the level of adherence, which means that more years of diagnosis and treatment are not good factors for adherence. This finding could be explained by the fact that patients appear very tired after years of

therapy, and they face difficulties regarding their adherence. Nonetheless, other similar studies have shown that a diagnosis exceeding 10 years correlates with higher adherence scores(Theofilou, 2022).In this study, the length of time with hypertension affected hypertension treatment adherence. This is similar to previous studies. The longer individuals have a disease, the more knowledge and understanding they have about the disease. Greater concern for symptoms due to hypertension can also improve adherence (Visuddho et al., 2023).

Patients with additional comorbidities require other medications, which can help maintain medication adherence. In addition, anxiety and fear of disease risk from not taking medication can improve patient adherence (Hoai Thuong et al., 2022).

The younger the age, the longer they live with someone, and the less they have depressive symptoms, the more likely they are to be in the adherence group (Lee et al., 2022). In our study, participants who had depressive symptoms tended to have negative beliefs and behaviours, particularly in relation to antihypertensive treatment. Depression is a common comorbid finding in individuals with hypertension with a three times greater likelihood of non-adherence to medical therapy. A broad approach is essential to address hypertension-related complications and reduce mental health conditions such as depression in adherence to antihypertensive treatment among older adults. Further intervention studies are needed to address depression and adherence to antihypertensive treatment and lifestyle recommendations in the older African American population (Adinkrah et al., 2020).

Another factor that improves medication adherence is a history of stroke. An Australian study examined adherence to antihypertensive treatment in the first six months after stroke and found that older adults showed high adherence to antihypertensives, leading to a reduced risk of new episodes. This awareness was an additional motivation for them to follow the recommended treatment, with the aim of controlling blood pressure and minimising the chance of having another stroke (Dalli et al., 2023). By understanding the relationship between hypertension-specific complications and adherence to treatment, public health interventions can be designed to provide optimal care to this population and prevent the development of major complications associated with hypertension(Fhon et al., 2024).

Another study stated that non-adherence to weight management was 1.86 times worse in 5-year hypertensive patients. The study also reported that knowledge was associated with adherence to weight management. It was positively correlated between knowledge and non-adherent self-care practices, such as adding healthy foods to eating habits, making unhealthy food

purchases, and not adhering to restrictions on favourite foods that are high in fat and salt. This finding is similar to a study in Iran which stated that 87.7% did not practice a healthy diet (Zinat Motlagh et al., 2016). An unhealthy lifestyle is a significant factor leading to uncontrolled blood pressure. Therefore, it is important to provide health education on healthy lifestyle practices for people with hypertension consistently (Gusty et al., 2022).

Factors Related to the Patient

Based on statistical testing conducted on 100 hypertensive elderly respondents at Bulili Health Centre, Palu City, the p-value for family support is 0.018, indicating that family support has a significant effect on medication adherence in hypertensive elderly. In addition, the Odds Ratio in the final multivariate model analysis was 4.0, indicating that elderly patients with high family support were four times more likely to adhere to treatment than patients with low family support, after taking into account employment status and accessibility to health services. The family plays an important role in assisting the elderly in home care, which includes the implementation of a low-salt diet, blood pressure regulation, timeliness of taking medication, scheduling doctor visits, and regular hypertension treatment. In a study (Masriadi et al., 2018) involving the Wilcoxon test, it was found that there were differences in systolic blood pressure before and after treatment, which involved lifestyle changes, such as dietary management by reducing salt and caffeine consumption, and stress management by increasing physical activity. Hypertension requires a long healing process, so social support is essential for effective treatment. Family support includes actions, attitudes, and acceptance from those affected. Encouragement from family and friends can significantly assist individuals in complying with health programmes, and generally, those who receive attention, care, and assistance from others are more likely to follow medical advice. Family supervision of medication adherence (SDG) is intended to ensure that patients adhere to their antihypertensive therapy, which can lead to a reduction in systolic and diastolic blood pressure. In hypertensive patients who received the SDG intervention in the experimental group for four weeks, there was a significant reduction in blood pressure. This was due to the patients' ability to self-regulate adherence to prescribed medication and manage their blood pressure effectively (Dolo et al., 2021).

Our study also found an association between higher follow-up adherence and having health insurance. This is because health insurance will cover the cost of doctor consultations, diagnostic tests, drug costs, and hospitalisation costs, therefore, patients may visit the hospital more frequently and have regular check-ups (Hoai Thuong et al., 2022).

In previous studies comparing older patients' adherence to their medication based on age, the results showed inconsistent results 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 participants in this study was 73 years, categorising them as part of the relatively older age group, particularly those over 65 years old. Based on previous research, analyses show that medication adherence in older populations follows a U-shape, and that medication non-adherence gradually decreases with age but then increases again after 75 years of age(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).

In this study, the elderly population living alone was identified as a factor affecting medication adherence possibly related to the residential living patterns of the elderly(Lee et al., 2022).

There is a significant relationship between patient attitude and hypertension treatment adherence. That is because the attitude statement shows the individual's tendency to act, both attitude and length of illness can interact to affect compliance. Patients who are sick longer generally gain more experience so that they have a positive attitude (Visuddho et al., 2023).

Participants who had higher levels of knowledge about hypertension were more likely to adhere 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 that treatment (Bazargan et al., 2017). This underscores our study's findings of a strong relationship between knowledge and adherence and the need to better educate African-American older adults for their age. This approach among similar community partnership projects has been successful in several interventions that seek to address behaviour change especially in under-resourced communities. Community health cadres are the source of health information dissemination. While this makes sense, limited resource allocation to low-income and medically underserved communities makes this unlikely. There is limited data on the cost-effectiveness of running a community health cadre programme. Health care providers are still considered the last and most reliable source of health information for communicating health information (Adinkrah et al., 2020).

Behavioural intention has a direct positive effect on antihypertensive treatment adherence behaviour at the 0.001 level (path coefficient = 0.353; $p < 0.001$), and is the main predictor of antihypertensive treatment adherence behaviour. patients with a positive attitude towards treatment and intention to adhere to prescribed treatment rules are likely to show positive treatment adherence behaviour, which should improve clinical outcomes (Pan et al., 2023).

When patients perceive treatment benefits, such as reduced blood pressure and complications, they are more likely to adhere to the prescribed treatment. Perceived barriers, such as lack of efficacy, side effects, and cost can reduce patients‘ confidence in treatment and decrease their adherence behavior (Woode et al., 2022). Consistent with this, other studies have shown a direct impact of perceived benefits and barriers on patients' decisions to manage hypertension (Mohebi et al., 2018). Perceived benefits and perceived barriers have an indirect influence on treatment adherence through behavioural intentions. When patients perceive treatment benefits, such as reduced blood pressure and complications, lower medical costs, and improved health outcomes, their desire to continue using treatment increases. In contrast, perceived barriers can reduce an individual's recognition of the effectiveness and importance of treatment therapy, thereby creating doubt and resistance to treatment adherence highlighting the importance of reducing perceived barriers to treatment adherence (Pan et al., 2023).

Factors related to disease management

There are two studies that resulted in the influence of disease management factors on treatment adherence of elderly hypertensive patients : Community-based health counselling and health education (Adinkrah et al., 2020)(Son et al., 2019).

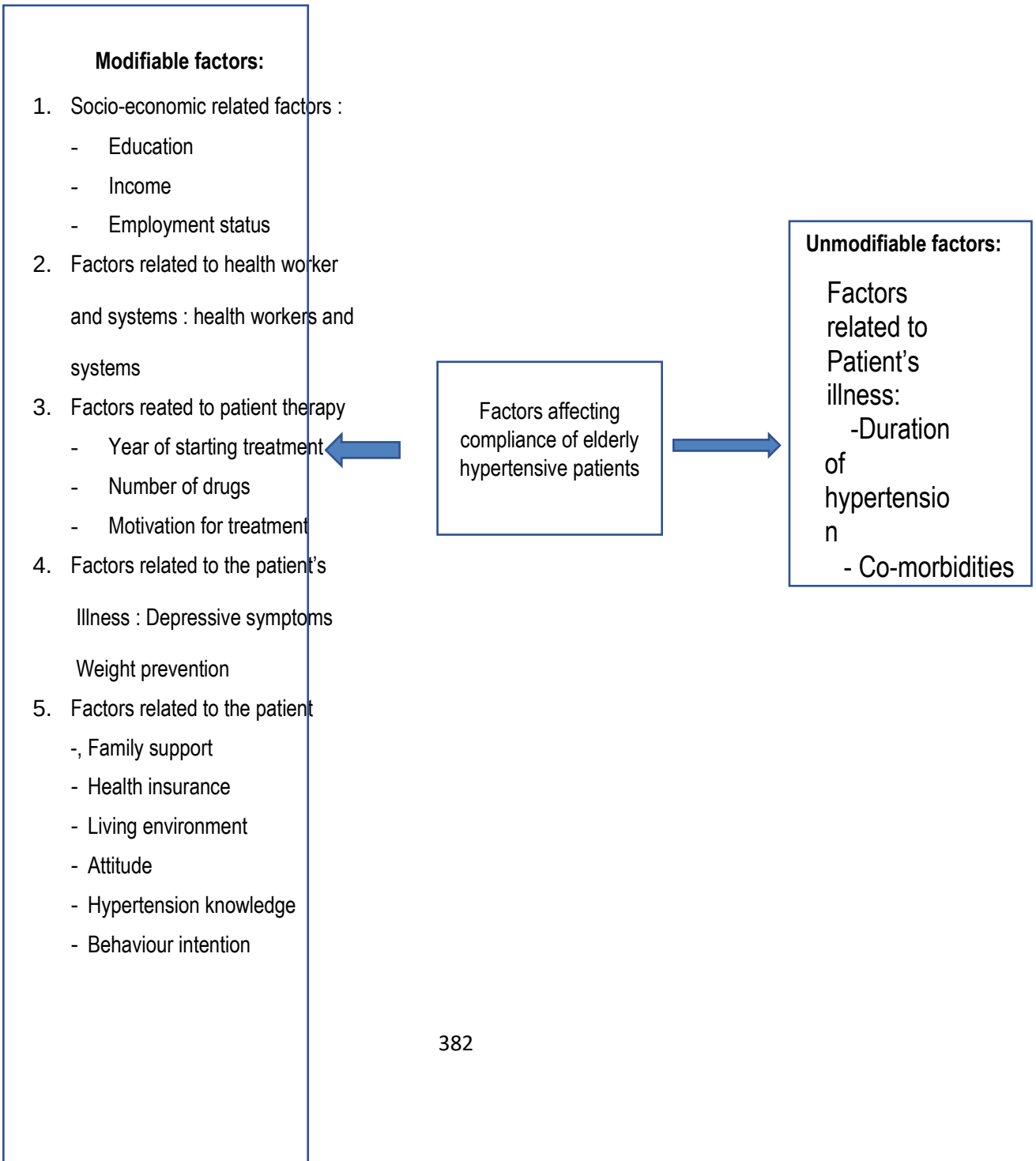
Providers tend not to ask patients about their practices and beliefs in taking medications. Therefore, it is important to empower healthcare providers to consciously engage their patients in their beliefs, knowledge, and behaviours regarding hypertension and its treatment methods. Healthcare providers can also provide specific counselling to help patients improve adherence to antihypertensive treatment and lifestyle recommendations. This requires education and programmes that can be used to support providers. Essentially, extended contact time and involving multiple parties not only allows misunderstandings and problems to be addressed but also encourages patient-provider relationships (Adinkrah et al., 2020)

Overall, these community-based healthcare programmes are an effective way to aid patient adherence to hypertension. A meta-analysis of community-based interventions, to improve medication adherence and blood pressure control in hypertension, documented significant but

modest post-intervention improvements in blood pressure outcomes among hypertensive patients (Son et al., 2019).

The results of this review indicate that treatment adherence of elderly hypertensive patients is multifactorial. All WHO adherence domains were present in the majority of studies.

The factors examined can be categorised into modifiable and non-modifiable factors, with the aim of identifying interventions for elderly individuals with hypertension, as illustrated in Figure 1.



- Perceive benefits

6. Factors related to disease

mana gement :

- Health education
- Community based health

programmes

Picture 1. Factors affecting adherence of elderly hypertensive patients

The classification of the factors studied into modifiable and non-modifiable categories is expected to create opportunities to develop intervention strategies related to treatment adherence of elderly hypertensive patients. The majority of adherence factors were modifiable, but there were two non-modifiable factors in this review: patient disease-related factors: duration of illness, comorbidities and history of stroke and patient-related factors: age.

Interventions should be designed specifically around the categories of modifiable factors in order to make changes to these factors. Interventions should also target multiple factors at the same time, as treatment adherence in elderly hypertensive patients is multi-factorially interconnected and complex. Other factors that influence medication adherence in a region with different socio-cultural backgrounds need to be researched using a more comprehensive methodological approach such as mixed methods (combination of qualitative and quantitative).

CONCLUSIONS

Adherence to hypertension treatment in the elderly is influenced by multi-factors with different variations between settings and individual characteristics. Several factors were identified, namely modifiable factors ((1) social and economic related factors: Education, income, occupation, (2) factors related to health workers and systems: support from health workers, (3) factors related to patient therapy: duration of treatment, number of drugs and motivation for treatment, (4) factors related to patient's disease: depressive symptoms and weight management, (5) patient-related factors: family support, health insurance, living environment, attitude, knowledge, intention, benefits, (6) factors related to disease management: counselling and community-based health

programs and non-modifiable factors (factors related to patient's disease: duration of suffering, comorbidities and history of stroke, and patient-related factors: age).

This research is limited to the study of correlation studies (majority cross-sectional) so in the future more comprehensive research is needed to be related to the analysis of factors related to hypertension treatment compliance. Qualitative study designs can be added (mixed-method) to produce more in-depth analysis results. Elderly people with hypertension are expected to comply with medication to improve the quality of life and reduce mortality, so specific interventions are needed according to the causative factors.

Conflict of Interest

There are no conflicts of interest to declare.

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