ORIGINAL ARTICLE

Factors Associated with Medication Compliance among Hypertensive Patients in Barangay Sambag II, Cebu City

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ABSTRACT

Background. Medication compliance contributes to preventing significant morbidities, such as stroke, among hypertensive patients.

Objective. This study aimed to examine the factors affecting hypertensive patients' medication compliance in Sambag II, Cebu City.

Methods. This study is an observational cross-sectional study. The study was conducted in Barangay Sambag II of Cebu City and involved 170 random, voluntary, self-reporting hypertensive patients. The Tao Yamane formula was used to determine the sample size. An interviewer-guided survey questionnaire was utilized to collect the data for the pilot study. The data were analyzed using Cronbach's Alpha Test for internal consistency and reliability.

Results. Three factors were shown to influence compliance with antihypertensive medications. These are the source of medication, access to medication, and symptoms experienced before intake of anti-hypertensive medications. A factor that significantly affects compliance is the source of medication, wherein hypertensive patients prefer medications from retail pharmacies compared to the free medications supplied by the local health center.

Conclusion. Residents of Sambag II, Cebu City preferred medications from retail pharmacies over the free medications provided by the local health center. Local health units may use this information to implement information drugs regarding the efficacy of medications provided by government agencies. Further studies are recommended to use subgroup analysis on factors influencing compliance and non-compliance to anti-hypertensive medicines.

Keywords: medication compliance, hypertension, stroke, Cebu City

INTRODUCTION

Chronic non-communicable diseases are responsible for 71% of mortality around the globe in 2022.[1] At least 1.28 billion adults aged 30 to 79 years across the world have hypertension. Most of these hypertensive individuals live in low-and middle-income countries.[2] Hypertension is the most prevalent risk factor for stroke.[3] The public health burden of stroke is set to rise over the coming decades because of demographic transitions of populations, particularly in developing countries.[4] High blood pressure is one of the modifiable risk factors for stroke. Thus, hypertension control and the prevention of associated morbidity and mortality should be achievable.[5]

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According to the fourth Philippine Heart Association (PHA) Report on the Study of Hypertension,[6] the prevalence of hypertension among Filipinos is around 37%. However, hypertension awareness in the Philippines is around 67.8%. Out of those who are aware, only 75% are treated, with only 27% of those who are treated having their hypertension under control.

The main goal of hypertension treatment is to reduce blood pressure to less than 140/90 mmHg. Nonpharmacologic interventions must be instituted in all patients with hypertension. Antihypertensive medication adherence, defined as the extent to which patients take medications as prescribed by their physicians, is an important determinant for the preventive effect of antihypertensive medication for stroke. Previous studies have reported that poor adherence to antihypertensive medication appeared to be associated with an increased risk of stroke recurrence in patients with hypertension.[7]

More than seven out of ten hypertensive Filipinos still have uncontrolled hypertension, despite the availability of effective medications to control it. Long-term adherence has been noted as a major problem that must be addressed in the management of chronic medical conditions in the Philippines.[8]

A study found in the Journal of Haemophilia Practice by Strike et al. (2020) used the ecological theory in predicting treatment adherence in patients with chronic diseases using the Multidimensional Adherence Model (MAM) from WHO. To comprehend adherence behavior, the model includes intrapersonal, interpersonal, organizational, policy, and community constraints.[9] The MAM framework divides adherence hurdles into five categories: factors connected to the patient, the healthcare team and system, socio-economic issues, and both treatment- and condition-related aspects. With this model, factors associated with medication compliance among hypertensive patients may also be identified. The conceptual framework of our study was adapted from this model (Figure 1).

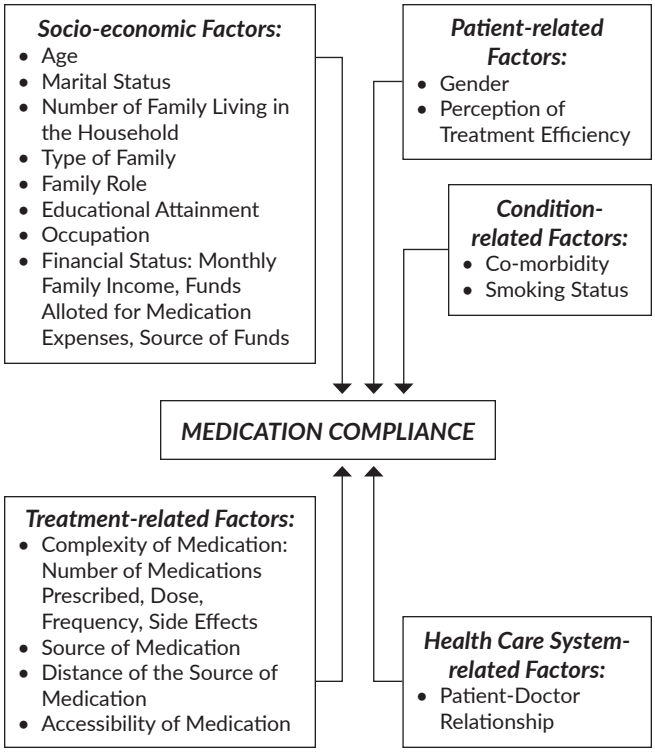

Figure 1. Medication Compliance Conceptual Framework.

In the Philippines, a systematic review of reported factors that affect adherence in hypertensive Filipinos was done by Gutiérrez and Sakulbumrungsil (2021). In their study, they found both positive and negative correlations between the factors with adherence. Healthcare system-related characteristics, such as a pleasant patient-provider connection, accessibility to healthcare, utilization of specialist clinics and programs for hypertension, and health insurance, were found to be positively correlated with adherence. The following factors were identified as having a negative impact on adherence: (1) social-economic factors, including young age, single civil status, low educational attainment, and unemployment; (2) patient-related factors, including low levels of health literacy and awareness, knowledge of hypertension, attitudes toward hypertension, self-efficacy, and social support; (3) therapy-related factors, including inconsistent drug regimen schedules, use of Thiazide, and use of complementary and alternative medicines; and (4) condition-related factors.[10]

Studies that focus on antihypertensive medication compliance will help healthcare providers understand the gaps in the multifaceted management of hypertension. Ultimately, these studies will help institute local programs that shall contribute towards addressing uncontrolled hypertension. Therefore, this study aimed to determine the factors that influence medication compliance among hypertensive patients in Sambag II, Cebu City.

OBJECTIVES

General Objective

To examine the factors associated with compliance with medications among hypertensive patients in Sambag II, Cebu City.

Specific Objectives

1. To determine the socio-demographic profile of the hypertensive patients in Sambag II, Cebu City in terms of the following:
   a. Age
   b. Gender
   c. Educational attainment
   d. Source of medication
   e. Distance to the source of medication
   f. Accessibility to the medication
   g. Source of funds for medication expenses

2. To determine the medical history profile of the hypertensive patients in Sambag II, Cebu City in terms of the following:
   a. Source of diagnosis
   b. Years diagnosed
   c. Common symptoms
   d. Other medical conditions
   e. Number of medications for hypertension
   f. Medication for other medical conditions
   g. Usual blood pressure
3. To determine the prevalence of compliance versus non-compliance to medication among hypertensive patients in Sambag II, Cebu City.
4. To determine the association between the identified factors and non-compliance to medication versus identified factors and compliance to medication.
5. To determine the relationship between compliance to medications with and overall hypertensive therapy.

Scope and Delimitation of the Study

This was conducted in Sambag II, Cebu City due to the proximity and community involvement. The study subjects were hypertensive patients aged 18 up to 80 years old. This study only focuses on knowing the factors under the socio-demographic profile and medical history associated with medication compliance. This study does not focus on the dietary practices of respondents. However, it is limited to their practices of medication intake, sodium intake, and compliance with recurring appointments at their healthcare providers. This does not also include the effects of compliance with blood pressure control due to the limited time frame of the study. The study does not follow up on the effectiveness of the prescribed treatment regimen in the target population due to limitations of the Data Privacy Act (Republic Act No. 10173) which prevents the researchers from obtaining objective data on their blood pressure monitoring sheets from the barangay health office. Although the blood pressure average was obtained by self-reporting from the respondents, it will be exclusively for building an epidemiologic profile. The researchers also refrained from associating specific classes of prescribed medications with compliance in the respondent population. Furthermore, subgroup analysis will not be conducted on the factors which will be identified due to time constraints.

MATERIALS AND METHODS

Research Design and Study Locale

This is a cross-sectional study conducted in Barangay Sambag II, Cebu City. The respondents were interviewed in their houses or any comfortable nearby area. Being part of the Sambag II community (due to the location of Southwestern University – the institution represented by the researchers), the barangay was chosen to raise awareness of public health concerns in proximal areas. Also, this barangay was an excellent choice because of the readily available health center, and the willingness of the barangay officials and its citizens to cooperate with the researchers.

Inclusion and Exclusion Criteria

Residents of Brgy. Sambag II, Cebu City, between the ages of 18-80 years old, who were diagnosed with hypertension and subsequently prescribed maintenance medications were recruited to the study. Exclusion criteria include people with mental disorders who would not be able to answer the questionnaire.

Sampling Procedure

The Tao Yamane formula was used to determine the sample size. Data on the estimated population of diagnosed hypertensives were obtained from the barangay health center. There were an estimated 295 hypertensive individuals for the year 2022. Based on the said formula, a sample size of 170 residents, who had been diagnosed with hypertension, was needed to take part in the study. This sample size was determined with an allowable error of 5% and a confidence level of 95%.

Data Instrument

The instrument used was an interview-guided survey questionnaire that was prepared by the researchers based on the Multidimensional Adherence Model (MAM) from WHO. After securing the author's permission, the Hill-Bone Compliance to High Blood Pressure Therapy Scale was included as part of the questionnaire. The demographic data collected included age, gender, marital status, the number of people living in the participant's household, educational attainment, occupation, income, family type, role in the family, smoking habits, medication costs, source of medication funds, and access to medication. Also collected were the respondents' duration of being diagnosed with hypertension, source of diagnosis, symptoms before taking anti-hypertensive medication, the usual blood pressure of the patient for the last three months, and presence of comorbidities. If the respondent has reported comorbidities, an additional medication regimen was also collected.

The Hill-Bone Compliance to High Blood Pressure Therapy Scale consists of fourteen 4-point Likert-type items (1 = none of the time, 2 =some of the time, 3 = most of the time, 4 = all the time) that measured the degree of non-compliance to medication taking, appointment keeping, and a healthy diet. Higher scores on the scale corresponded to non-compliance. The respondent was considered non-compliant with medications when he or she was rated 2 or higher on the scale.

Data Collection Procedure

An initial pilot study involved interviewing 10 respondents randomly, from the clusters in barangay Sambag II, Cebu City. This involved a door-to-door request for willing participants, followed by a self-introduction of the interviewer,

and an explanation of the purpose of the study and the informed consent forms. Afterward, the data collected was gathered and tabulated in an Excel sheet, and then it was sent to the statistician for analysis.

The pilot study was analyzed using Cronbach's Alpha Test for internal consistency and reliability. The instrument obtained a Cronbach alpha of 0.8895 (which is greater than the standard 0.70) and the internal consistency of the instrument was considered "good" for implementation.

The flow of the main survey was similar to the pilot study. Using probability sampling by cluster sampling, we identified 10 clusters in the barangay by dividing the 18 sitios into 10 clusters. Data collection was performed over one week. Two clusters were visited each day and the questionnaire was administered to consenting participants. Data analysis was performed with the assistance of a statistician.

Ethical Considerations and Data Management Plan

This study was reviewed and subsequently cleared by the Research Ethics Committee (REC) of the University of San Carlos (USC). This study adheres to the universal principles of autonomy, beneficence, non-maleficence, and justice. These universal principles were achieved by securing informed consent from the participants after thoroughly explaining the study, emphasizing that anonymity and confidentiality would be maintained. Furthermore, the participants were allowed to withdraw from the study at any point of its conduct.

Sampling bias was minimized by using probability (cluster) and non-probability methods, dividing 18 sitios into 10 representative clusters.

Data Analysis

Data analysis was conducted in two phases. The first phase involved summarizing the distribution of respondents' sociodemographic factors and medical history using frequency and percentage tables. The Hill-Bone Compliance to High Blood Pressure Therapy Scale results were also tabulated in frequency and percentage tables to classify respondents as compliant or non-compliant.

The second phase utilized inferential statistics with SPSS version 23, guided by the compliance status determined from the Hill-Bone Scale scores. For the main study, which followed the same process as the pilot study but with 17 participants per cluster, dimension reduction factor analysis was applied to identify underlying factors associated with compliance. These factors were further analyzed using Analysis of Variance (ANOVA) to assess their association with compliance. Finally, the Pearson Correlation was used to examine the relationship between medication-taking compliance and overall compliance with anti-hypertensive therapy.

RESULTS

A total of 170 participants consented to participate in this study. As shown in Table 1, the majority of the participants were aged 56-65 (34.7%) and 66-75 (25.3%). Out of the participants, 107 (62.9%) were female. Most of the participants completed high school. The majority (91.8%) obtain their medication from retail pharmacies, while the remaining participants obtain theirs either from the local health center or charity organizations.

Table 2 shows the medical history profile of the hypertensive patients in Sambag II, Cebu City which includes the source of diagnosis, symptoms experienced before starting hypertensive medications, participants with other medical conditions, participants taking medications for other medical conditions, number of prescribed hypertension medications within the last 3 months and participants usual blood pressure. Before initiating hypertensive medications, the most frequently reported symptoms were as follows: headache was reported by 37.2% of individuals, followed by dizziness at 26%, nape pain at 21.8%, chest pain (8%), vomiting (5.1%), and other symptoms (1.9%).

The majority of the participants (133; 78.2%) were found to be non-compliant with their medications as seen in Table 3.

As shown in Table 4, the p-value for the source of medication was 0.018. This indicates that the participants' sources of medicine affect their compliance with their medication. Meanwhile, accessibility to the medication and symptoms experienced before starting hypertensive medications have no significant association when linked to compliance and non-compliance with medication.

Table 5 shows a strong positive correlation (Pearson correlation of 0.293) between participants' medication compliance and overall therapy compliance. The low p-value of 0.000 (less than 0.01) leads to rejecting the null hypothesis, indicating a significant relationship between medication compliance and overall hypertensive therapy, which includes compliance to regulating sodium intake and compliance with scheduled doctor appointments.

DISCUSSION

According to the Expanded National Nutrition Survey conducted by the Department of Science and Technology – Food and Nutrition Research Institute (DOST-FNRI)[11] in 2018, the prevalence of elevated high blood pressure among adults in the 40-49 age group is 22.2%. In the 50-59 age group, the prevalence is 30%, indicating that the majority of hypertensive adults are at the age of 40 and above. This is consistent with the results of this study, in which most of the participants are from the ages 56 to 65 (34.7%).

This study also shows that non-compliance to medication-taking among the participants is at 78.2%. Studies have shown that adherence declines with age. This suggests that senior patients require more intensive counseling and straightforward dosing regimens.[12] Patients who had only been prescribed one antihypertensive medication showed significantly greater adherence than subjects taking numerous medications. However, our findings do not agree with this

Table 1. Socio-demographic Profile of the Hypertensive Patients in Sambag II, Cebu City, 2023

	Frequency	Percent (%)
Age (years)		
18-25	1	.6
26-35	6	3.6
36-45	14	8.2
46-55	32	18.8
56-65	59	34.7
66-75	43	25.3
76-80	15	8.8
Gender		
Female	107	62.9
Male	63	37.1
Marital status		
Married	115	67.6
Single	25	14.7
Widowed	30	17.6
Educational attainment		
College Graduate	66	38.8
Highschool Graduate	78	45.9
Elementary Graduate	20	11.8
No formal schooling	6	3.5
6-10 years	2	4.7
Source of medication		
Clinic/Hospital	1	.6
Donation	2	1.2
Local health center	10	5.9
Private hospital	1	.6
Retail pharmacy	156	91.8
Distance to the source of medication (km)		
<1	113	66.5
1-2	39	22.9
>2	18	10.6
Means to access the source of medication		
Private vehicle	17	10.0
Public vehicle	36	21.2
Walking	117	68.8
Allocated funds for the medication		
<₱1000/month	109	64.1
₱1000-<₱2000/month	29	17.1
₱2000-<₱3000	10	5.9
₱3000-<₱4000	5	2.9
₱4000-₱5000	1	.6
>₱5000	2	1.2
None	10	5.9
Unrecalled	4	2.3
Participants' source of funds		
Charity	10	5.8
Family members	44	25.9
Own income	109	64.1
Own pension	7	4.1

Table 2. Medical Profile of the Hypertensive Patients in Sambag II, Cebu City, 2023

	Frequency	Percent (%)
Source of diagnosis (hypertension)		
Check-up from non-health facility	7	4.1
Doctor	139	81.8
Health worker in local health center	24	14.1
Symptoms experienced before starting hypertensive medications		
Nape pain	47	21.8
Headache	80	37.2
Chest pain	17	8
Vomiting	11	5.1
Dizziness	56	26
Others	4	1.9
Participants with other medical conditions		
Yes	74	43.5
None	96	56.5
Participants taking medications for other medical conditions		
Yes	46	62.2
None	28	37.8
Number of prescribed hypertension medications (last 3 months)		
Monotherapy	122	71.8
Polytherapy	48	28.2
Participants' usual blood pressure (last 3 months)		
Normal	8	4.7
Elevated	3	1.8
Hypertension Stage 1	50	29.4
Hypertension Stage 2	92	54.1
Hypertensive crisis	5	2.9
Unrecalled	12	7.1

Table 3. Compliance versus Non-compliance to Medications among Hypertensive Patients in Sambag II, Cebu City

Compliance	Interpretation	Frequency	Percent
Compliance with Medications	Non-compliance	133	78.2
	Compliance	37	21.8
	Total	170	100.0

observation. It was shown that even though the number of participants with monotherapy is 71.8%, the majority of the participants are still non-compliant. This is a finding further supported by the lack of association between the participants' number of prescribed medications and their compliance with medications.

Females are more likely to be compliant with their antihypertensive medication regimen.[13] However, in the current study, the majority of the participants are female, but the percentage of non-compliance to medication-taking remains high compared to those who are compliant. There was no significant association between participants' gender and their compliance and non-compliance to medication-taking.

A study conducted in India aimed to investigate the factors associated with medication adherence among

Table 4. Association between Identified Underlying Factors with Medication Compliance Using ANOVA

Identified underlying factors	Groups	Sum of squares	Df	Mean square	F	Sig.	Finding 0.05 > p > 0.05	Finding 0.05 > p > 0.05	Conclusion
Source of medication	Between groups	1.426	2	0.713	4.142	0.018	P <0.05	Reject the null hypothesis	There is a significant association
	Within groups	28.932	168	0.172					
	Total	30.359	170						
Accessibility to the medication	Between groups	0.152	2	0.076	0.421	0.657	P >0.05	Failed to reject the null hypothesis	There is no significant influence
	Within groups	30.206	167	0.181					
	Total	30.358	169						
Symptoms experienced before starting anti-hypertensive medications	Between groups	0.737	5	0.147	0.982	0.402	P >0.05	Failed to reject the null hypothesis	There is no significant influence
	Within groups	29.622	165	0.180					
	Total	30.359	170						

Table 5. Relationship between Compliance with Medication with Overall Hypertensive Therapy

		Overall Hypertensive Therapy	Level	Remark	Conclusion
Compliance with Medications	Pearson Correlation	0.293**	Positive weak correlation	Reject the null hypothesis	There is a significant relationship
	Sig. (2-tailed)	0.000			
	N	170			
Compliance to sodium intake	Pearson Correlation	0.198**	Positive weak correlation	Reject the null hypothesis	There is a significant relationship
	Sig. (2-tailed)	0.009			
	N	170			
Compliance with the appointment	Pearson Correlation	0.311**	Positive weak correlation	Reject the null hypothesis	There is a significant relationship
	Sig. (2-tailed)	0.000			
	N	170			
Compliance to Overall therapy	Pearson correlation	1			
	Sig. (2-tailed)				
	N	170			

***Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).*

hypertensive patients, specifically comparing the adherence levels between educated and uneducated individuals. The study found that educational level did not significantly impact medication adherence among hypertensive patients.[12] Similarly, in this study, there was no significant difference in medication compliance in terms of educational attainment.

Three underlying factors influence medication compliance among hypertensive patients in Sambag II, Cebu City. These are the source of medication, accessibility to the medication, and symptoms experienced before starting anti-hypertensive medications. Of these, only the source of medication has a significant association with the compliance of patients with medication. The majority of the participants avail their medications from retail pharmacies rather than from the local health center.

According to the American Heart Association (AHA),[14] one of the interventions including eliminating or reducing co-payments consistently resulted in small improvements in adherence to medications. In the current study, nearly half (48%) of the respondents claimed that generic medications are less effective than brand-name drugs, while 33% thought generics had equivalent efficacy and 4.8% thought they were more effective. In a 2021 study done in Korea,[15] it was found that older persons tend to not avail of free medications because they are not aware that some of these medications are free. Even with the support of the government, through the local health centers giving out free medications, there are still other possible reasons that need to be explored on why most patients do not avail of these free medications which might help improve compliance to medication.

The findings also showed that the participants' compliance with medicine-taking, appointment-taking, and sodium intake are correlated to overall compliance with antihypertensive therapy. This is in line with the study done among elderly hypertensive patients,[16] wherein the study found that, in the long run, treating hypertension with both pharmaceutical and non-pharmacological approaches can lower the risk of problems linked to the condition and stop the patient's quality of life from declining.

CONCLUSION

The overall compliance to medication among hypertensive patients is low. Three factors that influenced compliance to antihypertensive medication-taking are the sources of medication, access to medication, and symptoms experienced before taking antihypertensive medication. Hypertensive patients in Sambag II, Cebu City preferred medications from retail pharmacies compared to the free medications supplied by the Local Health Center. There is also a correlation

between medication compliance and compliance with overall hypertensive therapy, which includes compliance with sodium intake regulation and scheduled doctor appointments. Further studies are recommended to use subgroup analysis on factors influencing compliance and non-compliance to anti-hypertensive medication.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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