

ORIGINAL ARTICLE

FACTORS ASSOCIATED WITH THERAPEUTIC NON-ADHERENCE AMONG HYPERTENSIVE INDIVIDUALS WHO SEEK EMERGENCY CARE

HIGHLIGHTS

1. Of those who sought Emergency care, 36% did not adhere to the therapy.
2. Non-adherence was associated with being aged less than 60 years old.
3. Frequently seeking ER services was associated with non-adherence.
4. Having bonds with Primary Care professionals was associated with non-adherence.

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ABSTRACT

Objective: to analyze factors associated with therapeutic non-adherence among individuals with Arterial Hypertension who seek emergency care and/or assistance due to hypertensive complications. **Method:** this is a cross-sectional study conducted from December 2019 to October 2020 with 238 people living in a medium-sized municipality from southern Brazil using Morisky's 8-Item Medication Adherence Scale. Multiple Logistic Regression was used in the analysis. **Results:** a total of 86 (36.1%) participants were considered as non-adherent. A higher change of non-adherence was observed in people younger than 60 years of age (Odds Ratio=2.04), who sought emergency services in the three years under study (Odds Ratio=5.08), and who had a bond with Primary Health Care professionals (Odds Ratio=1.96). **Conclusion:** acknowledging the factors associated with non-adherence to the therapy will allow professionals to conduct educational interventions and assist people with hypertension according to their needs, thus preventing/postponing complications.

DESCRIPTORS: Nursing; Hypertension; Adherence to Medication; Primary Health Care; Emergency Medical Services.

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INTRODUCTION

It is estimated that 1.13 billion people suffer from Arterial Hypertension (AH), with most of them living in low- and middle-income countries and only one out of five in full control of the disease¹. Despite various public policies, AH prevention and control are still a challenge for health systems worldwide (high prevalence and high costs)², and this condition is considered the main risk factor for morbidity and mortality due to cardiovascular diseases and chronic kidney disease³. Some situations contribute to this phenomenon, such as population aging⁴, difficulties in diagnosing⁵ and properly monitoring people with AH, and non-adherence to self-care actions and prescribed treatment⁶ by most of the affected people.

Non-adherence to the drug therapy (ADT) – intake at the incorrect dose and/or time, forgetfulness or early treatment interruption – is one of the main reasons for blood pressure non-control⁷. Therefore, it consists of a complex⁸ and continuous process that presents barriers correlated to sociodemographic aspects, dosage regime and health systems, as well as to people themselves and their own conditions^{3,9}.

Non-adherence is a common behavior that can be observed even in individuals aware of the importance of the therapy⁸, hence the need for early analysis and identification of the factors that may influence non-adherence³. This may come to mitigate cardiovascular morbidity and mortality, the number of hospitalizations, and the onset and progression of complications, favoring quality of life in the people affected¹⁰.

The studies that address non-ADT by people with AH are commonly conducted in the Primary Health Care (PHC) scope^{7-9,11-15}. No studies were found investigating people who sought health services due to disease acuteness or complications and the possible relationship with adherence or non-adherence to the drug therapy. However, in the case of chronic conditions, the degree of adherence to and maintenance of a healthy lifestyle is related to decompensation cases and also to the development of complications. Therefore, investigating ADT levels among people with AH decompensation or complications and the factors involved in this issue may favor the identification of unique information to support the creation of more effective strategies and interventions to prevent cardiovascular diseases^{3,9-10}.

In view of the foregoing, the current study aimed at analyzing factors associated with non-ADT among individuals with AH who sought emergency care services due to hypertensive emergency and/or complications.

METHOD

An exploratory and analytical study conducted with people with AH who sought one of the three public emergency services from a medium-sized municipality in southern Brazil due to uncontrolled blood pressure or disease complications. The municipality had an estimated population of 430,000 inhabitants, 85% of them covered by the Family Health Strategy (FHS). The public health care network consists of 34 Basic Health Units (BHUs), two hospitals (municipal and university), two municipal Emergency Care Units (ECUs), and the University Hospital Emergency Service (*Pronto Atendimento do Hospital Universitário, PA-HU*).

The data were collected by the main researcher from December 2019 to October 2020. Initially, data from visits performed at all three emergency services from January 2018 to February 2020 were surveyed, and those related to one of the previously established International Classification of Diseases (ICD-10) codes were identified. The ICD codes considered for inclusion in the study were those related to AH (I10, I15 and I15.9), to AH

and Diabetes Mellitus (DM) (from E10 to E10.9; from E11 to E11.9; from E13 to E13.9; from E14 to E14.9; R73.9) and to complications (I11; I11.0; I11.9; I12; I12.0; I12.9; I13; I13.0; I13.1; I13.2; I13.9; G45; G45.8; I64; I21; I21.0; I21.1; I21.2; I21.3; I21.4; I21.9; O11; I20; I20.8; I20.9).

The eligibility criteria of the study were as follows: being at least 18 years old, living in the municipality, and having records of two or more admissions due to conditions related to the previously established codes during the study period. In turn, cases of death and of patients who did not use antihypertensive medication were excluded; as well as those who failed to return the questionnaire or who returned it with incomplete answers (more than three unanswered questions) and those who could not be contacted by telephone after at least five attempts on different days and at different times.

Sample size was defined based on the total number of people (N=962) who sought emergency care in the UPAs at least twice due to acute AH complications (850 people) or of AH and DM in association (112 people). Considering a maximum variability of 50%, estimation error of 6%, and 95% confidence interval, plus 10% to compensate for possible losses, the minimum sample size was estimated at 221 subjects.

To identify the possible participants, a single list was prepared in a Microsoft Office Excel 2021[®] spreadsheet, containing the following: users' names in alphabetical order, date of birth, medical record number, health service sought, date and time of the visits, and respective ICD code. Subsequently, the eligible cases were identified. A total of 296 individuals were selected as possible participants, of which 22 did not answer the telephone calls, 17 reported not using antihypertensive medications, and 14 did not accept to take part in the study. Of all 243 subjects who agreed, three failed to return the questionnaire and two returned it with incomplete answers, resulting in an effective sample of 238 individuals under study.

When selecting the participants, the clustered proportional random sampling technique was adopted, considering the year when the consultations took place and the health unit sought. Subsequently, the participants' electronic medical records were accessed via the municipal management system, and the following data were collected: home address and telephone, reference BHU, housing arrangement, schooling, skin color, marital status and religion.

The invitation to take part in the study was via telephone contacts from June to October 2020. On that occasion and due to the coronavirus pandemic, two participation options were available: answering and sending the questionnaire via WhatsApp[®] or telephone interviews to be conducted on a day and at a time chosen by the participants. The interviews lasted a mean of 15-20 minutes and were all conducted by the same researcher.

A total of 167 interviews were carried out via telephone calls and 71 users answered the questionnaires via the link sent in the messaging app.

The instrument used in data collection comprised two parts: the first one was about sociodemographic characteristics (gender, age, schooling, monthly family income, skin color, occupation, marital status, and housing arrangement); health profile (established AH diagnosis, time since diagnosis, comorbidities, number of continued use medications, blood pressure monitoring frequency, having somebody assisting in blood pressure control); use of health services (number of admissions to emergency services, year of the admissions, diagnosis at admission, having already attended an appointment in the BHU, having already taken part in the Hypertension and Diabetes Program [HIPERDIA] in the basic health care network, bond with BHU professionals, having seen a cardiologist in the last 12 months, and having a health plan).

The second part of the instrument consisted of Morisky's 8-item Medication Adherence Scale (MMAS-8), validated into Portuguese¹⁶, which has eight questions with dichotomous answers (Yes/No), considering ADT as outcome. A score of eight points

indicates "high adherence", between six and seven corresponds to "moderate adherence" and below six, to "low adherence"^{4,16}. In the analysis, non-adherent users were those with low compliance (ADT < 6) and adherent user were those that presented high or moderate compliance (ADT ≥ 6).

The data were typed, organized and categorized in a Microsoft Office Excel 2021[®] spreadsheet and analyzed in the R software program by means of Multiple Logistic Regression. Variables for the model were selected using the Forward-Backward Stepwise method. The association measure between the explanatory variables was Odds Ratio (OR), considering as outcome the random variable with binomial distribution called Y: Adherence to the Drug Therapy (ADT) – If score ≥ six, there was ADT; or if < six, there was no ADT (risk).

Quality of the final adjusted regression model was verified using the Hosmer and Lemeshow (H-L) test, in addition to measuring the area under the Receiver Operating Characteristic (ROC) curve (AUC) and graphically verifying the behavior of residuals via the binomial simulated envelope.

The study was approved by the Committee of Ethics in Research with Human Beings (Opinion No. 4,609,444/2021).

RESULTS

The mean ADT score obtained was 5.92 points (Standard Deviation: 1.93), with 86 (36.1%) individuals considered as not compliant with the drug therapy. Among the 152 (63.9%) compliant subjects, only 41 (26.9%) presented high adherence; the other 111 (73.1%) had moderate adherence.

It is noted that the sample under study was mostly comprised by people belonging to the female gender, white-skinned, aged over 60 years old, with more than eight years of study, with a partner and with no employment contracts. With regard to health conditions, more than a half of the participants, 123 (51.9%) people, were diagnosed with AH more than ten years ago; and most of the participants had comorbidities, take more than three medications a day, and rarely measure their blood pressure (Table 1).

Table 1 - Sociodemographic and clinical variables according to adherence or non-adherence to the drug therapy among people who sought emergency services due to Systemic Arterial Hypertension acuteness and/or complications. Maringá, PR, Brazil, 2020

Variables	Adherence to the Drug Therapy		
	No	Yes	Total
	n (%)	n (%)	n (%)
Gender (n=238)			
Male	33 (13.9)	53 (22.3)	86 (36.1)
Female	53 (22.3)	99 (41.6)	152 (63.9)
Race/Skin color (n=237)			
White	61 (25.6)	112 (47.1)	173 (72.7)
Non-white	25 (10.5)	39 (16.4)	64 (26.9)
Age (n=238) (years old)			

18 - 59	47 (19.7)	60 (25.2)	107 (45.0)
≥60	39 (16.4)	92 (38.7)	131 (55.0)
Schooling (n=238) (years)			
≤8	35 (14.7)	66 (27.7)	101 (42.4)
>8	51 (21.4)	86 (36.1)	137 (57.6)
Monthly family income (in minimum wages) (n=227)			
≤1	10 (4.4)	14 (6.2)	24 (10.6)
>1	72 (31.7)	131 (57.7)	203 (89.4)
Occupation (n=230)			
Not active/Unemployed	46 (20.0)	96 (41.7)	142 (61.7)
Active/With a job	40 (17.4)	48 (20.9)	88 (38.3)
Marital status (n=238)			
With a partner	55 (23.1)	86 (36.1)	141 (59.2)
No partner	31 (13.0)	66 (27.7)	97 (40.8)
Housing arrangement (n=238)			
Lives alone	11 (4.6)	14 (5.9)	25 (10.5)
Lives with someone	75 (31.5)	138 (58.0)	213 (89.5)
Diagnosis established (n=238)			
No	4 (1.7)	4 (1.7)	8 (3.4)
Yes	82 (34.5)	148 (62.2)	230 (96.6)
Time since diagnosis in years (n=237)			
≤10	45 (19.0)	69 (29.1)	114 (48.1)
>10	40 (16.9)	83 (35.0)	123 (51.9)
Comorbidities (n=237)			
No	12 (5.1)	13 (5.5)	25 (10.5)
Yes	73 (30.8)	139 (58.6)	212 (89.5)
Number of continued use medications (n=238)			
≤2	34 (14.3)	40 (16.8)	74 (31.1)
≥ 3	52 (21.8)	112 (47.1)	164 (68.9)
Blood pressure monitoring periodicity (n=238)			
Once a week	27 (11.3)	60 (25.2)	87 (36.6)
Rarely	59 (24.8)	92 (38.7)	151 (63.4)
Somebody assists in blood pressure control (n=238)			
No	43 (18.1)	70 (29.4)	113 (47.5)
Yes	43 (18.1)	82 (34.5)	125 (52.5)

Source: The authors (2020).

Note: Only valid answers were considered in the total of each variable.

Table 2 shows that 143 (60.1%) participants had two admissions to the ER services. This was more frequent in the same year, among people who did not have their hypertension diagnosis registered in the BHU, who went to the cardiologist last year, who had some type of bond with the BHU professionals, and who had a health plan.

Table 2 – Therapeutic adherence and characterization of the appointments in the health services attended by people who sought emergency care due to Systemic Arterial Hypertension acuteness and/or complications. Maringá, PR, Brazil, 2020

Variables	Adherence to Drug Therapy		
	No	Yes	Total
	n (%)	n (%)	n (%)
Reason for the admissions (n=238)			
Primary and/or secondary hypertension	69 (29.0)	110 (46.2)	179 (75.2)
Complications of hypertension	17 (7.1)	42 (17.6)	59 (24.8)
Number of admissions (n=238)			
2	55 (23.1)	88 (37.0)	143 (60.1)
≥3	31 (13.0)	64 (26.9)	95 (39.9)
Year(s) when the admissions took place (n=238)			
In a single year	47 (19.7)	88 (37.0)	135 (56.7)
In two years	33 (13.9)	59 (24.8)	92 (38.7)
In all three years	6 (2.5)	5 (2.1)	11 (4.6)
Hypertension diagnosis registered in the BHU (n=238)			
No	53 (22.3)	77 (32.1)	130 (54.6)
Yes	33 (13.9)	31.3 (31.3)	108 (45.4)
Already attended an appointment in the BHU (n=238)			
No	6 (2.5)	15 (6.3)	21 (8.8)
Yes	80 (33.6)	137 (57.1)	217 (91.2)
Already took part in HIPERDIA (n=237)			
No	64 (27.0)	106 (44.7)	170 (71.7)
Yes	22 (9.3)	45 (19.0)	67 (28.3)
Bond with the BHU professionals (n=238)			
No	22 (9.2)	54 (22.7)	76 (31.9)
Yes	64 (26.9)	98 (41.2)	162 (68.1)
Went to the cardiologist last year (n=238)			
No	34 (14.3)	55 (23.1)	89 (37.4)
Yes	52 (21.8)	97 (40.8)	149 (62.6)
Has a health plan (n=238)			
No	41 (17.2)	70 (29.4)	111 (46.6)
Yes	45 (18.9)	82 (34.5)	127 (53.4)

Source: The authors (2020).

BHU: Basic Health Unit

Note: Only valid answers were considered in the total of each variable.

Table 3 shows that individuals aged less than 60 years old and who sought the ER service in all three years under study were two to five times more likely to not presenting ADT. In addition, not having a bond with BHU professionals was a protective factor for non-adherence, as individuals who had contact with a BHU professional were nearly twice more likely to be non-adherent.

Table 3 – Significance, Odds Ratio and respective confidence intervals corresponding to the factors associated with the outcome: Non-Adherence to the Drug therapy, considering the adjusted final model (n=223). Maringá, PR Brazil, 2020

Variables	OR* (95% CI)	p-value
Age (years old)		
≥60	0.49 (0.27-0.903)	0.022
<60		-
Admission (years)		
In all three	5.08 (1.22-26.06)	0.031
In two	-	0.537
Only in one		-
Number of medications		
≥3	-	0.087
<3		
Bond with the Basic Health Unit professional		
No	0.51 (0.26-0.97)	0.045
Yes		-

Source: The authors (2020).

*OR: Odds Ratio, 95% CI: 95% Confidence Interval.

DISCUSSION

The higher proportion of low and average ADT levels among the study participants corroborates a meta-analysis including only studies that used MMAS-8, which identified that more than 45% of the people with AH were non-adherent⁸. A clinical trial that assessed the effectiveness of the discharge guidance and of the telephone contacts verified that, after 90 days, less than 20% of the participants presented high adherence to the drug therapy¹⁷.

The problem of non-ADT is found in different parts of the world. In Sub-Saharan Africa, for example, the prevalence of low and average adherence was 64.4%¹², whereas

it was 72.0% in Nepal¹⁹ and 72.5% in China⁴. These results reiterate the breadth of the care-related challenges inherent to planning strategies that favor monitoring and actions targeted at encouraging adherence aimed at people with AH.

The national literature points to discordant data about the prevalence of ADT, in addition to different classifications depending on the measuring instrument used. For example, in northeastern Brazil, 12.8% of the 421 individuals with hypertension monitored by the FHS presented high adherence⁷; however, the authors of another study conducted in this same region considered the adherence rate unsatisfactory¹⁸, whereas it was deemed satisfactory in southeastern Brazil¹¹.

The fact that an inverse relationship between age and non-adherence was identified corroborates results found in a cohort study conducted in Korea¹⁰. In Midwestern Brazil, a study conducted with 1,548 patients monitored at a Hypertension Treatment Multidisciplinary Service found lower adherence to the therapy among those younger than 60 years of old²⁰. It is possible that aged people, as well as those who do not work, have more time available to control their condition and also to use health services⁹, as better ADT levels have been identified in inactive or unemployed people⁷.

In addition, ADT in the aged population may reflect a longer period of time living with AH, greater knowledge about this condition and its risks, and fear of more severe complications or even death, for having already experienced the consequences of non-adherence⁴. In addition, at onset of the disease and especially in younger people, there is a possibility of absence of symptoms, mainly those that limit the activities of daily living¹⁹. This makes these individuals not recognize themselves as with a chronic condition, leading them to not follow the treatment properly, or even to abandoning it.

Referring to variables related to the association of the health teams and the health system with therapeutic adherence, it is important to consider that the appointments and educational actions in health services take place during business hours, coinciding with the work shift of most of the productive-age population⁹. Therefore, not working – which is more common aged people – favors access to health actions and to health services themselves, in addition to providing more availability to manage a chronic condition, which may influence the level of adherence to the antihypertensive therapy.

In turn, the fact that the results of the current study evidenced a significant association between the users' bond with the health professionals and non-ADT is instigating at the very least. However, although health professionals play an important role with people suffering from chronic diseases – by informing, clarifying doubts, supporting and encouraging self-care –, proper ADT is up to those suffering from the condition. This imposes a challenge on health managers and professionals for them to seek means that may contribute to solve this problem. In this sense, we emphasize the importance of professionals valuing interaction moments with users in order to more accurately identify factors that may interfere to a greater or lesser degree with ADT and, based on this information, establish, with the users, priorities and goals that can be achieved in the short-, medium- and long-term.

A research study conducted with 270 people with HA admitted due to cardiovascular complications found better adherence among those who did not seek the emergency service or who did so only once in the two-year period²¹. Other surveys also verified lower adherence in users with AH who mentioned some hypertensive emergency during the previous year⁷, as well as higher risk for complications and increased hospitalizations¹³.

Also in this context, ADT proved to be a predictor of blood pressure control, as one third of the participants with AH who were adherent to the therapy did not control their blood pressure levels¹¹. In turn, in aged patients, non-ADT proved to be associated with polypharmacy, presence of DM and early readmissions²². The fact that people who sought ER services in all three years were approximately five times more likely to be non-adherent to the therapy reveals the relationship between non-ADT and uncontrolled disease, corroborating what is pointed out in the literature.

In southern Brazil, it was also identified that those who had not attended appointments in BHUs presented more chances of not adhering to the pharmacotherapy and of having pressure non-control²³. It is worth noting that pressure non-control demands greater search for health services, which constitutes a bonding opportunity between users and professionals. However, they need to take advantage of these contacts so that, by means of differentiated assistance, they may identify the factors that hinder hypertension control.

A study conducted with 270 patients hospitalized due to some cardiovascular complication also failed to identify any association between ADT and been registered in Hipertdia. However, it did verify better adherence among those who attended between four and six Nursing consultations a year and that have received health guidelines in the last six months²¹. It is observed that, although actions targeted at health promotion and disease prevention were conceived and recommended³, they still represent an important challenge to care integrality and to the existing Health Care network²⁴.

Continuous monitoring centered on the patient favors ADT and improves the clinical condition. A clinical trial verified that the ADT proportion was three times higher in the Intervention Group than in the Control Group¹⁷. It is interesting to note that this result is somehow contrary to the one found in this study, as the bond with the BHU professionals did not result in better therapeutic adherence.

In order for hypertensive people to make conscious choices about the habits necessary to control their condition, they need to be motivated, informed and duly equipped with instruments about the disease and its possible complications and treatments, as well as on prevention means¹⁴. This is because countless factors can exert a significant impact on the patients' behavior regarding medication use, including presence of side effects, difficulties managing them and financial constraints²⁵.

In the current study, schooling failed to present an association with the ADT level, which differs from what is frequently found in the literature^{4,7,9,26}. Low schooling interferes with health literacy⁹ – a person's ability to read and interpret written information¹⁴ on package inserts and medical prescriptions, and even with understanding how to manage their own disease, based on the care plans established.

In this regard, a study conducted with 500 individuals with AH and DM in Colombia found that not being able to read written information on disease management and not receiving information on the benefits of the medications prescribed were pointed out as the cause of the low adherence levels observed, which in turn were strongly related to the schooling and knowledge levels¹⁴. Therefore, there is an obvious need to consider the different factors that may influence ADT, especially those related to all the information provided by health professionals and even the patients' understanding level.

In relation to the disease conditions, it was observed that the participants who made use of at least three medications also presented better ADT levels, as identified in other studies^{7,10,12}. This may be due to the fact that people believe that the more medications, the more severe the disease and, thus, they become more attentive and engaged in management of their health condition, in order to restore their well-being and quality of life¹⁰.

However, it is evidenced that the more continued use medications, the greater the difficulty taking them properly, resulting in lower ADT, which justifies the movement against polypharmacy and in favor of monotherapy²⁷. In this regard, a review with meta-analysis evidenced the importance of monotherapy in better adherence and clinical outcomes (with a reduction in outpatient/emergency consultations and in hospitalizations) among people with AH²⁶. It is worth noting that a study based on the analysis of 135 medical records of hypertensive people monitored in a BHU from southern Brazil observed that the proportion of patients with disease decompensation was lower among those on monotherapy than in those on dual therapy²⁸.

It is emphasized that the high proportion of non-ADT, the recurrence of acute AH complications and the limited or no influence of health services on these conditions, show the urgent need for innovations in the care provided to people with AH in PHC. The Telemonitoring services and sending messages via cell phones represent intervention possibilities to be considered¹⁸, and are even suggested in the latest Brazilian Hypertension Guideline. They have already proved to be effective in different countries and conditions^{17,29-30}, although they are still little used in Brazil.

In the PHC context, nurses are involved with organizational management and work mediation of the other professional categories, in addition to being responsible for many other activities. However, as nurses have technical ability and are the most accessible professionals to the population, especially to people with chronic conditions²¹, the relationship/bond with the users and education in health should be the priority of nurses' work. It is essential to provide these people with access to Nursing assistance centered on care integrality, thus favoring ADT. In addition, integration between different points of the Health Care Network may favor early identification of the population who seek ER services due to acute AH complications, enabling these patients to be assisted in a differentiated way in PHC.

The limitations of the current study are related to its cross-sectional design, which precludes establishing causal relationships, as well as the fact that all the clinical information was obtained by self-reporting, thus being prone to recall bias. In addition, the fact that the interviews were conducted by telephone may have impaired some answers, but it was the only possible strategy on that occasion due to the social distancing measures imposed to reduce spread of the pandemic caused by SARS-CoV-2.

CONCLUSION

Non-ADT in people who sought ER services due to hypertensive crisis and/or complications was associated with age below 60 years old, having a bond with PHC professionals, and seeking ER services in all three years under study.

The results found may support discussions between health managers and professionals, especially nurses, who sometimes act as team leaders, about the importance of implementing educational interventions, assistance and monitoring actions focused on non-ADT as a strategy to prevent risk factors and complications resulting from hypertension. In this sense, the relevance of establishing indicators and goals to be achieved with the AH users living in the territory covered by each BHU/Family Health Strategy unit stands out.

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