

Therapeutic Adherence among Hypertensive Outpatients Followed in the Cardiology Department of Grand Yoff General Hospital (HOGGY)

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Abstract

Introduction: Hypertension is one of the main modifiable cardiovascular risk factors and remains insufficiently controlled despite the availability of effective treatments. Therapeutic adherence is a major determinant of blood pressure control, particularly in low- and middle-income countries, where healthcare costs, irregular access to medication and the use of traditional treatments may compromise continuity of care. This study aimed to assess therapeutic adherence among hypertensive outpatients, describe the socioeconomic characteristics of the study population, estimate adherence levels, and explore bivariate associations between adherence and selected patient characteristics. **Methods:** This was a cross-sectional, descriptive and analytical study conducted from 7 August to 6 October 2017 in the outpatient cardiology department of Grand Yoff General Hospital in Dakar. Patients with known hypertension for at least six months, followed as outpatients, able to take their medication without assistance and who agreed to participate were included. Sampling was exhaustive, and the final sample comprised 99 patients. Sociodemographic, clinical and anthropometric data, lifestyle habits, comorbidities, complications, use of traditional treatment and blood pressure control were collected. Adherence was assessed using the six-item Girerd test (0 positive responses: good adherence; 1 - 2: minor adherence problems; ≥ 3 : poor adherence). Bivariate comparisons were assessed using Pearson's chi-square test, with statistical signifi-

cance set at 5%. **Results:** Mean age was 61.4 ± 11.6 years, and women accounted for 66.7% of the study population. Most patients came from Dakar (90.6%), and 64.3% had a monthly income of 60,000 CFA francs or less. Mean BMI was 26.6 ± 5.9 kg/m²; 34.7% were overweight and 26.5% were obese. Mean systolic blood pressure was 150.1 ± 20.3 mmHg, and systolic blood pressure was controlled in 35.4% of patients. Treatment discontinuation was reported by 43.4% and use of traditional treatment by 32.3%. According to the Girerd test, 45.5% had good adherence, 45.5% had minor adherence problems and 9.1% had poor adherence. **Conclusion:** Therapeutic adherence was overall intermediate, with insufficient blood pressure control. Improving adherence requires strengthened therapeutic education, simplification of prescriptions, better financial accessibility to treatment and a more structured patient-provider relationship.

Keywords

Hypertension, Therapeutic Adherence, Girerd Test, Blood Pressure Control, Senegal

1. Introduction

Hypertension remains one of the main modifiable cardiovascular risk factors worldwide. It contributes substantially to stroke, heart failure, ischaemic heart disease, chronic kidney disease and premature mortality [1]-[4]. Despite the availability of effective treatments, blood pressure control remains insufficient, particularly in low- and middle-income countries, where economic constraints, irregular access to medication, limited health insurance coverage and still fragmented chronic care systems compromise therapeutic continuity [5]-[8].

Therapeutic adherence, or adherence to treatment, refers to the degree of agreement between medical recommendations and patient behaviour. It concerns not only medication intake, but also lifestyle measures, attendance at appointments, clinical and biological monitoring, and long-term acceptance of an often asymptomatic disease [9]-[12]. In hypertension, the challenge is particularly important: the absence of immediate symptoms, the need for long-term treatment, medication costs, perceived adverse effects, beliefs about the disease and the use of traditional treatments may all contribute to treatment interruption or irregular use [13]-[17].

In sub-Saharan Africa, available data suggest that adherence is often insufficient, with levels varying according to populations, assessment methods and healthcare systems [18]-[22]. In Senegal, recent hospital-based data describing therapeutic adherence and its correlates among hypertensive patients followed in specialist outpatient care remain limited.

The general objective of this study was to assess therapeutic adherence among hypertensive patients followed as outpatients in the Cardiology Department of

Grand Yoff General Hospital. The specific objectives were to describe the socio-economic characteristics of the population, estimate therapeutic adherence levels, explore bivariate associations with selected patient characteristics, assess the relationship with hypertension-related complications and propose strategies for improvement.

2. Methods

This was a cross-sectional, descriptive and analytical study conducted from 7 August to 6 October 2017 in the outpatient clinic of the Cardiology Department of Grand Yoff General Hospital, a level 3 hospital located in Dakar. The department includes an outpatient consultation unit, a non-invasive investigations unit, an inpatient unit and a cardiac intensive care unit.

The study population consisted of patients with known hypertension followed as outpatients in the Cardiology Department. Patients with hypertension diagnosed for at least six months, with or without cardiovascular complications, able to take their medication without assistance and who agreed to participate in the study were included. Patients who refused to participate or who did not have full mental capacity were not included. Sampling was exhaustive: all patients seen in consultation during the study period who met the inclusion criteria were recruited. The final sample comprised 99 patients. The archived study records did not preserve the number of patients screened, the number who refused participation, or the number excluded; these recruitment-flow counts could therefore not be reconstructed.

The data collected included sociodemographic characteristics, namely age, sex, region of origin, marital status, schooling, occupation, monthly income and type of housing. Lifestyle habits analysed included tobacco and alcohol consumption, fruit and vegetable intake, and physical activity. Clinical data included heart rate, weight, height, body mass index, waist circumference and blood pressure values. Personal and family history, comorbidities, hypertension-related complications, use of traditional treatment, dietary measures and blood pressure control were also studied.

Operational definitions were those specified in the original study protocol. Monthly income was categorized as low ($\leq 60,000$ CFA francs), middle ($> 60,000$ to $\leq 150,000$ CFA francs), or high ($> 150,000$ CFA francs). Sedentariness was defined as the absence of daily physical activity or < 120 minutes of physical activity per week. Comorbidity was defined as hypertension associated with at least one of the following conditions: diabetes, heart disease, dyslipidaemia, chronic kidney disease, or obesity. Treatment interruption was recorded as self-reported suspension of prescribed antihypertensive treatment; the archived protocol did not specify a minimum interruption duration. Traditional treatment use was recorded by self-report as concomitant use of traditional therapy; the type, dose, and duration were not further classified. Dietary adherence was assessed only among patients who had been prescribed dietary measures and was based on self-reported com-

pliance with the prescribed regimen.

Therapeutic adherence was assessed using the Girerd adherence test, consisting of six closed-ended questions answered “yes” or “no”. Each “yes” response scored one point and each “no” response scored zero points. A total score of 0 indicated good adherence, 1 - 2 indicated minor adherence problems, and ≥ 3 indicated poor adherence. The archived study documentation did not record the language in which the questionnaire was administered or whether a translated or locally adapted version was used. Blood pressure was measured using an OMRON M6 electronic device after 10 minutes of rest in the seated position. Two consecutive measurements were obtained at both arms, and the lower recorded blood pressure values were retained for analysis; no single arm was prespecified. Blood pressure control in this study was defined by systolic blood pressure alone (SBP < 140 mmHg); diastolic blood pressure was not included in the control criterion. Data were entered using Sphinx V5 and analysed with Excel 2010 and Epi Info. Qualitative variables were expressed as numbers and percentages, while quantitative variables were expressed as means, medians, standard deviations and ranges. Recalculation from the archived contingency tables reproduced the reported bivariate p-values using Pearson’s chi-square test; this test is therefore specified for the comparisons presented in **Table 3**. Cramér’s V was added as a global effect-size measure for the three-category adherence outcome, with 95% confidence intervals derived from the noncentral chi-square distribution. Two-sided p-values < 0.05 were considered statistically significant. Because only archived aggregate contingency tables were available, no multivariable analysis could be reconstructed.

3. Results

The study population comprised 99 hypertensive patients. Mean age was 61.4 ± 11.6 years, with a range from 25 to 82 years. Women were predominant, representing 66.7% of the sample, with a male-to-female sex ratio of 0.5. Most patients were from Dakar, accounting for 90.6%. Married patients represented 69.7% of the study population. Among married patients with available data, 57.4% were in monogamous unions and 42.6% in polygamous unions. The proportion of patients who had attended school was 62.6%, with primary education being the most common level among those who were schooled. Housewives were the most frequent occupational category (26.3%), followed by retired patients (20.2%) and traders (15.2%). Monthly income was less than or equal to 60,000 CFA francs in 64.3% of patients (**Table 1**).

Risk behaviours were generally uncommon for tobacco and alcohol: 4.0% of patients were smokers and 5.0% consumed alcohol. Exposure to tobacco concerned 12.6% of patients. Physical activity was reported by 73.7%. Mean heart rate was 80.3 ± 14.8 beats per minute. Mean body mass index was 26.6 ± 5.9 kg/m²; 34.7% of patients had a normal BMI, 34.7% were overweight and 26.5% were obese. Mean systolic blood pressure was 150.1 ± 20.3 mmHg and mean diastolic blood pressure was 88.4 ± 12.6 mmHg. Systolic blood pressure was controlled, defined as SBP < 140 mmHg, in 35.4% of patients (**Table 2**).

Table 1. Sociodemographic and clinical characteristics of the study population.

Variable	Total n = 99
Total sample size	99 (100.0%)
Age, years	61.4 ± 11.6
Female sex	66 (66.7%)
Male sex	33 (33.3%)
Origin from Dakar	87/96 (90.6%)
Married	69 (69.7%)
Formal schooling	62 (62.6%)
No formal schooling	37 (37.4%)
Occupation: housewife	26 (26.3%)
Occupation: retired	20 (20.2%)
Monthly income ≤ 60,000 CFA francs	63/98 (64.3%)
Current smoking	4 (4.0%)
Alcohol consumption	5 (5.0%)
Physical activity	73 (73.7%)
BMI, kg/m ²	26.6 ± 5.9
Overweight	34/98 (34.7%)
Obesity	26/98 (26.5%)
SBP, mmHg	150.1 ± 20.3
DBP, mmHg	88.4 ± 12.6
Hypertension duration > 5 years	65 (66.3%)

Table 2. Therapeutic adherence, treatment follow-up and comorbidities.

Variable	Total n = 99
Good adherence	45 (45.5%)
Minor adherence problem	45 (45.5%)
Poor adherence	9 (9.1%)
Treatment interruption	43 (43.4%)
Knowledge of hypertension complications	62 (62.6%)
Diet prescribed	74 (74.7%)
Diet adherence	59/74 (79.7%)
Controlled SBP (<140 mmHg)	35 (35.4%)
Traditional treatment	32 (32.3%)
Diabetes	21 (21.2%)
Heart disease	21 (21.2%)
Dyslipidaemia	49 (49.5%)
Comorbidity present	64 (64.6%)

Table 3. Bivariate comparisons of therapeutic adherence across selected patient characteristics.

Variable	Good adherence	Minor adherence problem	Poor adherence	p-value; V (95% CI)
Age				0.005; 0.33 (0.10 - 0.51)
<60 years	10 (25.6%)	25 (64.1%)	4 (10.3%)	
≥60 years	35 (58.3%)	20 (33.3%)	5 (8.3%)	
Formal schooling				0.159; 0.19 (0.00 - 0.37)
Yes	25 (40.3%)	29 (46.8%)	8 (12.9%)	
No	20 (54.1%)	16 (43.2%)	1 (2.7%)	
Knowledge of hypertension complications				0.497; 0.12 (0.00 - 0.29)
Yes	29 (46.8%)	26 (41.9%)	7 (11.3%)	
No	16 (43.2%)	19 (51.4%)	2 (5.4%)	
Hypertension complications				0.864; 0.05 (0.00 - 0.19)
Yes	14 (48.3%)	12 (41.4%)	3 (10.3%)	
No	31 (44.3%)	33 (47.1%)	6 (8.6%)	
Comorbidity				0.209; 0.18 (0.00 - 0.35)
Yes	32 (50.0%)	25 (39.1%)	7 (10.9%)	
No	13 (37.1%)	20 (57.1%)	2 (5.7%)	
Income level				0.223; 0.17 (0.00 - 0.27)
Low	29 (45.3%)	32 (50.0%)	3 (4.7%)	
Middle	7 (43.8%)	7 (43.8%)	2 (12.5%)	
High	9 (47.4%)	6 (31.6%)	4 (21.1%)	
Number of medicines per day				0.912; 0.07 (0.00 - 0.12)
1	21 (42.9%)	23 (46.9%)	5 (10.2%)	
2	15 (50.0%)	12 (40.0%)	3 (10.0%)	
≥3	9 (45.0%)	10 (50.0%)	1 (5.0%)	
Traditional treatment				0.287; 0.16 (0.00 - 0.33)
Yes	14 (43.8%)	13 (40.6%)	5 (15.6%)	
No	31 (46.3%)	32 (47.8%)	4 (6.0%)	
Controlled SBP (complete-case n = 98)				0.645; 0.09 (0.00 - 0.26)
Yes	17 (48.6%)	14 (40.0%)	4 (11.4%)	
No	27 (42.9%)	31 (49.2%)	5 (7.9%)	

Note: Pearson's chi-square test was used for the bivariate comparisons. V denotes Cramér's V; 95% confidence intervals were derived from the noncentral chi-square distribution. The SBP comparison used the 98 observations available in the archived bivariate cross-tabulation. Sex-specific bivariate results were excluded because the archived sex cross-tabulation was internally inconsistent with the verified overall adherence totals.

Hypertension had been present for more than five years in 66.3% of patients. Treatment discontinuation was reported by 43.4%. Hypertension-related complications were known by 62.6% of patients. Dietary measures had been prescribed to 74.7%, and 79.7% of those concerned reported adhering to them. Use of tradi-

tional treatment was reported by 32.3%. Comorbidities were frequent and were dominated by dyslipidaemia (49.5%), obesity (26.5%), diabetes (21.2%) and heart disease (21.2%) (**Table 3**).

According to the Girerd adherence test, 45.5% of patients had good adherence, 45.5% had minor adherence problems and 9.1% had poor adherence (**Figure 1**). Age was the only variable showing a statistically significant bivariate association with adherence ($p = 0.005$; Cramér's $V = 0.33$, 95% CI 0.10 - 0.51): good adherence was observed in 58.3% of patients aged ≥ 60 years compared with 25.6% of those aged < 60 years. Descriptive differences according to schooling, comorbidity, hypertension-related complications, traditional treatment use and SBP control were not statistically significant (**Table 3**, **Figure 2**). The sex-specific adherence cross-tabulation in the archived report was internally inconsistent with the verified overall adherence totals and was therefore not retained in the revised bivariate table. The SBP-adherence cross-tabulation contained 98 observations, and this denominator is now explicitly reported.

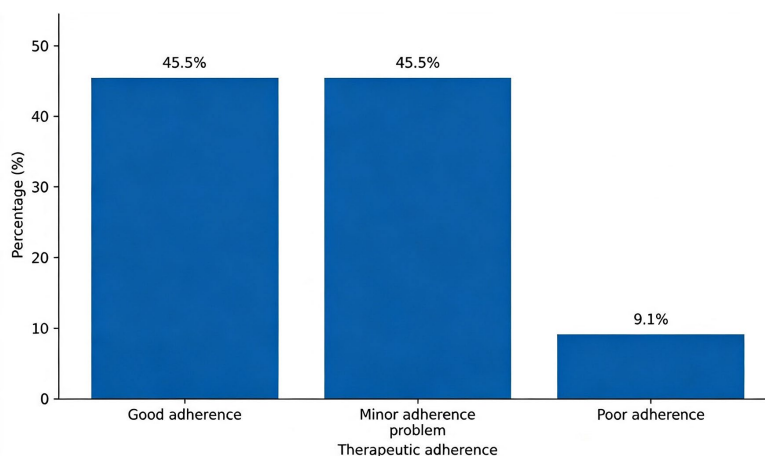


Figure 1. Distribution of patients according to therapeutic adherence (n = 99).

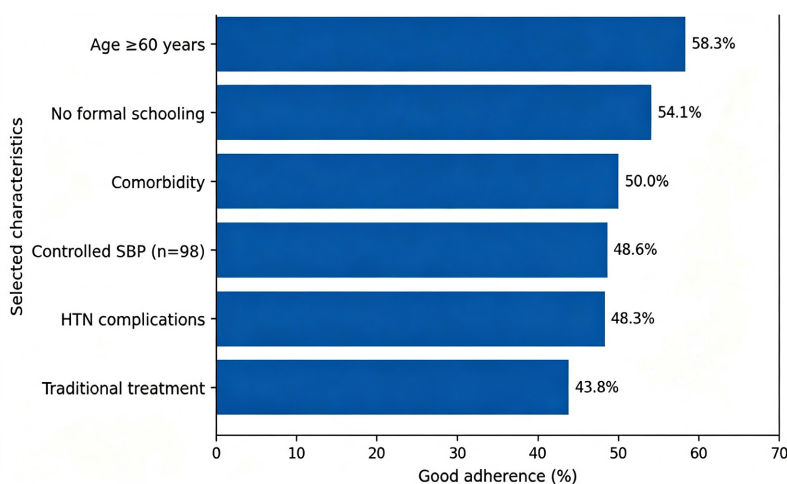


Figure 2. Descriptive proportion of good therapeutic adherence according to selected characteristics.

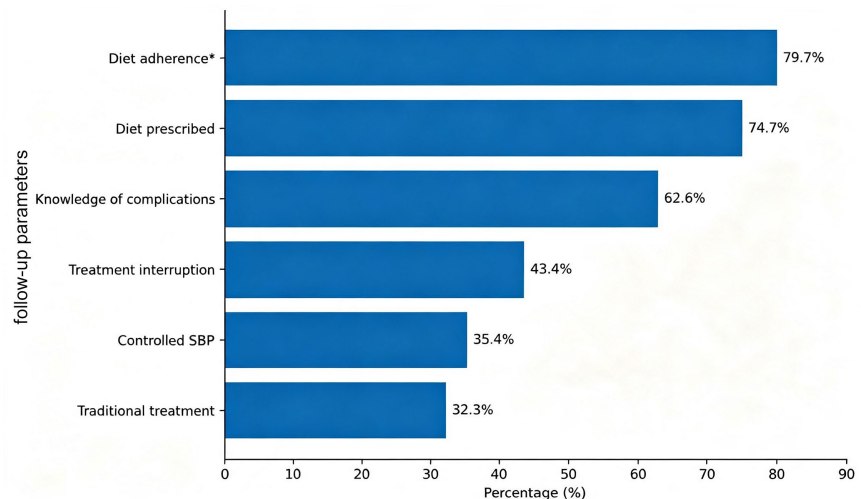


Figure 3. Treatment follow-up parameters and blood pressure control.

4. Discussion

This study describes therapeutic adherence among hypertensive patients followed in outpatient cardiology consultation at Grand Yoff General Hospital. The main finding was that slightly less than half of the patients had good adherence according to the Girerd adherence test, while an equivalent proportion had minor adherence problems and 9.1% had poor adherence. These data confirm that adherence should not be considered a binary variable, but rather a continuum ranging from complete adherence to occasional or repeated difficulties [9]-[12].

The sociodemographic profile of the population was that of relatively older patients, predominantly women, mostly living in Dakar, with a high proportion of low-income patients. The mean age of 61.4 years is consistent with the usual profile of hypertensive patients followed in cardiology. The female predominance may reflect greater use of healthcare facilities by women or greater availability for outpatient consultations. The high proportion of low-income patients is an important element, as the direct cost of medication, transport, investigations and consultations is one of the main determinants of treatment interruption in chronic diseases in sub-Saharan Africa [18]-[22].

The rate of good adherence observed in this study appears higher than that reported in several African series describing frequent poor adherence, but lower than levels observed in some high-income countries [19]-[24]. However, comparisons remain difficult because assessment tools differ. The Girerd test is simple, suitable for clinical practice and inexpensive, but it is based on self-reporting, which exposes it to social desirability bias. Electronic methods or biological assays are more objective, but remain difficult to access in our context [9] [25].

Age was the only variable with a statistically significant bivariate association with therapeutic adherence in this study. Patients aged ≥ 60 years had a higher proportion of good adherence than younger patients. No statistically significant association was observed for formal schooling, knowledge of hypertension complications, presence of hypertension-related complications, comorbidity, income

level, number of medicines per day, traditional treatment use or SBP control. These results are unadjusted bivariate associations and should not be interpreted as independent determinants or causal effects. The observed age difference may reflect differences in risk perception, experience with chronic disease or patterns of healthcare use, but these hypotheses cannot be tested with the available data.

An important finding was the low level of blood pressure control despite a substantial proportion of patients with good adherence. Only 35.4% of patients had controlled SBP. This suggests that adherence, although central, is not the only determinant of blood pressure control. Therapeutic inertia, insufficient doses, the use of complex regimens, a high-salt diet, obesity, interactions with traditional treatments and difficulties in regularly accessing medication may contribute to poor control [1]-[6] [26]-[29]. Treatment follow-up parameters and blood pressure control are shown in **Figure 3**.

This study has several limitations: a modest sample size, single-centre recruitment, self-reported measurement of adherence, absence of multivariable analysis and possible selection bias related to recruitment in specialist consultation. Additional limitations include the inability to reconstruct the numbers screened, refusing participation or excluded; the absence of documentation on the language of Girerd questionnaire administration or any local adaptation; and internal inconsistencies in some archived stratified tables. Unsupported individual-level values were not imputed or reconstructed. Nevertheless, the study has practical value and highlights the need to integrate adherence assessment into hypertension consultations together with therapeutic education, simplification of prescriptions, family involvement and improved financial accessibility of treatment.

5. Conclusions

Therapeutic adherence among hypertensive patients followed as outpatients in the Cardiology Department of Grand Yoff General Hospital was overall intermediate. Nearly half of the patients had good adherence, but an equivalent proportion had minor adherence problems, reflecting a real fragility in treatment continuity. Strict poor adherence concerned fewer than one in ten patients, but blood pressure control remained insufficient, with only about one-third of patients having controlled systolic blood pressure.

These findings show that improving adherence should be integrated into a comprehensive strategy for hypertension control. This strategy should combine a stronger doctor-patient relationship, repeated therapeutic education, simplification of treatment regimens, consideration of medication costs and involvement of family members. In a context where hypertension is often chronic, silent and costly in the long term, adherence should become a quality indicator of outpatient follow-up. Prospective multicentre studies with multivariable analysis are needed to better identify independent correlates of non-adherence.

Author Contributions

Conceptualisation: AAN and JSM; Formal analysis: AG; Writing - original draft:

AAN, NDG and JSM; Writing - review and editing: all authors.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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