Adherence to Antihypertensive Treatment and Associated Factors in Semi-urban Area in North Togo

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Abstract: *Background*. The purpose of this study was to determine the rate of non-adherence to antihypertensive therapy and to investigate factors that may explain this non-adherence. *Methods*. This is a cross-sectional study conducted from March to December 2017 in two public hospitals in the city of Kara. It included hypertensive patients known to have been on treatment for at least six months, and who were able to provide information to the Girerd self-questionnaire. A survey form was used to collect sociodemographic, clinical and therapeutic data. *Results*. Of the 216 received patients, 35.2% had good adherence and 64.8% had difficulties in adhering to their treatment (16.7% had minor adherence problems and 48.1% had poor adherence). The low level of education (OR=1.87; 95% CI=1.01-3.44; p=0.04), the short duration of progression (<5 years) of hypertension (OR=2.90; 95% CI=1.62-5.17; p=0.001), lack of financial resources (OR=2.78; 95% CI=1.37-5.64; p=0.04), non-staff status (OR=2.89; 95% CI 1.60-5.20, p<0.001) and the high number of tablets to be taken per day (OR=3.32; 95% CI 1.80-6.10; p≤ 0.001) were predictive factors for treatment non-compliance. *Conclusion*. Adherence to antihypertensive therapy was low in a hypertensive population in Northern Togo. Low education level, a duration of hypertension evolution of less than five years, lack of financial means, non-civil servant status and high number of tablets were the factors associated with nonadherence to treatment.

Keywords: Adherence to Treatment, Hypertension, Semi-urban Environment, North Togo

1. Introduction

High blood pressure (hypertension) is the most common chronic disease in the world and its prevalence is estimated to reach 1.56 billion people by 2025, corresponding to 29.2% of the world adult population [1]. The treatment of this disease has rarely achieved the desired blood pressure targets. In developed countries such as France, the rate of hypertensive patients controlled under treatment remains below 60% [2]. In almost all studies, non-compliance with treatment is the main factor responsible for this low rate of controlled hypertensive patients. Non-adherence to treatment has become a public health issue throughout the world because it is likely to worsen the morbidity and mortality associated with hypertension [3, 4].

The rate of non-adherence to antihypertensive treatment is variously assessed by the authors [5-8]. In Togo in 2013, a study carried out in the southern part of the country by Pio et al in an urban environment found that only 16% of hypertensive patients had good adherence to treatment [9]. In black African societies, increasing poverty and lack of social security coverage are the main causes of non-compliance [10].

The objectives of our study were to determine the rate of

non-adherence to antihypertensive treatment and to investigate the factors that could explain this non-adherence in a semi-urban population in Northern Togo.

2. Methods

This is an observational and cross-sectional study carried out in the city of Kara, which is the main city in the northern part of the country (Togo), over a period of 10 months from March to December 2017. Two public health structures were used as study framework: the University Hospital Center (Kara UHC) and the Regional Hospital Center (Kara-Tomdè RHC).

The study involved patients of 18 years of age and older with known hypertension who had been under treatment for at least six months. A survey form was developed to provide information on the socio-demographic, clinical and therapeutic aspects of the patients included. The survey included the Girerd Antihypertensive Adherence Self-Assessment Questionnary [11] (Table 1). Hypertensive patients arriving on an outpatient basis for follow-up are interviewed about the study and when they give their consent, the self-administered questionnaire is given to them and completed on site. Patients who could not read French were assisted by a nurse.

Table 1. Girerd's Compliance Assessment Test [11].

Compliance Assessment Test	Yes	No
1. This morning did you forget to take your medicine?		
2. Since the last consultation, have you run out of medicine?		
3. Have you ever taken your medication later than usual?		
4. Have you ever missed taking your medication because your memory is failing on certain days?		
5. Have you ever not taken your treatment because some days you feel that your treatment is doing you more harm than good?		
6. Do you think you have too many pills to take?		

Interpretation: Total YES=0 → good compliance; total YES=1 or 2 → minimal compliance problem; total YES ≥ 3 → poor compliance.

The studied parameters were: epidemiological data (age, sex, education, marital status, sector of activity [civil servants and non-civil servants], residence and lack of financial means [difficulty in obtaining medication due to lack of money]); clinical parameters (blood pressure, body mass index, presence of another chronic pathology such as diabetes, HIV/AIDS, stroke) and therapeutic modalities (monotherapy or fixed dual therapy in one dose, monotherapy in two doses or separate dual therapy [two tablets to be taken daily], separate triple therapy and quadruple therapy and more [at least four tablets to be taken daily]). Blood pressure was taken with a well-calibrated OMRON electronic blood pressure monitor after 15 minutes of rest. Blood pressure was considered to be equilibrated when the average of the last four self-measurements taken during the current month was less than 140/90 mmHg.

Statistical Analysis

Quantitative variables are presented as average±standard deviation and qualitative variables as headcount followed by percentage. The Chi-square test was used to compare categorical variables. In univariate analysis, poor compliance was studied according to socio-demographic characteristics. The odds ratio and its confidence interval were calculated by logistic regression. P values less than 0.05 were considered significant. Data processing was carried out using Epi info 7 software.

3. Results

3.1. Socio-demographic Aspects

A total of 216 patients were recruited for this study. The average age of the patients was 58.4±10.2 years (extremes: 34 and 80 years). Males represented 53.7% (116 patients) of the sample with a mean age of 57.6±10 years compared to 59.4±10.5 years for females (p=0.5). One hundred and twenty-four patients (57.4%) lived in a semi-urban area versus 92 patients (42.6%) who lived in a rural area. Table 2 shows the different socio-demographic aspects of the study population.

3.2. Clinical Elements and Therapeutic Attitudes

One hundred and twenty-eight patients (59.3%) had normal blood pressure on the day of the interview corresponding to the number of patients with a balanced hypertension. The rate of balanced patients was higher in women (64%) than in men (55.2%) with no statistically significant difference (p=0.1). Seventy-two patients (33.3%) had comorbidity associated with hypertension. Table 3 summarizes the clinical and therapeutic aspects of the patients.

Table 2. Socio-demographic characteristics.

Characteristics	Headcount (%)
Age range	
Less than 50 years old	40 (18.5)
Between 50 and 60 years old	72 (33.3)
Over 60 years	104 (48.2)
Education level	
Illiterate	32 (14,8)
Primary level	44 (20.4)
Secondary level	108 (50)
Upper level	32 (14.8)
Sector of activity	
Civil servant	112 (51.8)
Non-civil servant	104 (48.2)
Marital status	
Couple (married)	152 (70.4)
Single (widowed or single)	64 (29.6)
Lack of financial means	
Yes	156 (72.2)
No	60 (27.8)

Table 3. *Clinical Features and Therapeutic Modalities.*

Characteristics	Headcount (%)
Hypertension evolution duration	
<1 year	56 (25.9)
1 to 5 years	60 (27.8)
6 to 10 years	36 (16.6)
>10 years	64 (29.7)
Body Mass Index	
≤ 25 kg/m²	128 (59.3)
>25 and<30 kg/m²	40 (18.5)
≥ 30 kg/m²	48 (22.2)
Therapeutic protocol	
Single-take monotherapy or fixed bi or triple therapy (one tablet per day)	120 (55.5)
Monotherapy in 2 intakes or separate dual therapy (two tablets per day)	68 (31.5)
Three tablets daily	20 (9.3)
Four or more tablets per day	8 (3.7)

3.3. Level of Adherence

Adherence was good in 76 patients (35.2%) compared to 140 patients (64.8%) who had difficulties in correctly observing their treatment. Thirty-six patients (16.7%) had minimal compliance problems versus 104 patients (48.1%) who had poor compliance.

3.4. Investigation of Factors Associated with Non-adherence with Therapy

In patients younger than 50 years of age, the rate of non-adherence was 70%. This rate increased to 65% in patients between 50 and 60 years of age. In patients over 60 years of age the rate was 61.1%. When we transform this parameter into a dichotomous variable (age less than 58 years and age greater than or equal to 58 years), non-compliance with treatment is always higher in young patients (68.2%) compared to 62.5% in older patients. This difference in non-compliance rate between younger and older patients was not statistically significant (OR=1.3; 95% CI=[0.73-2.30]; p=0.9).

The study sample consisted of 152 patients living in a couple (married) versus 64 patients living alone (widowed or single). There was no significant difference in the rate of non-compliance (65.8%) between patients living in a couple and those living alone (62.5%); (OR=1.15; 95% CI=[0.63-2.11]; p=0.95).

The rate of non-adherence was higher in patients with primary education (81.82%) compared to 62.5% in illiterate patients; 55.6% in subjects with secondary education and finally 75% in patients with tertiary education. By grouping these patients into two groups, namely low education (illiterate and primary level) and high education (secondary and higher level), we find that the rate of non-compliance was significantly higher in patients with a low education level (73.7%) than in patients with a higher level (60%) (OR=1.87; 95% CI=[1.01-3.44]; p=0.04).

With regard to the duration of progression of hypertension, the rate of non-compliance was higher when the discovery of hypertension was more recent, i.e. 64.3% if the hypertension had progressed for less than 1 year; between 1 and 5 years the rate of non-compliance was 86.7%; 55.6% of non-compliance between 5 and 10 years and 50% if the hypertension had progressed for more than 10 years. When this parameter is transformed into a dichotomous variable, non-compliance is higher (75.9%) when the HBP has been less than 5 years compared to 52% non-compliance when the HBP has been 5 years or more. This difference was statistically significant (OR=2.90; 95% CI=[1.62 - 5.17]; p=0.001). Of the 120 patients who had only one drug to take at one time (monotherapy or fixed dual or triple therapy), 64 (53.3%) were non-compliant. This rate of non-compliance increased as the number of tablets to be taken per day increased (Figure 1). A total of 96 patients were taking two or more tablets per day for one or more drugs, and the non-compliance rate in these patients was 79.2% (76 of 96 patients). The search for factors associated with non-compliance is summarized in Table 4.
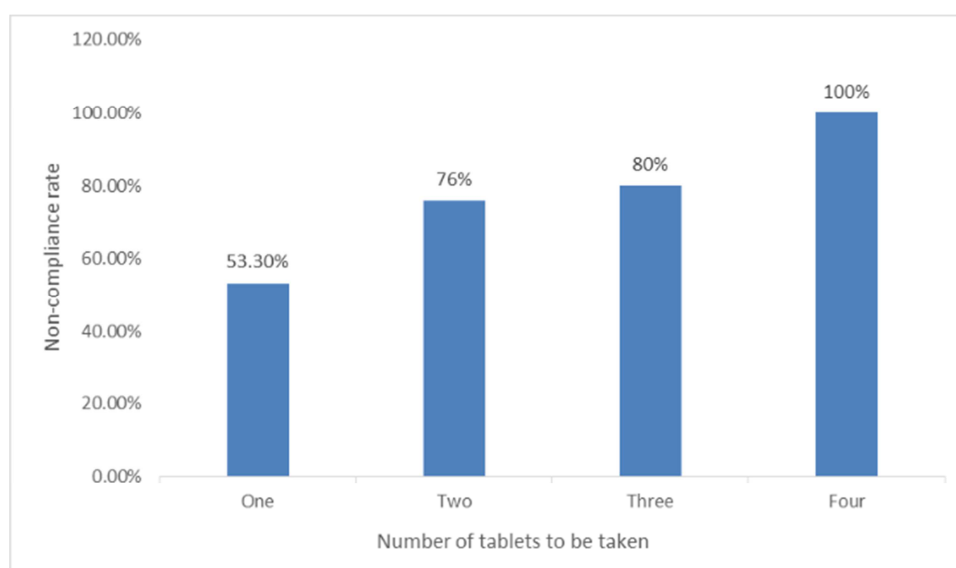

Figure 1. *The rate of non-compliance according to the number of tablets taken per day.*

Table 4. *Factors associated with non- compliance to therapy.*

Variables		Total headcount	Non-compliance rate	OR [CI95%]	P
Sector of activity	Civil servant	112	76,9%	2,89 [1,60-5,20]	<0,001
	Non-civil servant	104	53,6%		
Sex	Male	116	62,1%	1,30 [0,74-2,02]	0,9
	Female	100	68%		
Residence	City	124	61,3%	1,44 [0,81-2,55]	0,1
	Countryside	92	69,6%		
Associated chronic disease	Yes	72	61,1%	0,78 [0,43-1,4]	0,9
	No	144	66,7%		
BMI	Normal	128	68,7%	1,52 [0,86-2,68]	0,1
	Abnormal	88	59,1%		
Lack of financial resources	Yes	156	59%	2,78 [1,37-5,64]	0,01
	No	60	80%		
Age	<58 years	88	68,2%	1,3 [0,73-2,30]	0,9
	≥ 58 years	128	62,5%		
Marital status	In couple	152	65,8%	1,15 [0,63-2,11]	0,95
	Single	64	62,5%		
Level of education	Low	76	73,7%	1,87 [1,01-3,44]	0,04
	High	140	60%		
Duration of the HBP evolution	<à 5 years	116	75,9%	2,90 [1,62-5,17]	0,001
	≥ à 5 years	100	52%		
Number of tablets per day	1 tablet	120	53,3%	3,32 [1,80-6,10]	<0,001
	≥ 2 tablets	96	79,2%		

OR=Odd ratio; IC=Confidence Interval; BMI=Body Mass Index; HBP=High Blood Pression

4. Discussion

This observational study, which we conducted in a low income population, allowed us to determine the rate of antihypertensive treatment non-compliance and to investigate the factors associated with this non-compliance [12]. Our sample size of 216 patients is close to that of other studies conducted in the sub-region: Ikama and al [7] in Congo (212 patients), Pio and al [9] in Togo (363 patients) and Adoubi and al [8] in Ivory Coast (332 patients). This allows us to compare our results with those of these studies, even though other studies have involved much larger samples: Koffi and al [6] in Ivory Coast (1000 patients), Reach and al [13] in France (3242 patients).

Several methods have been used in the past to determine or assess compliance with treatment. The method of history taking and clinical evaluation [14, 15] is unreliable and sometimes overestimates compliance because patients tend to say what the doctor wants to hear. Serum or urinary drug concentration [16] is sometimes inaccessible and the use of the electronic pill dispenser [17], which is expensive and difficult to handle, means that these methods are almost never used. The method most commonly used by most authors is the standardized self-questionnaire developed by Girerd et al [11].

In our series, good compliance was found in 35.2% of the cases against 64.8% of patients who had difficulties to correctly comply with their prescriptions (48.1% poor compliance and 16.7% minimal compliance problems). All the studies carried out in the sub-region (sub-Saharan Africa) show low rates of good adherence: Pio and al in Togo reported 16.25% good adherence against 83.75% who had

difficulties in complying with their treatment (poor adherence + minor problems of adherence) [9]. Ikama and al in Congo reported in their series that 21.2% of patients had good adherence versus 78.8% non-adherence [7]. In addition, Adoubi and al in Ivory Coast reported 26.8% good compliance versus 73.2% non-compliance [8]. In all these studies, it appears that poverty, lack of fixed income and lack of social security coverage were at the root of this high rate of non-compliance. This aspect is found in the work of Koffi and al in Ivory Coast who conducted a two-phase study [6]: during the first phase (without therapeutic education), adherence to therapy was only 15% and after the second phase (five sessions of therapeutic education) the rate of good adherence rose to 85%. The compliance rate in our study (35.2%), which was remarkably higher than in other studies in the sub-region, could be linked to the state health insurance (for civil servants) introduced a few years ago (since 2011) and which allows patients to obtain medicines more easily. In addition, our sample was composed of a high rate (64.8%) of patients who have a high level of education (secondary and higher) and who have a higher income enabling them to obtain medicines; this could constitute a recruitment bias and mean that it is civil servants who can afford to visit our hospitals. It should also be noted the effort made by the nursing staff, especially cardiologists, during consultations to provide good therapeutic education to patients. This rate (35.2%) of good adherence in our study, which we describe as high compared to other studies in the sub-region (sub-Saharan Africa), is much lower than in developed countries: Girerd and al in France found 64% good adherence in a high-income population with the most efficient universal health insurance system in the world, thus proving the negative influence of financial insecurity on

adherence to treatment in developing countries [5].

In our study, it appears that the low level of education, the short duration of evolution (less than 5 years) of the hypertension, the lack of financial resources, the status of non-civil servant, and the high number of tablets to be taken per day were the factors associated with non-compliance with treatment. Indeed, the low level of education and the absence of a fixed income (non-civil servants) are factors that stem from the low socio-economic level of the Togolese population, the majority of whom live below the poverty line [12]. In all the studies conducted on adherence to antihypertensive treatment, the financial precariousness of patients is often mentioned among the causes of poor adherence. Developed countries are no exception to this observation: Reach and al in France reported that it is the second most common factor of non-compliance in both men and women [13]. Wamala and al in Sweden have also highlighted the association between social precariousness and therapeutic non-adherence [18]. In order to improve the rate of adherence to treatment, the socio-economic level of the population must be improved. False beliefs are also a factor in poor adherence in black sub-Saharan populations [6]. This factor (false belief) is most pronounced in the early stages of hypertensive disease, but as time progresses and through the effect of therapeutic education, patient adherence to treatment increases and adherence rates improve [6]. This then explains the higher rate of non-compliance in patients whose hypertension has progressed for less than 5 years compared to those whose hypertension has progressed for more than 5 years, observed in our study.

In our study, gender was not a predictor of treatment non-compliance. In the literature the data differ from one study to another. For example, Pio and al [9] in Togo reported the same results as we did in a study conducted in an urban setting while in Côte d'Ivoire Konin and al [10] found that men were slightly more observant than women because in our societies, women generally depend on the income of their husbands. In contrast to Konin and al [10], Girerd and al [5] in France found that men were the worst observers.

In our series, the rate of non-observance decreases slightly with increasing age without significant difference. Our results are comparable to those of Pio and al [9] who found that patients in the 50-60 age group were the worst observers because they are the most subject to the demands of working life and therefore it is often difficult for them to comply with doctors' advice. Girerd and al made the same observation in France where young age was a predictor of poor compliance [5]. The other sociodemographic factors, namely marital status and residence, did not show any influence on the rate of non-compliance.

We found that the rate of non-compliance was lower in patients on monotherapy, bi- or triple fixed-dose single-tablet therapy, and this rate increased as the number of tablets to be taken per day increased. This finding was consistent across almost all studies [8, 10, 13]. This demonstrates the need to move towards fixed-dose, once-a-day combinations to promote good adherence.

5. Conclusion

Adherence to antihypertensive treatment was low in a hypertensive population living in a semi-urban area in northern Togo. Factors such as the low level of education, the short duration of progression of hypertension, lack of financial resources, the status of non-civil servant and the high number of tablets to be taken per day were associated with this poor compliance. There is a need to improve adherence to treatment for our populations through basic program involving access to basic education, more extensive medical coverage and therapeutic education sessions.

Data Availability

The datasets used and analyzed during the current study are not publicly available but the raw dataset are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflict of interest.

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