(RESEARCH ARTICLE)

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Overview of therapeutic inertia in the treatment of high blood pressure in type 2 diabetic patients monitored in Ouagadougou: Prevalence, determinants and implications for clinical practice

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Abstract

Introduction: High blood pressure is one of the comorbidities frequently associated with type 2 diabetes. However, its therapeutic management is often characterized by therapeutic inertia. This study aimed to assess the prevalence and factors associated with therapeutic inertia in the pharmacological management of high blood pressure in patients with type 2 diabetes.

Methodology: This was a cross-sectional, descriptive, and analytical study conducted in Ouagadougou from January 1, 2022, to December 31, 2024. The analysis included the evaluation of the score, modalities, and factors associated with therapeutic inertia.

Results: A total of 384 patients were included. The average age of the patients was 61.03 years, with a strong female predominance. The average duration of diabetes was 13.97 years and that of high blood pressure was 15.52 years. More than half of the patients (52.08%) experienced therapeutic inertia. The overall therapeutic inertia score was 61.41%. The only form of therapeutic inertia observed was the failure to intensify antihypertensive treatment. Non-compliance and discontinuation of antihypertensive treatment were the factors significantly associated with therapeutic inertia.

Conclusion: The therapeutic management of high blood pressure is inadequate in patients with type 2 diabetes in Ouagadougou, as characterized by a high therapeutic inertia score. The only form of therapeutic inertia observed was the failure to intensify treatment, which was associated with non-compliance and discontinuation of antihypertensive treatment.

Keywords: Therapeutic Inertia; Hypertension; Type 2 Diabetes; Ouagadougou

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1. Introduction

Type 2 diabetes (T2D) and high blood pressure (HBP) are noncommunicable diseases (NCDs) whose health burden is growing worldwide, particularly in sub-Saharan Africa (SSA)[1] . In patients with type 2 diabetes, high blood pressure (HBP) is one of the most common comorbidities (66% of T2D patients)[2] . The combination of HBP and T2D significantly increases the risk of micro- and macroangiopathic complications and cardio-renovascular mortality[3] . In Burkina Faso, HTN is also a major concern, with an estimated prevalence of 24.8% in 2021[4] . Recent international recommendations agree on strict control, with a blood pressure target of less than 130/80 mmHg in most diabetic and hypertensive patients[5] . Despite these recommendations and the availability of effective antihypertensive drugs, a significant proportion of diabetic and hypertensive patients do not achieve their blood pressure targets. This failure to achieve targets is often attributed to therapeutic inertia (TI), defined as the failure to initiate or intensify antihypertensive treatment when blood pressure remains above the set targets[6] . Internationally, the frequency of therapeutic inertia in the treatment of hypertension in T2D varies between 30% and 60% depending on definitions and contexts, with factors related to practitioners, patients, and the healthcare system[7,8] . In Africa, studies estimate the frequency of this inertia to be between 80 and 90% in hypertensive patients[5] . These findings show that TI in the treatment of hypertension in diabetics is a well-documented problem internationally[9] , but one that has been little explored in West Africa, particularly in Burkina Faso[8,10] . This study was therefore initiated to assess the extent of the phenomenon and identify the associated factors in a specialized hospital setting, in order to provide levers for intervention to improve clinical practice and reduce IT in the African context.

2. Materials and methods

2.1. Setting and type of study

The study was conducted in the internal medicine department of the Yalgado Ouédraogo University Hospital Center (CHU-YO) in Ouagadougou, which is the referral center for diabetes care in Burkina Faso. This was a cross-sectional study with a descriptive and analytical focus on data from patients seen in outpatient internal medicine consultations from 2023 to 2024.

2.2. Study population and sampling

The study population consisted of T2D patients with hypertension who were followed up on an outpatient basis in the Internal Medicine Department at CHU-YO. The sample size was calculated using the SWARTZ formula, based on an estimated prevalence of 50% (in the absence of precise local data). This resulted in a minimum sample size of N=384.

2.3. Inclusion criteria

Patients with T2DM and known hypertension who were followed up on an outpatient basis in Internal Medicine during the period 2023-2024 and whose medical records and health records included blood pressure measurements and the prescription of antihypertensive treatment were included.

2.4. Exclusion criteria

Patients who had been followed for less than six months, patients over the age of 74, or those whose records were incomplete or did not include recorded blood pressure measurements were not included. The exclusion of patients over the age of 74 was intended to avoid cases of IT due to "appropriate inaction," where blood pressure targets are relaxed due to geriatric frailty and the risks associated with iatrogenic hypotension.

2.5. Variables and operational definitions

The variables in the study concerned sociodemographic characteristics (age, gender, socioeconomic status, place of residence), clinical aspects (duration of diabetes and high blood , complications), cardiovascular risk factors (overweight, dyslipidemia, sedentary lifestyle), and therapeutic aspects (IT score, compliance and treatment discontinuation, type of treatment).

2.6. Operational definitions

Therapeutic inertia (TI): defined as the failure to initiate or intensify antihypertensive treatment when blood pressure was not controlled.

Therapeutic inertia score (TI score): ratio between the number of consultations where TI was observed and the total number of consultations where a therapeutic change was indicated.

Therapeutic targets: In accordance with the ESC study recommendations, the blood pressure target was BP < 130/80 mmHg.[11]

Non-compliance and treatment discontinuation: Non-compliance was recorded when irregular medication use was explicitly mentioned in the medical record. Discontinuation referred to prolonged interruption of treatment, regardless of the reasons.

2.7. Data collection and analysis

Data were collected using a data collection form based on interviews with patients and a review of medical records, notebooks, and consultation registers. Telephone calls were made to collect missing information, particularly for patients undergoing simultaneous follow-up in cardiology or nephrology, in order to compare blood pressure values and therapeutic adjustments.

The data were entered and analyzed using Excel and SPSS version 27 software.

Quantitative variables were expressed as mean and standard deviation, and qualitative variables as numbers and percentages. Comparisons were made using the chi-square test and Student's t-test. Associated factors were studied using binary logistic regression. All variables with a p-value <0.3 in univariate analysis were included in the multivariate analysis to identify factors associated with IT, with a threshold of p<0.05.

3. Results

3.1. General and sociodemographic characteristics

The study included 384 patients with T2DM and hypertension. The mean age was 61.03 years. The population was predominantly female (72.1%), with a male-to-female ratio of 0.39. The 65-74 age group was the most represented (51.8%).

Table 1 General and sociodemographic characteristics of the cohort

Sociodemographic characteristics	Number (n)	Frequency (%)
Gender		
Female	277	72.1
Male	107	27.9
Age		
<40	10	2.6
[40-65	175	45.6
[65-74]	199	51.8
Marital status		
Married	320	83.3
Widowed	58	15.1
Single	4	1
Divorced	2	0.5
Level of education		
No schooling	114	29.7

Primary	110	28.7
Secondary	103	26.8
Higher	57	14.8
Socio-professional status		
Housewife	175	45.6
Civil servant	77	20.1
Retired	56	14.6
Merchant	35	9.1
Farmer	22	5.7
Informal sector worker*	19	4.9
Residence		
Urban	315	82
Rural	69	17.9
Socioeconomic status		
Low	202	52.6
Medium	179	46.6
High	3	0.8

3.2. Clinical characteristics and risk factors

3.2.1. Clinical aspects of diabetes and hypertension

The average duration of T2D was 13.97 years, and that of HTN was 15.52 years. These long durations indicate that the cohort is composed of long-standing diabetic patients (duration > 10 years), classifying them in the very high cardiovascular risk category regardless of other factors, as shown in table 2.

Table 2 Distribution of type 2 diabetic and hypertensive patients according to clinical characteristics (N=384).

Characteristics	Number (n)	Frequency (%)
Circumstances of discovery of diabetes		
Accidental	360	93.8
Clinical suspicion	20	5.2
Complications	4	1
Duration of diabetes		
≤ 5 years	106	27.6
]5-10] years	108	28.1
]10-15] years	87	22.7
]15-20] years	60	15.6
>20	23	5.99
Diabetes complications		
Retinopathy	27	7

Neuropathy	11	2.9
Nephropathy	2	0.5
Circumstances of discovery of hypertension		
Incidental	381	99.2
Clinical suspicion	3	0.8
Duration of hypertension		
< 5	122	31.8
[5-10	105	27.3
[10-15[	73	19
[15-20[	40	10.4
>20	27	7

3.2.2. Cardiovascular risk factors and comorbidities

Among the patients included in the study, 54.43% were overweight and 46.35% were sedentary. table 3 below shows the distribution of patients according to other cardiovascular risk factors.

Table 3 Distribution of patients with type 2 diabetes and hypertension according to other cardiovascular risk factors (N=384).

Cardiovascular risk factors and comorbidities	Number (n)	Frequency (%)
Cardiovascular risk factors Cardiovascular Overweight	209	54.4
Sedentary lifestyle	178	46.4
Dyslipidemia	151	39.3
Alcohol consumption	72	18.8
Metabolic syndrome	47	12.2
Tobacco use	8	2
Associated conditions		
Chronic renal failure	25	6.5
Stroke/TIA*	20	5.2
Eye damage	13	3.4
Heart failure	6	1.6
Hemoglobinopathy	6	1.6
Chronic liver disease	4	1
HIV infection**	3	0.8

* Stroke/TIA: stroke/transient ischemic attack; **HIV: human immunodeficiency virus

3.3. Therapeutic characteristics of the study population

3.3.1. Therapeutic aspects of diabetes

The majority of diabetic patients (94.5%) were treated with oral antidiabetic drugs, with a predominance of monotherapy (68.9%).

Table 4 Distribution of type 2 diabetic and hypertensive patients according to therapeutic characteristics of diabetes (N=384).

Therapeutic characteristics of diabetes	Number (n)	Frequency (%)
Type of medication		
Insulin	47	12.2
Oral antidiabetic	363	94.5
Treatment strategy		
Monotherapy	250	68.9
Dual therapy	109	30
Triple therapy	4	1
Number of tablets antidiabetic		
<5	354	92.2
≥5	9	2.4

3.3.2. Therapeutic characteristics of hypertension

Antihypertensive treatment was initiated and monitored in internal medicine in nearly half of the patients (49.74%). These patients were also on antihypertensive monotherapy, which is suboptimal given the high cardiovascular risk profile of this diabetic population. The following table shows the distribution of patients according to the therapeutic aspects of hypertension.

Table 5 Distribution of type 2 diabetic and hypertensive patients according to therapeutic characteristics of hypertension (N=384).

Therapeutic characteristics of hypertension	Number (n)	Frequency (%)
Place of follow-up		
Cardiology	192	50
Internal medicine	191	49.7
Nephrology	1	0.3
Strategy		
Monotherapy	191	49.7
Dual therapy	150	39
Triple therapy	24	6.3
Quadruple therapy and above	19	4.95
Number of antihypertensive tablets taken per day		
<5	376	97.9
≥5	8	2
Regularity of follow-up		

Yes	336	87.5
No	48	12.5
Discontinuation of treatment		
No	337	87.8
Yes	47	12.2
Therapeutic compliance		
Yes	321	83.6
No	63	16.4

3.4. Data on treatment inertia

3.4.1. Proportion of treatment inertia

Among our patients, 52.08% (i.e., 200 patients) experienced at least one episode of TI during follow-up. Analysis of the progression of inertia during the various consultations shows an increasing trend in TI, which rose from 54% at the first consultation (C1) to 75% at the fourth consultation (C4). This finding reflects increasing difficulties in intensifying antihypertensive treatment despite unmet targets. The table 6 below illustrates the proportion of TI during the various follow-up consultations.

Table 6 Proportion of patients with type 2 diabetes and hypertension who experienced treatment inertia during the various consultations.

Consultation	Total number of patients	Number of patients indicated for therapeutic changes	Number of patients who did not receive a change	Proportion (%)
Consultation 1	384	268	145	54
Consultation 2	365	198	128	65
Consultation 3	280	131	86	66
Consultation 4	155	56	42	75

3.5. Therapeutic inertia score

The overall therapeutic inertia score was estimated based on 1,184 consultations. Among these, a change in treatment was indicated in 653 consultations, but was only implemented in 252 consultations. The number of consultations with TI therefore amounts to 401, which corresponds to an average overall TI score of 61.41%.

Table 7 Therapeutic inertia scores during different consultations

Consultations	Number of consultations (n)	Number of consultations with indication of therapeutic modification	Number of consultations with changes not made	Inertia score (%)
Consultation 1	384	268	145	54.1%
Consultation 2	365	198	128	64.65%
Consultation 3	280	131	86	65.65%
Consultation 4	155	56	42	75

3.6. Therapeutic inertia modalities

Analysis of the modalities in our series shows that non-intensification of antihypertensive treatment was the only modality observed (100% of consultations).

3.7. Factors associated with therapeutic inertia

Univariate analysis revealed several clinical and therapeutic factors associated with TI, including duration of diabetes (p=0.031), regularity of hypertension monitoring (p=0.031), presence of metabolic syndrome (p=0.028), non-compliance with treatment (p=0.005), and treatment discontinuation (p<0.001). Multivariate analysis identified two factors significantly associated with IT, namely non-adherence to treatment (p=0.009, OR=1.8) and treatment discontinuation (p=0.022 OR=2.520).

Table 8 Factors associated with treatment inertia in multivariate analysis

Variables	Odds Ratio	95% confidence interval		P-value
		Lower	Upper	
Age				
>40	-	-	-	-
[40-65[	1.645	0.358	7,565	0.523
[65-74]	1.222	0.753	1.985	0.417
Gender				
Women	1.354	0.786	2.331	0.275
Male	-	-	-	-
Socioeconomic status				
Low	-	-	-	-
Average	1.09	0.671	1.771	0.728
High	1.169	0.061	22.47	0.917
Therapeutic non-compliance				
No	-	-	-	-
Yes	1,809	1,013	3,583	0.009
Total number of medications taken by the patient	0.934	0.815	1.071	0.326
Duration of progression				
<10	1.003	0.975	1.032	0.814
>10	-	-	-	-
Alcohol				
No	-	-	-	-
Yes	1.348	0.713	2.549	0.358
Overweight				
No	-	-	-	-
Yes	1.307	0.183	9.333	0.79
IRC				
No	-	-	-	-
Yes	0.723	0.26	2.014	0.535

Dyslipidemia				
No	-	-	-	-
Yes	1.223	0.646	2.315	0.537
Metabolic syndrome				
No	-	-	-	-
Yes	0.511	0.218	1.201	0.124
Duration of hypertension	0.981	0.928	1.036	0.491
<10	1.003	0.975	1.032	0.814
>10	-	-	-	-
Duration of diabetes				
<10				-
>10	0.687	0.445	1.059	0.089
Regularity of treatment				
Yes	0.898	0.077	10.467	0.932
No	-	-	-	-
Therapeutic break				
Yes	2.52	1.004	4.235	0.022
No	-	-	-	-

4. Discussion

The objective of our work was to assess therapeutic inertia in the pharmacological treatment of hypertension over the last two years of follow-up of T2D patients in internal medicine. The interpretation of the results obtained must take into account certain limitations inherent in the retrospective nature of our study. Our study also had some limitations and biases, including:

- Selection bias due to the number of incomplete records
- Information bias due to the absence of certain data and the assessment of non-compliance and discontinuation often based on self-reporting
- Despite these limitations and biases, we obtained relevant results that were compared with existing data.

4.1. General and clinical profile of the cohort

In our study, the high average age of patients (61 years) and the long duration of diabetes (13.97 years) and hypertension (15.52 years) show that our cohort is at high cardiovascular risk and particularly vulnerable to degenerative complications. Our results are similar to those of Sow et al. in Mali [55] and Khalid in Morocco [37], who found an average age of 60 and 58 years, respectively, in the same population. In Burkina Faso, the 2021 STEPS survey report found a predominance of the 45-69 age group in the association between high blood pressure and diabetes[4] . These data reinforce the relevance of targeting this population in screening strategies and integrated care for hypertension and diabetes. Our patients have uncontrolled risk factors, such as being overweight (54.4%) and sedentary (46.4%). These results highlight a very high cardiovascular risk that is insufficiently controlled.

Indeed, the high prevalence of overweight and sedentary lifestyles has a negative impact on the control of hypertension, as they are associated with elevated blood pressure, resistance to antihypertensive treatments, and increased cardiovascular morbidity and mortality[12–14] . In addition, an average blood pressure of 137.48/83.2 mmHg indicates that the majority of patients did not reach the recommended blood pressure target (<130/80 mmHg) despite high and very high cardiovascular risk[14] . These observations argue for making the fight against hypertension a public health priority. The strong female predominance (72.1%) is consistent with data reported in Burkina Faso by the National Institute of Statistics and Demography (INSD)[15] .

4.2. Data on treatment inertia

4.2.1. Proportion of therapeutic inertia

In our study, more than half of the patients (52.08%) were victims of therapeutic inertia. Our results are higher than those observed in other African contexts. Thiam in Senegal found a frequency of 32.43%, and Bettaibi in Tunisia reported a proportion of 36% of therapeutic inertia[16] . The higher proportion of therapeutic inertia in our series can be explained by the profile of our patients (long-standing diabetes and hypertension, multiple comorbidities). These results confirm that therapeutic inertia remains a major problem, varying according to context, hence the need for targeted interventions aimed at improving therapeutic intensification and the overall quality of care for patients at high cardiovascular risk[17–19] .

4.2.2. The therapeutic inertia score

In our study, the average therapeutic inertia score across all consultations was 61.41%, with variations ranging from 54% to 75%. These results reflect a large number of missed opportunities to intensify treatment when it was indicated. Although this score is high in our series, it is lower than those of other international studies, such as those by Okonofua in the US, who reported a score of 86.9% [27], Bencherif in France, who reported a score of 84.2%[20] , and Ouattara in Burkina Faso, in cardiology consultations, who reported an average score of 86%[21] . This result and the differences observed in our series with the higher scores found in high-income countries[22] and in specialized services such as cardiology highlight the need to strengthen professional practices, in particular through strategies for the continuing education of prescribers on recommendations and the use of decision support tools in order to reduce therapeutic inertia[23] . In addition, the high TI score observed in our study increases over the course of consultations (from 54% at C1 to 75% at C4). This reflects the existence of barriers to optimal control of high blood pressure, despite the high cardiovascular risk of patients in our cohort. It therefore appears crucial to strengthen practitioners' skills and therapeutic education for patients in order to reduce this inertia and optimize blood pressure control[21,24] .

4.2.3. The nature of therapeutic inertia

In our series, therapeutic inertia is characterized exclusively by the non-intensification (100%) of antihypertensive treatment despite insufficient control of blood pressure and the high cardiovascular risk profile of our patients. Thiam in Senegal found that 67.57% of patients had not started treatment. Indeed, the literature highlights that inertia is multifactorial and multimodal. It can take the form of a total lack of treatment initiation or intensification despite blood pressure values[23] . These attitudes constitute a major obstacle to achieving blood pressure targets and reducing cardiovascular risk and involve factors related to the prescriber (workload, clinical uncertainty, lack of continuing education), the patient (comorbidities, perceived adherence), and the healthcare system (limited consultation time, access to specialized care and low-cost medication),[25,26] . This inertia in our series shows that hypertension in diabetics is diagnosed and initially treated, but that there is a failure to adjust and escalate therapy despite clear recommendations advocating gradual adaptation of treatment if targets are not met[24] . This practice in our series is concerning because more than half of the patients are followed up in both diabetes and cardiology departments . Our results, as well as those of other studies in Africa, could be explained by a combination of several factors, such as socioeconomic constraints, limited access to medication, a wait-and-see attitude among practitioners, fear of adverse effects, and poor treatment adherence[28] . Hence the need to improve access to treatment, strengthen patient education, and provide continuing education for practitioners[29] .

4.3. Factors associated with treatment inertia

In our study, the most significant results in terms of clinical implications are non-adherence to treatment (OR = 1.809) and treatment discontinuation (OR = 2.520) as factors associated with TI. This finding highlights the importance of patient-related factors in treatment intensification in our context. Indeed, discontinuation or non-adherence to drug treatment can lead to a wait-and-see attitude on the part of the practitioner, which significantly increases treatment intensification inertia. The physician may consider it unnecessary to add other, often expensive, medications and prefer to wait for improved adherence or resumption of medication before considering intensification. This delays intensification and increases the risk of cardiovascular complications.

This predominance of non-compliance and discontinuation as determinants of IT could be explained by factors such as socio-economic constraints (more than half of patients (52.6%) have a low socio-economic status), polypharmacy[30] and the silent nature of hypertension, where the absence of symptoms reduces adherence in some patients[31] . To prevent this inertia, there is an urgent need to implement targeted therapeutic education interventions (physician/patients)[32] and improve access to medication by subsidizing antihypertensive treatments[33] , as has been done for HIV infection in Africa[34] .

5. Conclusion

Therapeutic inertia during pharmacological treatment of high blood pressure is common among type 2 diabetic patients in Burkina Faso. It is mainly characterized by a failure to intensify antihypertensive treatment. Factors such as non-compliance and treatment discontinuation are associated with this lack of intensification. It is therefore necessary to implement targeted and appropriate interventions to improve clinical practice and blood pressure control. Further qualitative studies should be considered in order to better explore the factors related to practitioners in our resource-limited setting.

Compliance with ethical standards

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