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A Real-World Observational Study on the Usage Pattern, Safety, and Effectiveness of Telmisartan (Teleshal™) and Telmisartan plus Hydrochlorothiazide (Teleshal™-H) in Hypertensive Patients in Ghana

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Abstract

Background: Hypertension is among the leading drivers of cardiovascular morbidity and mortality in sub-Saharan Africa, with persistently low rates of detection, treatment, and control. Real-world data on the use of telmisartan-based regimens in Ghana remain limited. **Objectives:** To evaluate the drug-utilization pattern, blood pressure-lowering effectiveness, adherence, and safety of telmisartan monotherapy (Teleshal™) and the fixed-dose combination of telmisartan plus hydrochlorothiazide (Teleshal™ -H) in routine Ghanaian clinical practice. **Methods:** A non-interventional, multicenter, prospective, observational study was conducted at 15 sites across Ghana. Adults aged ≥ 18 years with hypertension clinically suitable for telmisartan (Teleshal™) or telmisartan/HCTZ (Teleshal™-H) were followed over 24 weeks, with assessments at baseline, 3 months, and 6 months. Demographic, clinical, vital-sign, bodyweight, adherence, and adverse-event data were collected, and treating physicians rated overall efficacy and safety on a four-point ordinal scale. Within-group changes were evaluated using paired t-tests, with two-sided $P < 0.05$ considered statistically significant. **Results:** A total of 375 evaluable patients were available for the demographic analysis—249 receiving telmisartan monotherapy (Teleshal™) and 126 receiving telmisartan + HCTZ (Teleshal™-H). Mean ages were 53.54 ± 12.69 and 56.05 ± 12.72 years, respectively, with female predominance in both arms (53.1% and 51.6%). The most prevalent modifiable risk factors were poor dietary habits (61.3%/59.5%), physical inactivity (46.7%/42.0%), and alcohol consumption (25.7%/19.8%); the most common comorbidities were dyslipidemia (39.5%/39.1%) and diabetes (27.1%/24.8%). Over 24 weeks,

telmisartan monotherapy reduced mean systolic blood pressure from 161.62 ± 18.91 mmHg to 132.33 ± 16.16 mmHg (−18.12%; P < 0.001) and diastolic blood pressure from 97.47 ± 13.46 mmHg to 85.04 ± 13.84 mmHg (−12.75%; P < 0.001). Telmisartan + HCTZ reduced systolic blood pressure from 158.14 ± 19.63 mmHg to 132.83 ± 15.29 mmHg (−16.01%; P < 0.001) and diastolic blood pressure from 90.14 ± 15.46 mmHg to 80.14 ± 13.85 mmHg (−11.09%; P < 0.001). Body weight declined from 78.71 to 76.41 kg in the monotherapy arm and from 85.65 to 78.61 kg in the combination arm. Physician global ratings at 6 months were favorable; the proportion of "Good" or "Excellent" ratings exceeded 95% in both arms. **Conclusion:** Both telmisartan monotherapy (Teleshal™) and the telmisartan/HCTZ fixed-dose combination (Teleshal™-H) produced clinically meaningful and statistically significant reductions in systolic and diastolic blood pressure over 24 weeks in routine Ghanaian practice, with favourable tolerability and physician-rated efficacy and safety. These findings support broader use of telmisartan-based regimens as part of an integrated strategy to mitigate hypertension-related cardiovascular morbidity and mortality in Ghana.

Keywords

Telmisartan, Hydrochlorothiazide, Hypertension, Ghana, Real-World Evidence, Observational Study, Sub-Saharan Africa

1. Introduction

Hypertension is among the most important modifiable risk factors for cardiovascular disease, chronic kidney disease, and premature mortality worldwide [1]. In sub-Saharan Africa, the epidemiologic transition driven by urbanization, dietary change, and population aging has accelerated hypertension-related morbidity and mortality, and the region is projected to bear a disproportionate share of the global non-communicable disease burden over the coming decades [2] [3]. Ghana provides a salient example: a large community-based survey reported an overall adult prevalence of 28.7%, with higher rates in semi-urban (32.9%) than in rural (24.1%) areas, and pooled meta-analytic data confirm an adult prevalence of approximately 27.0% (95% CI 24.0% - 30.0%), with regional variation from 13% in the northern belt to nearly 30% in coastal and middle geographic belts [1] [4]. In some urban populations, prevalence reaches 54.6%, with treatment rates of 7.8% and 13.6% and control rates of only 4.4% and 1.7% in men and women, respectively [2]. Consequently, the population-attributable risk from elevated blood pressure in Ghana is approximately 13-fold greater than in high-income countries such as the United States [1] [3]. Such low control rates amplify the burden of stroke, ischemic heart disease, and heart failure in Ghanaian adults.

Effective antihypertensive drug therapy can substantially alter this trajectory. Established analyses indicate that antihypertensive treatment is associated with a

35% - 40% reduction in stroke incidence, a 20% - 25% reduction in myocardial infarction, and more than a 50% reduction in heart failure, alongside reductions in overall cardiovascular mortality [5]. Choosing regimens that balance efficacy, tolerability, simplicity, and affordability is therefore central to long-term disease control in resource-constrained settings.

Among available drug classes, angiotensin receptor blockers have gained particular prominence because of their efficacy and favourable side-effect profile. Telmisartan, a highly selective AT1-receptor antagonist, has a long half-life at the recommended once-daily dose of 40 - 80 mg and provides effective blood pressure reduction across the full 24-hour dosing interval without disturbing the normal circadian pressure pattern [1] [6] [7]. When additional antihypertensive efficacy is needed, combining telmisartan with hydrochlorothiazide yields significantly greater reductions than either component alone, and telmisartan/HCTZ has demonstrated superior effectiveness to several other ARB/HCTZ fixed-dose combinations in head-to-head studies [8]-[10].

Real-world evidence from other settings supports this profile. In the TELMIMORE observational study, telmisartan-based therapy in primary care significantly increased the proportion of patients attaining office BP < 140/90 mmHg while preserving 24-hour ambulatory blood pressure control [11]. In the Russian TAINA program (n = 1933), 12 weeks of telmisartan reduced office BP from 155.7/92.2 to 125.3/78.2 mmHg, with ≥89% of patients reaching target BP, while the telmisartan/HCTZ combination produced comparable reductions from 162.7/94.3 to 126.0/78.4 mmHg [10]. The ON TIME observational study reported SBP/DBP reductions of 24.5/14.6, 34.4/16.8, and 49.6/22.1 mmHg in grades 1, 2, and 3 hypertension respectively, with target SBP ≤ 140 mmHg achieved in 95.3% of patients [12]. The SMOOTH trial demonstrated that telmisartan/HCTZ provides superior early-morning BP control compared with valsartan/HCTZ in obese hypertensive patients with type 2 diabetes [8], and Indian real-world data on more than 1300 patients confirmed that the majority of telmisartan-treated patients reach guideline-recommended BP targets [13].

Despite the international evidence, region-specific data on telmisartan and telmisartan/HCTZ in Ghanaian adults remain scarce. The present study was designed to address that gap by documenting, in routine clinical settings, the utilization pattern, blood pressure outcomes, adherence, safety, and physicians' global assessments for telmisartan-based therapy in adult hypertensive patients across multiple sites in Ghana.

2. Methods

A non-interventional, multicentric, prospective, observational study was conducted at 15 sites across Ghana. The study was embedded entirely within routine clinical practice; no additional diagnostic procedures, extra visits, or investigational interventions were imposed, and all treatment decisions—including the choice between telmisartan monotherapy and the fixed-dose combination with hydrochlorothia-

zide—were made at the discretion of the treating physician. The protocol-specified treatment duration was 24 weeks, with a planned aggregate enrolment of approximately 750 patients across both treatment arms. A total of 750 patients were screened for eligibility, of whom 396 met the predefined inclusion criteria and were enrolled in the study at the baseline visit (Visit 1). All 396 enrolled patients completed Visit 2 at 3 months and Visit 3 at 6 months. Of these, 375 patients were available for the final analysis. The study was conducted under real-world clinical practice conditions in Ghana; therefore, the availability of patients for the final analysis may have been influenced by the routine challenges associated with follow-up in clinical practice. These may include variable adherence to therapy, absence of symptoms or perceived need for follow-up, and other patient- or healthcare-related factors. Thus, the final analysis included patients with available data at the time of analysis.

2.1. Study Population

Eligible participants were adults aged ≥ 18 years with a clinical diagnosis of hypertension for whom the treating physician considered telmisartan (Teleshal™) or telmisartan/HCTZ (Teleshal™-H) clinically appropriate, and who were willing to provide written informed consent for the use of their personal and clinical data. Exclusion criteria included contraindications to any study medication per the locally approved prescribing information, pregnancy or lactation, unwillingness to use effective barrier contraception among women of child-bearing potential, and any medical or non-medical condition that, in the physician's judgment, precluded safe participation.

2.2. Study Visits and Variables

Three scheduled visits were defined:

- Visit 1 (Baseline): Informed consent, demographic data, vital signs and physical examination, medical and family history, study-drug assignment and dose, prior treatment details.
- Visit 2 (3 months ± 7 days): Adherence, dose changes, body weight, blood pressure, and adverse-event recording.
- Visit 3 (6 months ± 7 days): Adherence, dose changes, body weight, blood pressure, adverse-event recording, and the treating physician's global assessment of efficacy and safety.

The recorded variables comprised age, sex, family history of hypertension, lifestyle risk factors (tobacco use, physical inactivity, alcohol consumption, poor dietary habits), comorbidities (diabetes, dyslipidemia, chronic kidney disease, heart failure), vital signs (systolic and diastolic blood pressure, pulse rate), body weight, treatment adherence, adverse events, and the physician's four-point global rating (Poor/Fair/Good/Excellent).

2.3. Statistical Analysis

Descriptive statistics (means, standard deviations, frequencies, and percentages)

were used to summarize demographic and clinical variables within each treatment arm. Within-group changes in systolic and diastolic blood pressure between visits were evaluated using paired t-tests; a two-sided P-value < 0.05 was considered statistically significant. Analyses were conducted on evaluable patients available at each visit, consistent with the non-interventional design. Paired analyses included patients with both baseline and follow-up measurements.

2.4. Ethical Considerations

The study was conducted in accordance with applicable local regulations, the principles of the Declaration of Helsinki, and the protocol-approved ethical procedures. Written informed consent was obtained from every participant before any study-related data were captured, and patient confidentiality was preserved throughout.

3. Results

3.1. Patient Disposition and Baseline Characteristics

A total of 375 evaluable patients were available for the demographic analysis: 249 in the telmisartan monotherapy arm (Teleshal™) and 126 in the telmisartan + HCTZ combination arm (Teleshal™-H). The mean age was 53.54 ± 12.69 years in the telmisartan group and 56.05 ± 12.72 years in the telmisartan + HCTZ group. In both groups, the majority of patients were in the age group 51 - 60 years (31.3% and 28.6%, respectively). Females comprised 53.1% of the telmisartan group and 51.6% of the telmisartan + HCTZ group.

At baseline, 184 patients had been switched from previous antihypertensive therapy to telmisartan or telmisartan + HCTZ, while 183 patients had not undergone a treatment switch before study enrolment. Previous treatment status was unavailable for 29 patients. Among patients who had been switched from previous antihypertensive therapy, the most frequently reported prior antihypertensive classes were calcium channel blockers (n = 68), angiotensin receptor blockers (n = 58), angiotensin-converting enzyme (ACE) inhibitors (n = 56), diuretics (n = 51), beta-blockers (n = 16), and other antihypertensive agents (n = 15). As individual patients could have received more than one antihypertensive class before enrolment, the sum of these categories exceeds the total number of patients who had undergone a treatment switch.

Treatment modifications during follow-up were infrequent. At Visit 2 (3 months), four patients were switched from telmisartan monotherapy to the telmisartan + HCTZ fixed-dose combination, while one patient was switched from combination therapy to telmisartan monotherapy. Dose reduction was recorded in seven patients, and study medication was discontinued in two patients. By Visit 3 (6 months), no additional treatment switches were documented; one dose reduction and one treatment discontinuation were reported (Table 1).

The most prevalent risk factors were poor dietary habits (61.3% and 59.5%) and

physical inactivity (46.7% and 42.0%). A family history of hypertension was present in 71.3% of patients in the telmisartan group and 74.8% in the telmisartan + HCTZ group.

Missing observations for blood pressure and body weight were attributable to participants not attending all scheduled follow-up visits and/or measurements not being recorded in the case report forms. No imputation was performed for missing values; analyses were conducted using available paired observations for each respective parameter and time point.

Table 1. Baseline demographic and clinical characteristics.

Characteristic	Telmisartan (N = 249)	Telmisartan + HCTZ (N = 126)
Age (years), mean ± SD	53.54 ± 12.69	56.05 ± 12.72
Sex, n (%)		
Female	129 (53.1%)	66 (51.6%)
Male	114 (46.9%)	62 (48.4%)
Risk Factors, n (%)		
Tobacco use	12 (4.6%)	0 (0%)
Alcohol consumption	67 (25.7%)	26 (19.8%)
Physical inactivity	122 (46.7%)	55 (42.0%)
Poor dietary habits	160 (61.3%)	78 (59.5%)
Family History of Hypertension, n (%)		
Yes	169 (71.3%)	77 (74.8%)
No	68 (28.7%)	26 (25.2%)
Comorbidities, n (%)		
Diabetes	72 (27.1%)	33 (24.8%)
Dyslipidemia	105 (39.5%)	52 (39.1%)
Chronic kidney disease	7 (2.6%)	2 (1.5%)
Heart failure	12 (4.5%)	0 (0%)

*n with data available; differences reflect variable data completeness across baseline fields.

3.2. Utilization Pattern

Dose Distribution

In the telmisartan group, the majority of patients (65.0%) were prescribed the 40 mg dose, followed by 80 mg (24.1%) and 20 mg (10.9%). In the telmisartan + HCTZ group, the most commonly prescribed dose was 80/12.5 mg (50.0%), followed by 40/12.5 mg (44.2%) and 80/25 mg (5.8%). This distribution indicates that most patients were initiated on moderate to high doses, with dose escalation based on response and tolerance (Figure 1 and Figure 2).

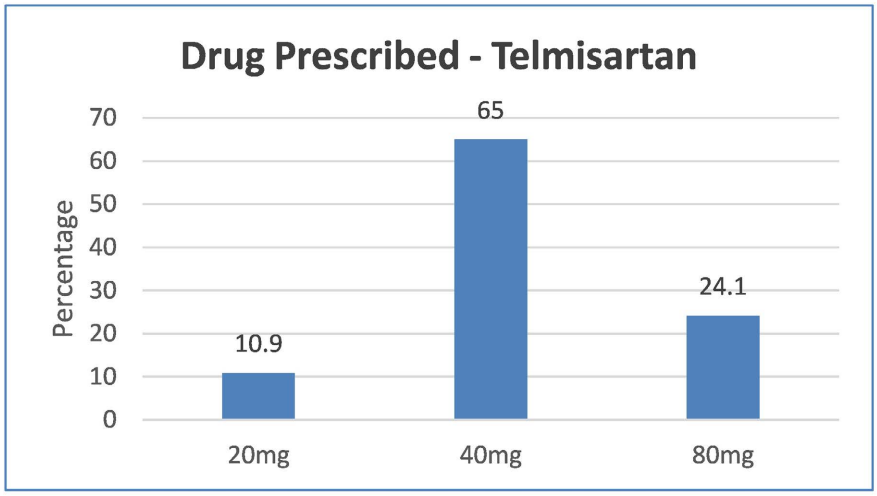

Figure 1. Distribution of drug potency of telmisartan.

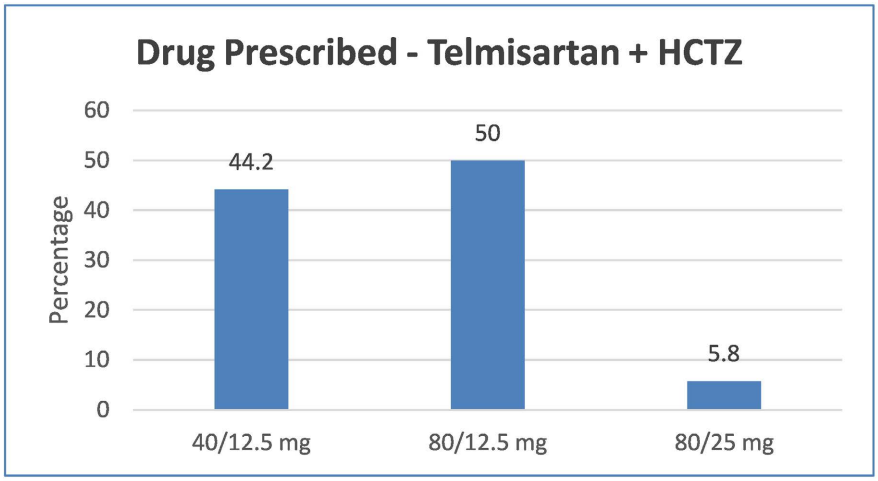

Figure 2. Distribution of drug potency of Telmisartan + HCTZ.

3.3. Changes in Blood Pressure

Significant reductions in systolic and diastolic blood pressure were observed in both groups from baseline to week 12 and week 24.

Systolic Blood Pressure (Table 2)

Table 2. Changes in systolic blood pressure from baseline to week 24.

Parameter	Baseline (Mean ± SD)	Week 24 (Mean ± SD)	Mean % Change	P-value
Telmisartan	161.62 ± 18.91	132.33 ± 16.16	**−18.12%**	**<0.001**
Telmisartan + HCTZ	158.14 ± 19.63	132.83 ± 15.29	**−16.01%**	**<0.001**

In the telmisartan group: Baseline (n = 227) to Week 12, mean SBP decreased from 162.10 ± 19.68 mmHg to 144.41 ± 18.54 mmHg (−10.91%; P < 0.001). Week 12 to Week 24 (n = 196), mean SBP decreased from 143.56 ± 16.84 mmHg to

131.69 ± 15.57 mmHg (−8.27%; P < 0.001). Baseline to Week 24 (n = 204), mean SBP decreased from 161.62 ± 18.91 mmHg to 132.33 ± 16.16 mmHg (−18.12%; P < 0.001).

In the telmisartan + HCTZ group: Baseline (n = 120) to Week 12, mean SBP decreased from 158.56 ± 20.27 mmHg to 145.03 ± 17.78 mmHg (−8.54%; P < 0.001). Week 12 to Week 24 (n = 112), mean SBP decreased from 144.71 ± 16.79 mmHg to 132.67 ± 15.12 mmHg (−8.32%; P < 0.001). Baseline to Week 24 (n = 112), mean SBP decreased from 158.14 ± 19.63 mmHg to 132.83 ± 15.29 mmHg (−16.01%; P < 0.001).

Diastolic Blood Pressure (Table 3)

Table 3. Changes in diastolic blood pressure from baseline to week 24.

Parameter	Baseline (Mean ± SD)	Week 24 (Mean ± SD)	Mean % Change	P-value
Telmisartan	97.47 ± 13.46	85.04 ± 13.84	**−12.75%**	**<0.001**
Telmisartan + HCTZ	90.14 ± 15.46	80.14 ± 13.85	**−11.09%**	**<0.001**

In the telmisartan group: Baseline (n = 227) to Week 12, mean DBP decreased from 97.28 ± 14.24 mmHg to 88.73 ± 13.28 mmHg (−8.79%; P < 0.001). Week 12 to Week 24 (n=195), mean DBP decreased from 88.21 ± 12.49 mmHg to 84.68 ± 13.90 mmHg (−4.00%; P < 0.001). Baseline to Week 24 (n = 203), mean DBP decreased from 97.47 ± 13.46 mmHg to 85.04 ± 13.84 mmHg (−12.75%; P < 0.001).

In the telmisartan + HCTZ group: Baseline (n = 120) to Week 12, mean DBP decreased from 90.52 ± 15.29 mmHg to 85.25 ± 11.92 mmHg (−5.82%; P < 0.001). Week 12 to Week 24 (n = 113), mean DBP decreased from 85.13 ± 12.26 mmHg to 80.14 ± 13.85 mmHg (−5.86%; P < 0.001). Baseline to Week 24 (n = 113), mean DBP decreased from 90.14 ± 15.46 mmHg to 80.14 ± 13.85 mmHg (−11.09%; P < 0.001).

Dose-Stratified Blood Pressure Outcomes

Mean percentage reductions in SBP from baseline to Week 24 varied by prescribed dose but did not follow a consistent monotonic gradient. Telmisartan group: 20 mg, 19.30% reduction (P < 0.001); 40 mg, 19.06% reduction (P < 0.001); 80 mg, 15.32% reduction (P < 0.001). Telmisartan + HCTZ group: 40/12.5 mg, 19.87% reduction (P < 0.001); 80/12.5 mg, 12.33% reduction (P < 0.001); 80/25 mg, 15.22% reduction (P < 0.001). In both arms, the highest prescribed dose showed the smallest percentage reduction. Because dose was selected by the treating physician rather than randomly assigned, this pattern most plausibly reflects confounding by indication—higher doses were likely prescribed preferentially to patients with more severe or treatment-resistant hypertension—rather than a true inverse dose-response effect. These findings are presented as dose-stratified descriptive results only, and no causal or comparative-efficacy conclusion should be drawn from them.

3.4. Patient Adherence

At week 24, adherence to treatment was assessed. In the telmisartan group, 50.9%

of patients were rated as having excellent adherence and 45.3% as good adherence, with only 3.7% rated as fair. In the telmisartan + HCTZ group, 11.6% were rated as excellent, 84.2% as good, 3.2% as fair, and 1.1% as poor. The high adherence rates observed are encouraging and suggest that patients were generally compliant with their medication regimen.

3.5. Global Assessment of Efficacy and Safety by Physicians

Physicians rated the global efficacy and safety of telmisartan and telmisartan +HCTZ as: (Figure 3)

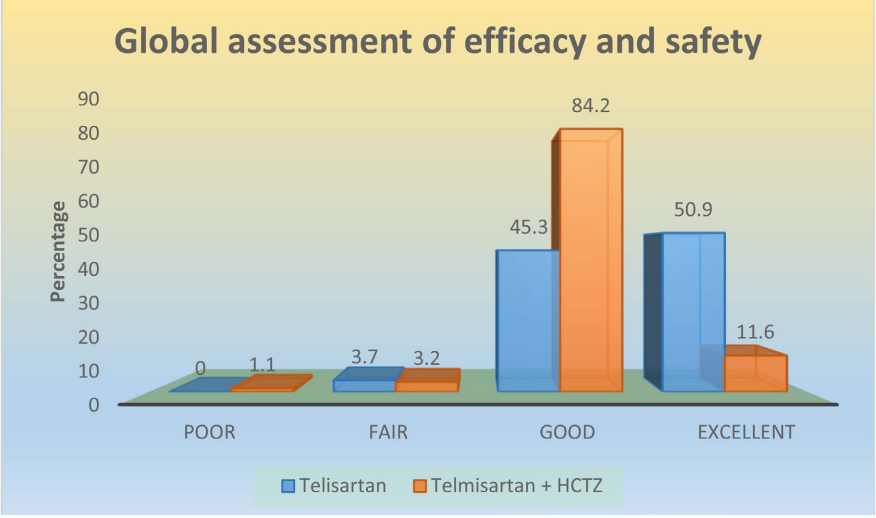

Figure 3. Global assessment of efficacy and safety.

In the global assessment of efficacy and safety by physicians, 96.2% of patients in the telmisartan group and 95.8% of patients in the telmisartan + HCTZ group were rated as having excellent or good efficacy and safety. Only 3.7% (telmisartan) and 4.3% (telmisartan + HCTZ) received fair or poor ratings. This indicates a very high level of clinical satisfaction with both therapies.

Safety assessment in this study was based on the physician's global assessment of efficacy and safety. In the telmisartan group, physicians rated treatment as excellent in 50.9% and good in 45.3% of patients, while in the telmisartan/HCTZ group, treatment was rated as good in 84.2% and excellent in 11.6% of patients. However, adverse events were not systematically collected; therefore, these ratings should be interpreted as overall clinical assessments rather than direct measures of treatment safety.

A limitation of this study is that adverse events, serious adverse events, treatment-related adverse events, and adverse-event-related treatment discontinuations were not prospectively or systematically recorded. Consequently, safety conclusions are based on physician global assessment rather than formal adverse-event reporting.

The physician global assessment suggested favorable overall tolerability of both

treatment regimens in routine clinical practice. Future prospective studies incorporating standardized adverse-event reporting are warranted.

4. Discussion

The present study is, to our knowledge, one of the first systematic real-world characterizations of telmisartan monotherapy (Teleshal™) and the telmisartan + hydrochlorothiazide fixed-dose combination (Teleshal™-H) in routine Ghanaian clinical practice.

Over 24 weeks, both regimens produced clinically meaningful and statistically significant reductions in systolic and diastolic blood pressure across the evaluable population, at both interim and final assessments. In the telmisartan arm, mean systolic blood pressure fell from 161.62 mmHg at baseline to 132.33 mmHg at 6 months—an overall reduction of 18.12% ($P < 0.001$)—and mean diastolic blood pressure fell from 97.47 to 85.04 mmHg (−12.75%; $P < 0.001$). In the combination arm, systolic blood pressure fell from 158.14 to 132.83 mmHg (−16.01%; $P < 0.001$) and diastolic blood pressure from 90.14 to 80.14 mmHg (−11.09%; $P < 0.001$). These magnitudes are aligned with international real-world evidence: in the Russian TAINA program (n = 1933), 12 weeks of telmisartan monotherapy reduced office blood pressure from 155.7/92.2 to 125.3/78.2 mmHg, with ≥89% of patients reaching target BP, while telmisartan/HCTZ produced comparable reductions from 162.7/94.3 to 126.0/78.4 mmHg [10]. The ON TIME observational study reported blood pressure reductions graded by baseline severity—24.5/14.6, 34.4/16.8, and 49.6/22.1 mmHg in grades 1, 2, and 3 hypertension respectively, with target systolic BP ≤ 140 mmHg achieved in 95.3% of patients [12]. The TELMIMORE primary-care study similarly demonstrated significant increases in the proportion of patients attaining office BP < 140/90 mmHg under telmisartan-based therapy, with preserved 24-hour ambulatory blood pressure control [11]. The magnitudes and proportions observed in the present study fall within the same range as these international cohorts and were achieved in a less protocolized, real-world Ghanaian setting.

The SMOOTH trial established that telmisartan/HCTZ provides superior early-morning blood pressure control relative to valsartan/HCTZ, particularly in obese hypertensive patients with type 2 diabetes [8], but within-class comparisons drawn from non-randomized observational data should be interpreted with appropriate caution. Dose-stratified analyses showed systolic blood pressure reductions ranging from approximately 12% to 20% across telmisartan and telmisartan/HCTZ dose strengths, without a consistent pattern of greater reduction at higher doses; the highest-dose stratum in each arm (80 mg telmisartan; 80/12.5 mg combination) showed the smallest percentage reduction, while the most commonly prescribed telmisartan strength (40 mg, 65.0% of the cohort) produced a reduction of approximately 19%. Given the non-randomized, physician-directed selection of dose in this observational design, we interpret this pattern as most consistent with confounding by indication—physicians likely prescribed higher

doses to patients with more severe or harder-to-control baseline hypertension—rather than evidence bearing on the comparative efficacy of different doses. We therefore do not draw conclusions from these data about which dose produces a greater treatment effect. Indian real-world data on more than 1300 patients similarly reported that the majority of telmisartan-treated patients—either on monotherapy or on combination regimens—reached guideline-recommended blood pressure targets [13].

The cohort in the present study exhibits the cardiovascular risk pattern characteristic of hypertensive adults in Ghana. With adult hypertension prevalence reaching 27% - 30% in pooled meta-analyses and blood pressure control rates as low as 1.7% - 12.7%, the population-attributable risk from elevated blood pressure in Ghana is approximately 13 times greater than in the United States [1] [4] [14]. The risk-factor distribution observed here reinforces this picture: poor dietary habits, physical inactivity, and alcohol consumption were widely prevalent across both treatment arms, while tobacco use was uncommon. Dyslipidemia (~40%) and diabetes (~25%) were the dominant comorbidities, with chronic kidney disease and heart failure present in smaller but clinically important proportions. A positive family history of hypertension was documented in approximately three-quarters of patients, mirroring patterns observed in earlier Ghanaian epidemiologic work [2]. The accompanying reductions in body weight and pulse rate across the 24-week follow-up reflect meaningful improvements in overall cardiovascular risk markers alongside the blood pressure reductions themselves.

Both regimens were well tolerated. Physician global ratings at 6 months yielded 96.2% "Good" or "Excellent" assessments in the telmisartan arm and 95.8% in the combination arm; the proportion of "Poor" ratings was 0% in the monotherapy arm and only 1.1% in the combination arm. These findings are consistent with international safety data showing that telmisartan and its hydrochlorothiazide combinations are generally well tolerated in real-world cohorts, with low rates of treatment discontinuation and rare serious adverse events [10] [11].

In Ghana, where hypertension prevalence is high (~27% - 30%) and blood pressure control remains very low (treatment rates of 7.8% and 13.6% and control rates of 4.4% and 1.7% in men and women, respectively), identifying regimens that work under routine conditions is essential [1] [2]. The present study demonstrates that telmisartan-based regimens, used either as monotherapy or as fixed-dose combinations with a thiazide diuretic, can deliver blood pressure reductions of the magnitude seen internationally, with physician-rated acceptability above 95%. Once-daily dosing, generally favourable tolerability, and the option of fixed-dose combinations make these regimens particularly suited to long-term adherence in resource-constrained settings. By documenting utilization patterns, dose distributions, comorbidity prevalence, and prescriber satisfaction across 15 sites, these findings provide actionable evidence for clinicians and policy makers working to expand hypertension management capacity in Ghana.

The principal limitations are inherent to its non-interventional design. First,

the absence of randomization means that differences between treatment arms reflect physician-driven treatment selection and may be subject to confounding by indication. Second, the open-label nature of treatment introduces potential reporting bias. Third, real-world recruitment fell modestly below the originally targeted aggregate enrolment of ~750 patients—approximately 375 evaluable patients were available for the demographic analysis—which should be borne in mind when extrapolating these findings to wider populations in Ghana.

Taken together, these findings support the broader use of telmisartan-based regimens as part of an integrated strategy to mitigate hypertension-related cardiovascular morbidity in Ghana, while highlighting the need for larger, controlled studies to confirm the observations and to evaluate long-term cardiovascular outcomes.

5. Conclusion

The CRYSTEL study demonstrates that telmisartan (Teleshal™) and telmisartan plus HCTZ (Teleshal™-H) produced clinically meaningful and statistically significant reductions in blood pressure among Ghanaian patients with hypertension in real-world clinical practice. Significant reductions were observed in both systolic and diastolic blood pressure over 24 weeks, with the monotherapy showing an 18.12% reduction in SBP and the combination therapy showing a 16.01% reduction. Reductions were observed across all prescribed dose strengths of both regimens. In the global assessment of efficacy and safety by physicians, over 95% of patients in both groups were rated as having excellent or good efficacy and safety. These findings support the use of telmisartan and telmisartan plus HCTZ as effective and well-tolerated options for hypertension management in Ghanaian patients and provide valuable real-world evidence for clinicians, policymakers, and patients in a resource-limited setting.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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