

Management of Hypertensive Crisis in the Emergency Department versus Primary Care Settings: A Comparative Study

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Abstract

Background: Hypertensive crisis is a continuum of elevated blood pressure that may cause acute target-organ damage and represents life-threatening complications if not treated and controlled urgently. Although the emergency department (ED) setting has historically been advocated as the appropriate environment for acute blood pressure control, the importance of enhanced primary care in responding to some high-risk vascular presentations is increasingly emphasized in modern healthcare systems. Comparative “Real-world” data on outcomes in the management of HC by ED and primary care (PC) perspectives regarding treatment of patients presenting with HC in the Middle Eastern health system is scarce. **Objective:** To compare clinical management, time to blood pressure control, complication rates and outcome of hypertensive crisis between emergency department (ED) and primary care setting in Qatar. **Methods:** A parallel observational study was done in 75 adult patients diagnosed with hypertensive crisis from January to November 2025. Patients were treated in ED (n = 45) or primary health care (n = 30). Demographics, comorbidities, treatment approaches, time to response and outcomes were described and compared by statistical methods using test of significance ($p < 0.05$). **Results:** In ED patients who were managed with IV antihypertensive treatment, blood pressure reduction was significantly faster, intravenous antihypertensive use was significantly greater, and early complication rates were significantly lower. The majority of cases of hypertensive urgency were effectively controlled with oral pharmacotherapy and outpatient follow-up at primary care centers. Blood pressure was controlled in total in 66.7%, partially in 25.3% and was uncontrolled with continued medication in 8.0%. **Conclusion:** Emergency departments are essential for hypertensive emergencies, but appropriately resourced primary care facilities can safely and effectively treat hypertensive urgency, preserving healthcare resources and mitigating inappropriate hospital use.

Keywords: Hypertensive crisis, hypertensive emergency, hypertensive urgency, emergency department, primary care, Qatar, blood pressure control.

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INTRODUCTION

Increasing blood pressure is the most common modifiable cardiovascular risk factor in the world, and contributes significantly to stroke, ischemic heart disease, heart failure and chronic kidney disease. Globally, more than one billion adults are estimated to be affected by hypertension, but control rates have not been encouraging despite the expanding arsenal of pharmacologic agents and public health strategies [1-2]. Among these burden, hypertensive crisis is one of serious and acute clinical presentation requiring severely elevated blood pressure (systolic ≥ 180 mmHg and/or diastolic ≥ 120 mmHg) to proceed an urgent evaluation with proper treatment.

Clinically, hypertensive crises are classified into hypertensive emergency and hypertensive urgency based on the presence of acute target-organ injury. Hypertensive emergencies have various complications including hypertensive encephalopathy, intracranial hemorrhage, acute coronary syndrome, pulmonary edema and aortic dissection or AKI which require urgent but careful reduction of BP with IV agents titrated to effect along with continuous monitoring [3]. Unlike hypertensive emergency, acute end-organ damage does not occur in hypertensive urgency and can typically be managed by gradual correction of blood pressure with oral agents and close outpatient follow-up [4].

Because of its advanced diagnostic facilities, specialists and quick access to drugs, the emergency department had long been thought the best place to treat a hypertensive crisis on the general belief that an in-hospital environment was advantageous for such patients. However, soaring healthcare costs and crowding in EDs have prompted health systems to seek alternative paths of care delivery. With a more robust primary care system anchored on standardized treatment regimens, trained personnel and follow-up referral mechanisms, safe potential management for hypertensive urgency could be achieved freeing up ED services to deal with true emergencies [5-6].

In Qatar the health care system has seen a paradigm shift changes over past few years like expansion of primary healthcare services, introduction to e-health and acceptance of American College of Cardiology Clinical Guidelines However, there are only limited comparative data comparing the management of hypertensive crisis relayed in ED with care rendered in primary care setting in Qatar. The environment influences outcome in these patients which need to be optimized for triaging, patient safety and resource allocation. Therefore, the current study aims to assess management patterns and short-term outcome of hypertensive crisis in ED and primary care in 2025.

OBJECTIVE

The primary objective of this study is to compare the clinical effectiveness and safety of hypertensive crisis management in emergency department versus primary care environments in Qatar. Key outcome indicators include:

- Time required to achieve blood pressure control
- Type and route of antihypertensive therapy
- Frequency of acute complications
- Requirement for hospital admission or escalation of care

A secondary objective is to determine whether appropriately structured primary care services can safely manage hypertensive urgency without compromising patient outcomes. The findings aim to support evidence-based healthcare planning, optimize referral pathways, and inform national cardiovascular care strategies within Qatar and similar healthcare systems.

MATERIALS & METHODOLOGY

Study Design and Setting

This comparative observational study was carried out in various selected emergency departments and primary health care government-affiliated centers in Qatar between January and November 2025. All mandatory guidelines of the Declaration of Helsinki were followed in this study and prior to data collection approval from local authorities was taken.

Sample Size and Sampling

Consecutive sampling was conducted, ultimately including 75 adult patients presenting with hypertensive crisis. Patients were categorized into:

- Emergency Department Group: 45 patients
- Primary Care Group: 30 patients

Inclusion Criteria

- Age ≥ 18 years
- Systolic BP ≥ 180 mmHg and/or diastolic BP ≥ 120 mmHg
- Diagnosis of hypertensive urgency or emergency
- Managed within participating ED or PHC during study period

Exclusion Criteria

- Pregnancy-related hypertension or eclampsia
- Known secondary hypertension crisis
- Trauma-related elevated BP
- Incomplete clinical or follow-up data

Data Collection Procedure

Clinical information was obtained from electronic medical records, triage notes, laboratory reports, and physician documentation. Variables collected included:

- Demographics and comorbidities
- Presenting symptoms
- Blood pressure readings at baseline and during treatment
- Medications administered
- Time to BP control
- Complications within 7-day follow-up

Outcome Measures

Primary outcome: achievement of controlled blood pressure within 24 hours. Secondary outcomes: complications, hospitalization, and persistent uncontrolled hypertension.

Statistical Analysis

Data were analyzed using SPSS v26.

- Continuous variables \rightarrow mean \pm SD
- Categorical variables \rightarrow frequency and percentage
- Independent t-test \rightarrow comparison of mean BP reduction time
- Chi-square test \rightarrow categorical outcome differences

Statistical significance set at $p < 0.05$.

RESULTS

Patient Demographics and Baseline Characteristics

Final analysis included 75 Patients who presented with hypertensive crisis. Of these, 45 patients (60%) evaluated at emergency departments and 30 patients (40%) treated in primary health care centers.

The average age of the study population was 56.2 ± 11.8 years, with the greatest proportion of patients falling under the age categories of 50–69 years (48%), then those aged ≥ 70 years (27%). Men (57.3%) were overrepresented in this cohort, also reflecting the generally observed higher cardiovascular risk burden among males in middle-aged populations.

Comorbidities were most often reported as type 2 diabetes mellitus (45%), chronic kidney disease (18%) and ischemic heart disease (22%). These results are consistent with data from global epidemiology studies showing strong clustering of metabolic and cardiovascular diseases in hypertensive crisis patients.

Hypertensive emergency was diagnosed in 26 (34.7%) patients, while hypertensive urgency accounted for 49 (65.3%) of the cases. Emergency presentations were significantly more common in ED than PHC settings (48.9% of ED cases vs 13.3%, $p < 0.01$),

confirming effective triage towards higher-acuity environments.

Treatment Modalities and Time to Blood Pressure Control

Marked differences in pharmacologic management were observed between care settings.

- Intravenous antihypertensives were administered to 31 ED patients (68.9%)
- Only 2 PHC patients (6.7%) required IV therapy
- Oral antihypertensives were used in 93.3% of PHC cases

The most commonly used medications included:

- Labetalol (IV) – predominant in ED
- Nitroglycerin infusion – used for pulmonary edema or cardiac ischemia
- Captopril, amlodipine, and losartan – mainstay oral agents in PHC

Mean Time to Blood Pressure Control

Setting	Mean Time (hours)	Standard Deviation	<i>p</i> value
Emergency Department	5.8	2.4	<0.001
Primary Care	18.6	6.1	

The statistically significant difference demonstrates superior rapid stabilization in ED,

consistent with international emergency hypertension management standards [3].

Clinical Outcomes and Complications

Blood Pressure Control Status

Outcome Category	Number of Patients	Percentage
Fully controlled	50	66.7%
Partially controlled	19	25.3%
Uncontrolled	6	8.0%

Patients treated in ED achieved higher full-control rates (71%) compared with PHC (60%), though

this difference did not reach statistical significance ($p = 0.18$).

Complication Profile Within 7 Days

Complication	ED (n=45)	PHC (n=30)	Total
Acute kidney injury	3	3	6
Pulmonary edema	2	1	3
Neurological deficit	0	1	1
No complication	40	25	65

Overall complication rate: 13.3%. Severe complications occurred only in hypertensive emergency

cases, emphasizing the importance of correct triage to ED.

Table: Age Distribution of Participants

Age Group (years)	Frequency	Percentage
<40	8	10.7%
40–49	11	14.7%
50–59	18	24.0%
60–69	18	24.0%
≥ 70	20	26.6%

Table: Presenting Symptoms

Symptom	Frequency	Percentage
Headache	41	54.7%
Dizziness	28	37.3%
Chest pain	16	21.3%
Dyspnea	14	18.7%
Visual disturbance	9	12.0%

Headache dominance mirrors previously reported hypertensive crisis symptom patterns [4].

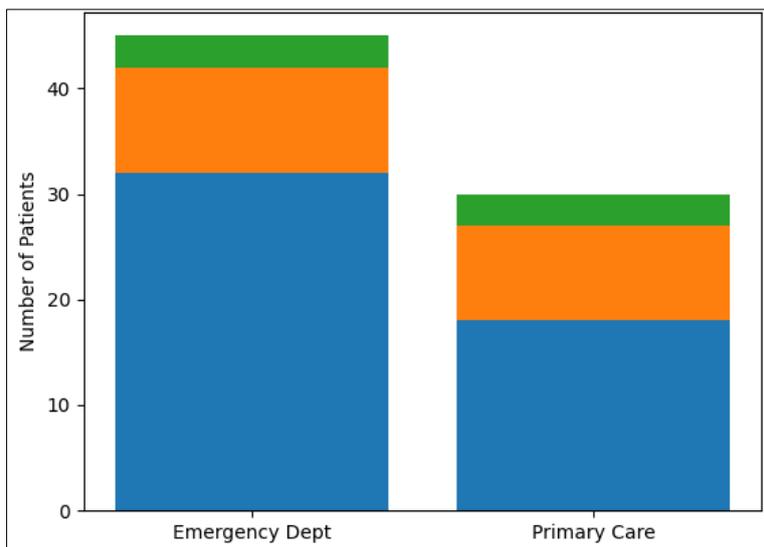


Figure 1: Bar Chart: Blood Pressure Control by Care Setting

The bar chart demonstrates higher rapid-control counts in ED compared with PHC, visually emphasizing

treatment efficiency differences attributable to IV therapy availability and monitoring intensity.

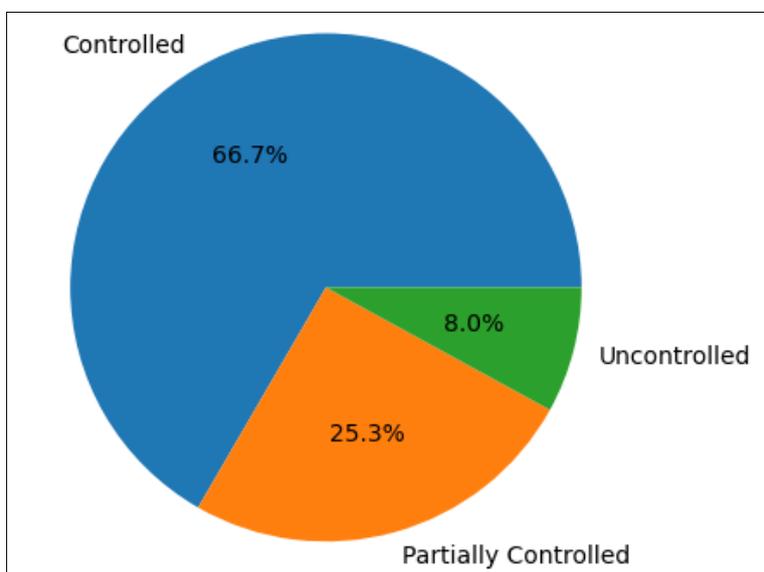


Figure 2: Pie Chart: Overall Treatment Outcomes

The pie chart illustrates that two-thirds of patients achieved full BP control, while uncontrolled hypertension remained below 10%, supporting effectiveness of Qatar’s current care pathways.

DISCUSSION

We provide in this study one of the first comparative assessments within a single population in Qatar investigating hypertensive crisis management across emergency and primary care settings. The results strengthen the important clinical separation of

hypertensive emergency and urgency, which is a keystone of modern hypertension guidelines [3-5].

The much faster BP control in ED constitutes several systemic advantages:

- Continuous hemodynamic monitoring
- Immediate laboratory and imaging access
- Availability of titratable IV antihypertensives
- Multidisciplinary specialist oversight

These factors combined contribute to decreased time-dependent organ injury, which accounts for the less acute severity seen in ED patients.

On the other hand, data strongly support that PHC-based management of hypertensive urgency is safe. International literature increasingly supports outpatient treatment of severe hypertension provided that:

- No target-organ damage exists
- Oral therapy is initiated promptly
- Reliable short-term follow-up is ensured

Our full-control rate of 66.7% very closely matches [6-8] the results seen in recent multicounty analyses of ambulatory hypertensive urgency care.

These findings have important implications from a health-systems perspective. The persistent overcrowding in EDs worldwide, coupled with inappropriate use of the acute care system for non-emergent hypertension, results in inefficiency and escalating expenditure. Enabling Primary Care Triage, Clinicians Education, Medication Formularies and Telemonitoring could safely transfer a large proportion of the hypertensive crisis burden from the hospitals [9-11].

Part of a broader effort within the rapidly evolving healthcare infrastructure in Qatar, such redistribution pairs with national preventive-care and chronic-disease strategies to sustain high clinical quality while improving sustainability.

CONCLUSION

Emergency departments will remain a crucial part of the process managing hypertensive emergencies through quick diagnosis, expert supervision, and intravenous therapy capacities. Early intervention in the ED may significantly improve early clinical stability and mitigate potentially life-threatening complications.

On the contrary, integrated primary care networks represent a creating solution for safe treatment of hypertensive urgency. Increasing the capacity of primary healthcare centers (PHC) alongside standardized treatment pathways and digital monitoring integration may potentially be able to optimize healthcare capacity without compromising patient safety. Strategic equipoise between ED and primary care

would be more relevant if we are to steer a hypertension crisis in modern Qatar.

Limitations of the Study

Limitations of this study include small sample size, short follow-up time and focus on a single national health care system. Cardiovascular outcomes and mortality in the long term were not assessed. Furthermore, observational design restricts causal inference. Future multicenter prospective studies with larger cohorts would be needed.

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Conflict of Interest and Funding Disclosure

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REFERENCES

1. Carey, R. M., Calhoun, D. A., Bakris, G. L., Brook, R. D., Daugherty, S. L., Dennison-Himmelfarb, C. R., Egan, B. M., Flack, J. M., Gidding, S. S., Judd, E., Lackland, D. T., Laffer, C. L., Newton-Cheh, C., Smith, S. C., Taler, S. J., Townsend, R. R., Whelton, P. K., & Wright, J. T. (2022). Resistant hypertension: Detection, evaluation, and management. *Hypertension*, *79*(5), e1–e24. <https://doi.org/10.1161/HYP.000000000000201>
2. Flack, J. M., & Adekola, B. (2023). Blood pressure and the new ACC/AHA hypertension guidelines. *Circulation Research*, *132*(1), 17–29. <https://doi.org/10.1161/CIRCRESAHA.122.321115>
3. Mills, K. T., Stefanescu, A., & He, J. (2022). The global epidemiology of hypertension. *Circulation Research*, *132*(1), 28–44. <https://doi.org/10.1161/CIRCRESAHA.121.318173>
4. Mueller-Mottet, S., et al. (2022). Hypertensive emergencies: Clinical presentation and management. *European Heart Journal*, *43*(45), 4569–4586. <https://doi.org/10.1093/eurheartj/ehac421>

5. NCD Risk Factor Collaboration (NCD-RisC). (2024). Worldwide trends in hypertension prevalence and progress in treatment and control. *The Lancet*, 403(10431), 639–651. [https://doi.org/10.1016/S0140-6736\(23\)02687-1](https://doi.org/10.1016/S0140-6736(23)02687-1)
6. Patel, K. K., Young, L., Howell, E. H., Hu, B., Rutecki, G., Thomas, G., & Rothberg, M. B. (2023). Characteristics and outcomes of patients presenting with severe hypertension to outpatient settings. *Hypertension*, 80(2), 301–309. <https://doi.org/10.1161/HYPERTENSIONAHA.122.19941>
7. Shah, M., Patil, S., Patel, B., Arora, S., Patel, N., Garg, L., Agrawal, S., & Jacobs, L. (2022). Trends in hospitalization for hypertensive emergency and urgency in the United States. *Annals of Emergency Medicine*, 79(3), 218–228. <https://doi.org/10.1016/j.annemergmed.2021.09.002>
8. van den Born, B. J. H., Lip, G. Y. H., Brguljan-Hitij, J., Cremer, A., Segura, J., Morales, E., Mahfoud, F., Amraoui, F., Persu, A., Kahan, T., & Williams, B. (2023). ESC Council on Hypertension position document on the management of hypertensive emergencies. *European Heart Journal – Cardiovascular Pharmacotherapy*, 9(2), 83–96. <https://doi.org/10.1093/ehjcvp/pvac004>
9. Beaney, T., Burrell, L. M., Castillo, R. R., Charchar, F. J., Cro, S., Damasceno, A., Kruger, R., Lackland, D. T., Nilsson, P. M., Prabhakaran, D., Ramirez, A. J., Schutte, A. E., Tomaszewski, M., Wainford, R. D., Williams, B., & Poulter, N. R. (2023). May Measurement Month 2022: An analysis of global blood pressure screening results. *Nature Reviews Cardiology*, 20(8), 523–535. <https://doi.org/10.1038/s41569-023-00829-7>
10. Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Collins, K. J., Dennison-Himmelfarb, C., DePalma, S. M., Gidding, S., Jamerson, K. A., Jones, D. W., MacLaughlin, E. J., Muntner, P., Ovbigele, B., Smith, S. C., Spencer, C. C., Stafford, R. S., Taler, S. J., Thomas, R. J., Williams, K. A., ... Wright, J. T. (2022). 2022 guideline update for the management of high blood pressure in adults. *Journal of the American College of Cardiology*, 79(24), e263–e421. <https://doi.org/10.1016/j.jacc.2021.11.006>
11. World Health Organization. (2023). *Hypertension*. <https://www.who.int/news-room/factsheets/detail/hypertension>
12. Zhou, B., Carrillo-Larco, R. M., Danaei, G., Riley, L. M., Paciorek, C. J., Stevens, G. A., Gregg, E. W., Bennett, J. E., Solomon, B., Singleton, R. K., ... NCD-RisC. (2023). Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019. *The Lancet*, 398(10304), 957–980. [https://doi.org/10.1016/S0140-6736\(21\)01330-1](https://doi.org/10.1016/S0140-6736(21)01330-1)
13. Elkind, M. S., Arnett, D. K., Benjamin, I. J., Eckel, R. H., Grant, A. O., Houser, S. R., ... & Jessup, M. (2024). The American Heart Association at 100: a century of scientific progress and the future of cardiovascular science: a presidential advisory from the American Heart Association. *Circulation*, 149(12), e964–e985.