

Background

- Malignant hypertension (MH) is severe hypertension with end-organ disease [1,2].
- MH was common before 1960 and the median survival was < 6 months [3].
- The residential Rice Diet Program (RDP) was designed to treat MH [4].
- RDP used a very low sodium (5 meq/d), low protein (~5% kcal), low fat (~5% kcal), high carbohydrate (~90% kcal) diet.
- MH patients were identified by papilledema and/or non-diabetic retinal hemorrhage and with a systolic BP (SBP) >170 mmHg.
- MH patients were identified between 1943-1955.

Objectives

- To examine BP changes in MH patients
- To find factors associated with BP changes

Methods

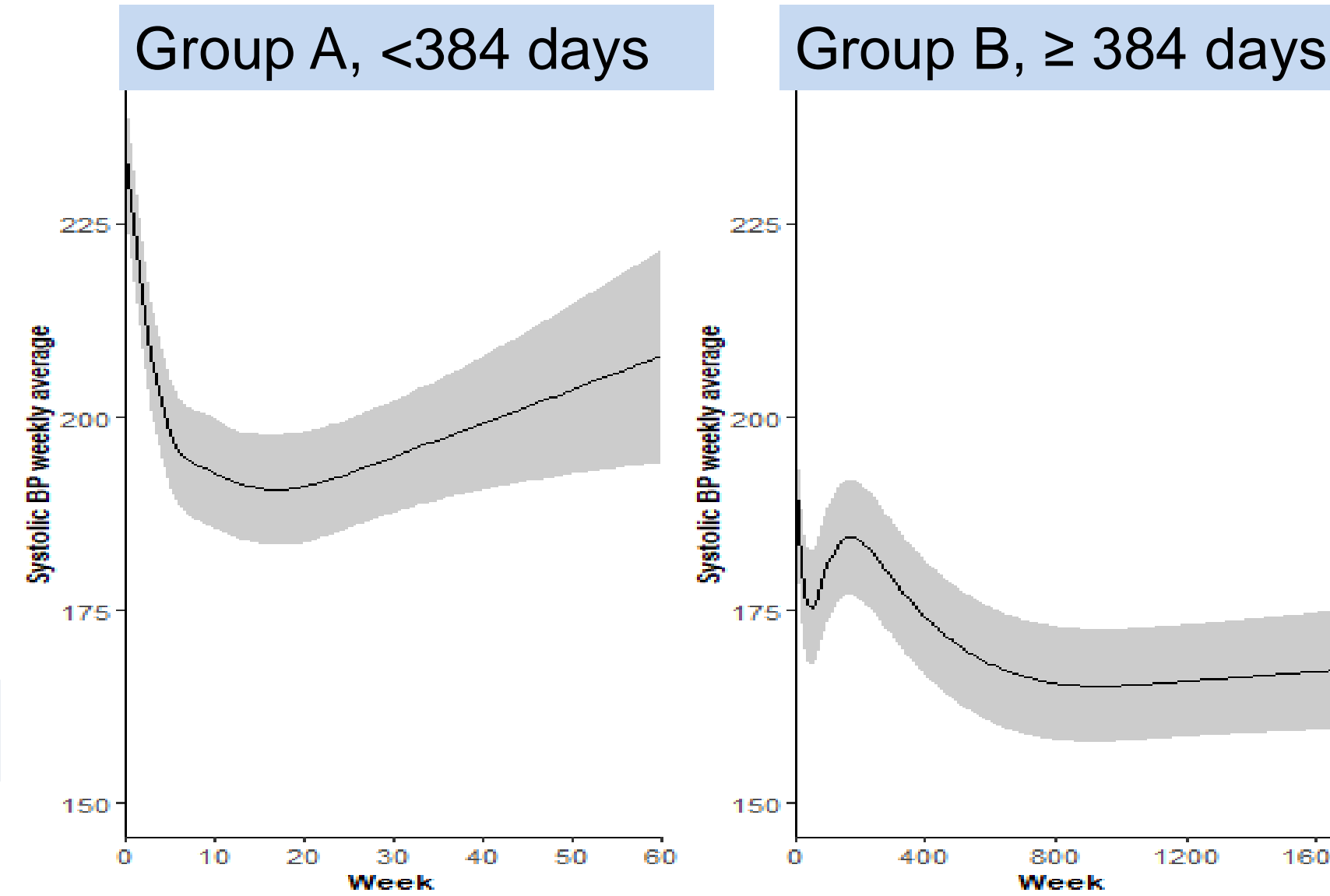
- Age at entry, gender, duration in RDP, BPs and urine Cl⁻ (measure of low-sodium diet adherence) were compared by Wilcoxon test between **Group A**, those who stayed <384 days (the median duration of MH patients in RDP) and **Group B**, those who stayed ≥384 days.
- Multivariable linear regression was used to examine the association between these factors and the SBP change from entry to week 13.

Results

Table 1 Baseline characteristics

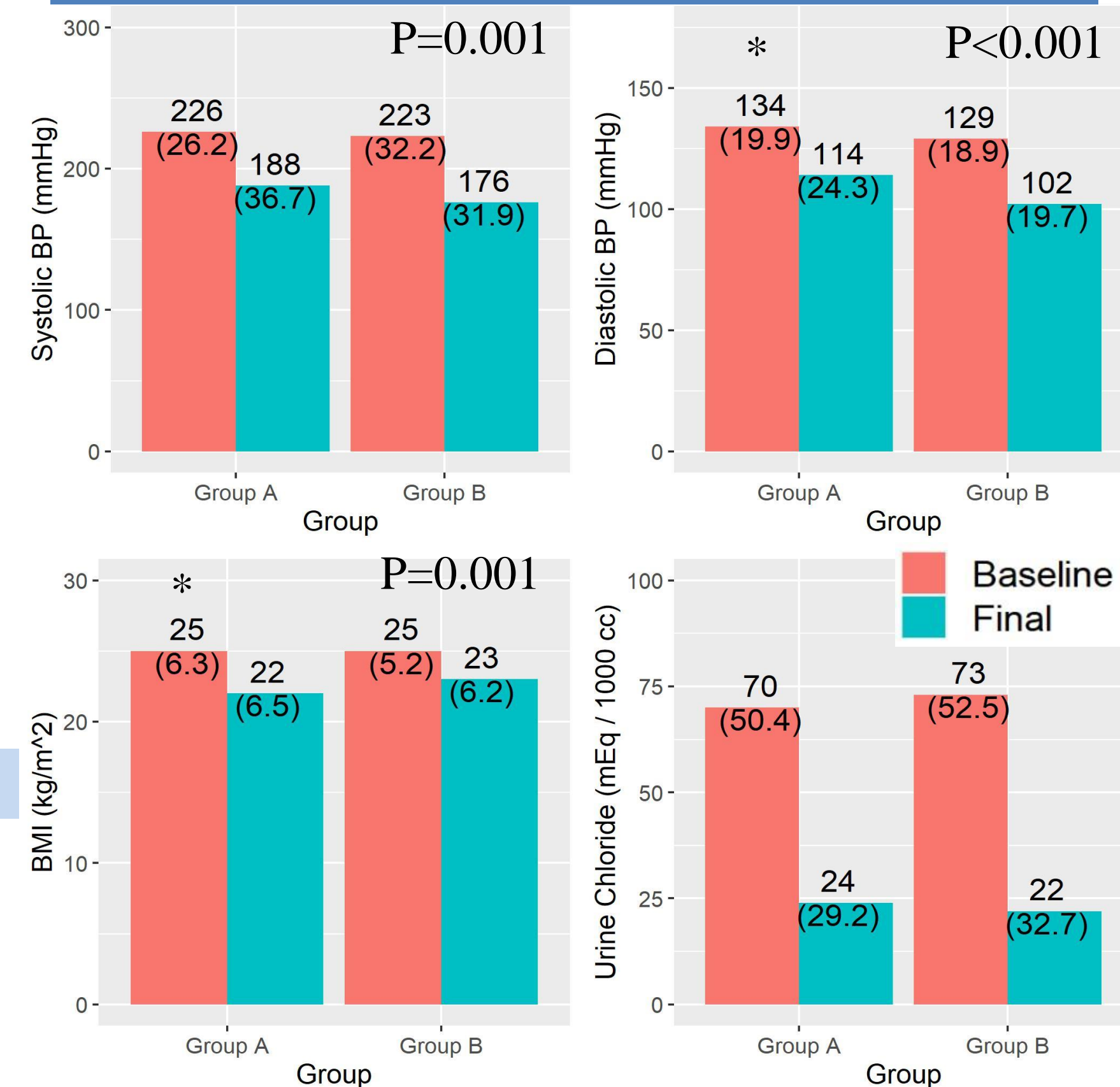
N=596 (410M; 185F)	Mean	SD
Age, years	50	10.9
Duration, days	1164	2011
Systolic BP, mmHg	224	29.4
Diastolic BP, mmHg	131	19.6
BMI, kg/m ²	25	5.8
Urine Cl ⁻ , mEq/L	72	51.5

Figure 1 Spline plots of BP changes predicted from linear regression



- BP dropped quickly in both groups and BP reduction was sustained in Group B (Figure 1).
- Group A stayed in RDP an average of 118 days. Group B stayed an average of 6 years.
- In a subset of patients with date of death data, Group A lived an average 1.1 year (N=122) and Group B 7.3 years (N=97) since first encounter in RDP.

Figure 2 Baseline and end of program data by group



All values in Figure 2 are Mean (SD). *P<0.05 comparison of baselines between groups. P values indicate comparison of changes between groups.

- Baseline SBP did not differ between groups but diastolic was higher, and BMI lower in Group A vs B (Figure 2).
- Group B patients had greater reductions in BPs and BMI (Figure 2).

References

1. Boulestreau et al. Malignant hypertension: Current perspectives and challenges. J Am Heart Assoc. 2022;11:e023397. DOI: 10.1161/JAHA.121.023397
2. Domek M, Gumprecht J, Lip G.Y.H. and Shantsila A. Malignant hypertension: does this still exist? J Hum Hypert 2020;34:1-4.
3. Keith NM, Wagener HP, Barker NW. Some different types of essential hypertension: their course and prognosis. Am J Med Sci. 1974;268:336-45.
4. Newborg B and Kempner W. Analysis of 177 cases of hypertensive vascular disease with papilledema. Am J Med 1955 (July):33-47.

Table 2 Multivariable Regression Week 13 Change in Systolic BP (N=153) R=0.365

Variable	Beta (95% CI)	P
Baseline SBP	-0.65 (-0.81, -0.49)	<0.001
Age	0.08 (-0.38, 0.55)	0.720
Male Gender	1.80 (-8.85, 12.45)	0.739
Weight change	0.58 (0.16, 1.00)	0.007
Urine Cl ⁻ Change	0.10 (0.01, 0.20)	0.039

- Baseline SBP, weight change and change in urine Cl⁻ (measure of diet compliance) were associated with SBP change at 13 week, while controlling for other covariates (Table 2).
- The higher the baseline SBP, the lower the SBP reduction.
- The greater the urine Cl⁻ reduction or weight loss, the greater the SBP reduction.
- Age at entry and gender had no effect.

Conclusion

- The low-sodium, low-protein, low-fat Rice Diet lowered BPs in MH patients.
- Sodium loss may be key, but other components must be examined.
- Over half of the MH patients lived > 1 year.