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## Introduction

- About 1 billion people are affected by hypertension worldwide(1).
- Hypertensive individuals typically have blood pressure readings higher than 120/80 mmHg and are at significant risk for developing heart disease, stroke, and kidney disease(2)(3).
- Hypertension treatment includes dietary changes, exercise, weight loss, and antihypertensive drugs(2)(4)(5).
- Caloric restriction: Decreasing one's daily caloric intake below the level of calories needed to maintain one's current weight (maintenance level), without the loss of essential nutrients(6).
- Fasting: Restricting one's feeding window within a day, week, or month. Restrictions on the feeding window may be a reduction in caloric intake below maintenance level(6).
- Previous research has shown that fasting and caloric restriction decreased blood pressure, body weight and improved health markers(7).
- This uses a larger sample size than other studies on dietary controls and health markers. Studies on dietary controls and health markers lack larger sample size and are not generalizable to the U.S population.

## Objective

To examine the associations between dietary practices and blood pressure control in hypertensive individuals.

## Methods

### Data Source

- IPUMS NHIS of 1991, 1993, and 1998

### Study Population

- Individuals diagnosed with hypertension at one point in their life, and are aged 18 and older.

### Exposure Variable(s)

- Eating fewer calories, fasting 24+ hours, and no dietary controls.

### Outcome

- Hypertensive or Not Hypertensive

### Confounding Variable(s)

- Sex, Hypertensive diet advice.

### Statistical Analysis

- Logistic regression
  - N=24,187
- SAS Studio University Edition.

**Table 1**

| Characteristics   |           |         |
|---|-----------|---------|
|   | Frequency | Percent |
| <b>Blood Pressure level at last check up</b>                                    |           |         |
| Hypertensive  | 4675      | 19.33   |
| Not Hypertensive  | 19512     | 80.67   |
| <b>Dietary Control Method</b>   |           |         |
| Caloric Restriction   | 7311      | 30.23   |
| Fasting 24+ Hours   | 28        | 0.12    |
| No Control Method   | 16848     | 69.66   |
| <b>Sex</b>  |           |         |
| Male  | 9623      | 39.79   |
| Female  | 14564     | 60.21   |
| <b>Age groups</b>   |           |         |
| age 18 to 39  | 4506      | 18.63   |
| age 40 to 59  | 7870      | 32.54   |
| age 60 to 99  | 11811     | 48.83   |
| <b>Did the individual receive dietary advice to lower their blood pressure?</b> |           |         |
| No  | 10351     | 42.8    |
| Yes   | 13836     | 57.2    |

**Table 2**

| Crude relationship between Dietary control method and Blood Pressure level      |           |                         |         |
|---|-----------|-------------------------|---------|
| Dietary Control Method  | Odds      | 95% Confidence Interval | P-value |
| No Control Practice   | Reference | Reference               |         |
| Caloric Restriction   | 0.938     | 0.875-1.005             | 0.066   |
| Fasting 24+ Hours   | 0.422     | 0.195-0.916             | 0.0356  |
| Adjusted relationship between Dietary control method and Blood Pressure level   |           |                         |         |
| Dietary Control Method  | Odds      | 95% Confidence Interval | P-value |
| No Control Practice   | Reference | Reference               |         |
| Caloric Restriction   | 0.989     | 0.922-1.060             | 0.0431  |
| Fasting 24+ Hours   | 0.435     | 0.200-0.945             | 0.0368  |
| <b>Sex</b>  |           |                         |         |
| Male  | Reference | Reference               |         |
| Female  | 0.968     | 0.907-1.034             | 0.3345  |
| <b>Did the individual receive dietary advice to lower their blood pressure?</b> |           |                         |         |
| Yes   | Reference | Reference               |         |
| No  | 1.45      | 1.356-1.550             | <0.0001 |

## Results

Before adjusting for confounding variables

- Hypertensive individuals practicing fasting for 24+ hours were 57.8% lower odds of having a high blood pressure reading at their most recent check-up than those who did not follow a control practice.
- Hypertensive individuals practicing caloric restriction were 6.2% lower odds of having a high blood pressure reading at their most recent check-up than those who did not follow a control practice.

After adjusting for confounding variables

- Hypertensive individuals practicing fasting for 24+ hours were 56.5% lower odds of having a high blood pressure reading at their most recent check-up than those who did not follow a control practice.
- Hypertensive individuals practicing caloric restriction were 1.1% lower odds to have a high blood pressure reading at their most recent check-up than those who did not follow a control practice.

## Discussion/Conclusion

Findings suggest that caloric restriction and fasting are associated with reduced blood pressure. Findings in this study suggest that fasting results in a greater reduction of the odds of an individual having a high blood pressure reading at their most recent check-up than caloric restriction. Study findings were statistically significant.

## Limitations

- The data collected in the NHIS are self-reported.
- Lab data does not verify inquiries about blood pressure readings.
- Temporal relationships between exposures and outcomes cannot be established for cross-sectional data.
- A very small number of participants reported practicing fasting.

## Strengths

- This studies large sample size increases generalizability to the U.S. population and gives this study greater statistical power.

## References

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