





# **Age and Weight Trends in Relation to Hypertension Diagnosis**

Report and Analysis

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This dataset focuses on exploring whether there is a significant relationship between age and weight in hypertensive (level 3) and non-hypertensive (level 1) individuals. The goal was to understand if having hypertension affects how age and weight are related. Using normalized values for both variables, a simple linear regression was applied separately to each group to test if age could predict weight.

To investigate the relationship between normalized age and weight in hypertensive (level 3) and non-hypertensive (level 1) patients, a simple linear regression analysis was conducted. The dataset was first filtered by hypertension level, separating patients into two distinct groups. For each group, age and weight were normalized to remove unit differences and allow for clearer comparison. The regression analysis aimed to determine if normalized age could significantly predict normalized weight within each group. By evaluating the slope,  $R^2$  value, and p-value from each model, we assessed whether the relationship was statistically significant and how well age explained variations in weight. Separate models were used for each subgroup to avoid bias and to accurately reflect differences between hypertensive and non-hypertensive individuals.

#### **Hypothesis:**

##### **Null Hypothesis ( $H_0$ ):**

There is no significant difference in the relationship between normalized age and normalized weight between hypertensive and non-hypertensive patients.

##### **Alternative Hypothesis ( $H_1$ ):**

There is a significant difference in the relationship between normalized age and normalized weight between the two groups

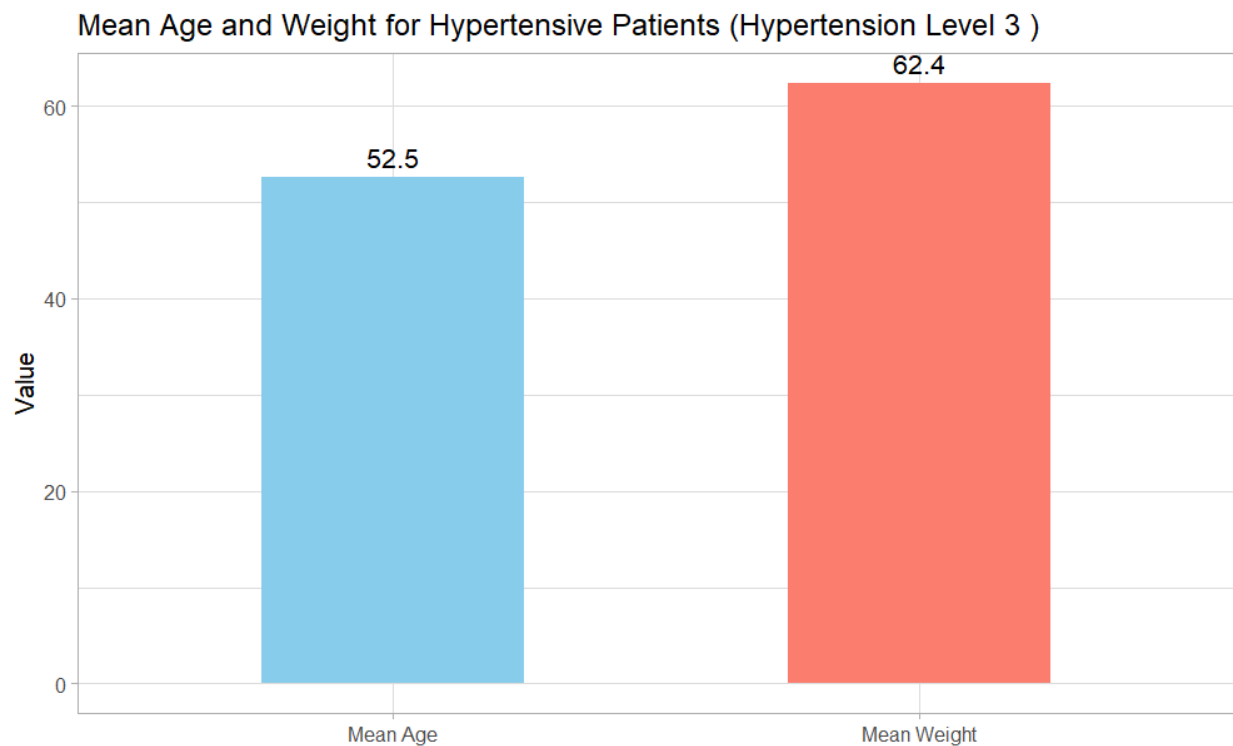
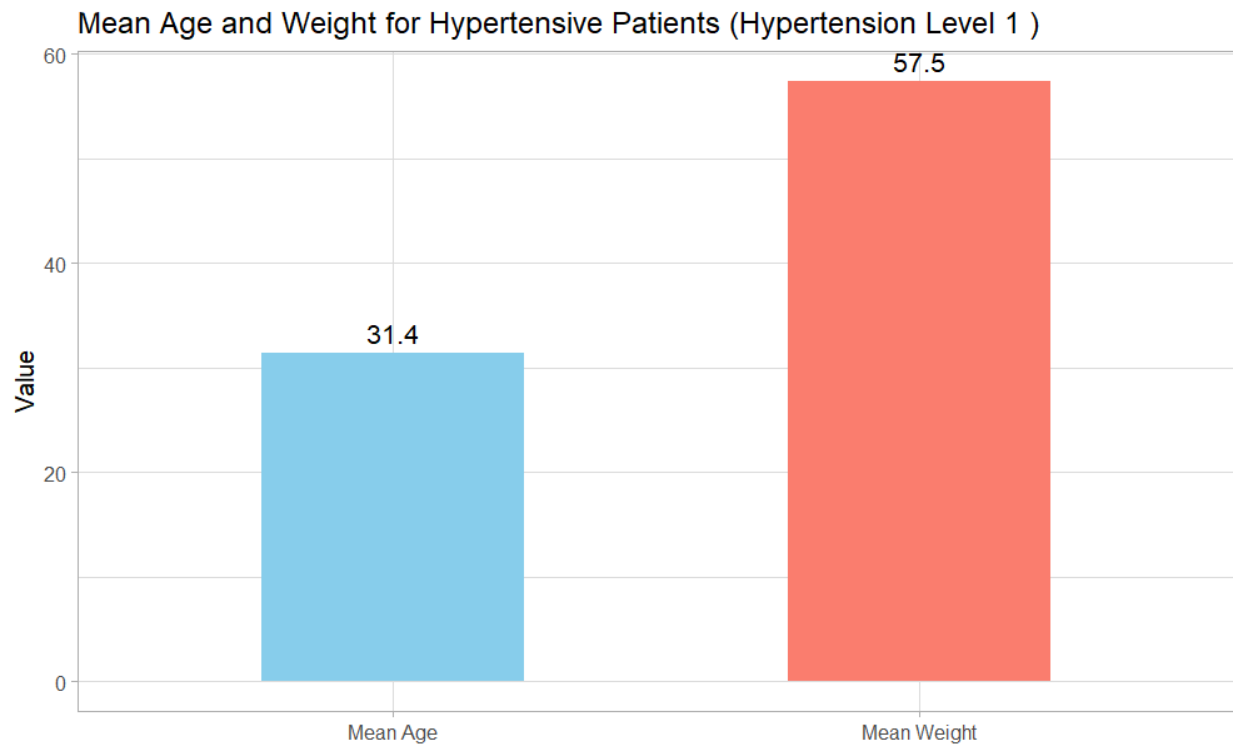
In the dataset Vital signs diagnosis data Group 010 we have found that:

- Average age of participants is 54.29 years, with ages ranging from 18 to 90.
- Average weight is 62.81 kg with weights ranging from 41 kg to 86 kg.

Statistic	Age (years)	Weight (kg)
Minimum	18.00	41.00
1st Quartile (Q1)	35.00	56.00
Median	55.00	63.00
Mean	54.29	62.81
3rd Quartile (Q3)	72.00	69.00
Maximum	90.00	86.00

### Comparison of Age and Weight of Hypertensive to Non-hypertensive Patients

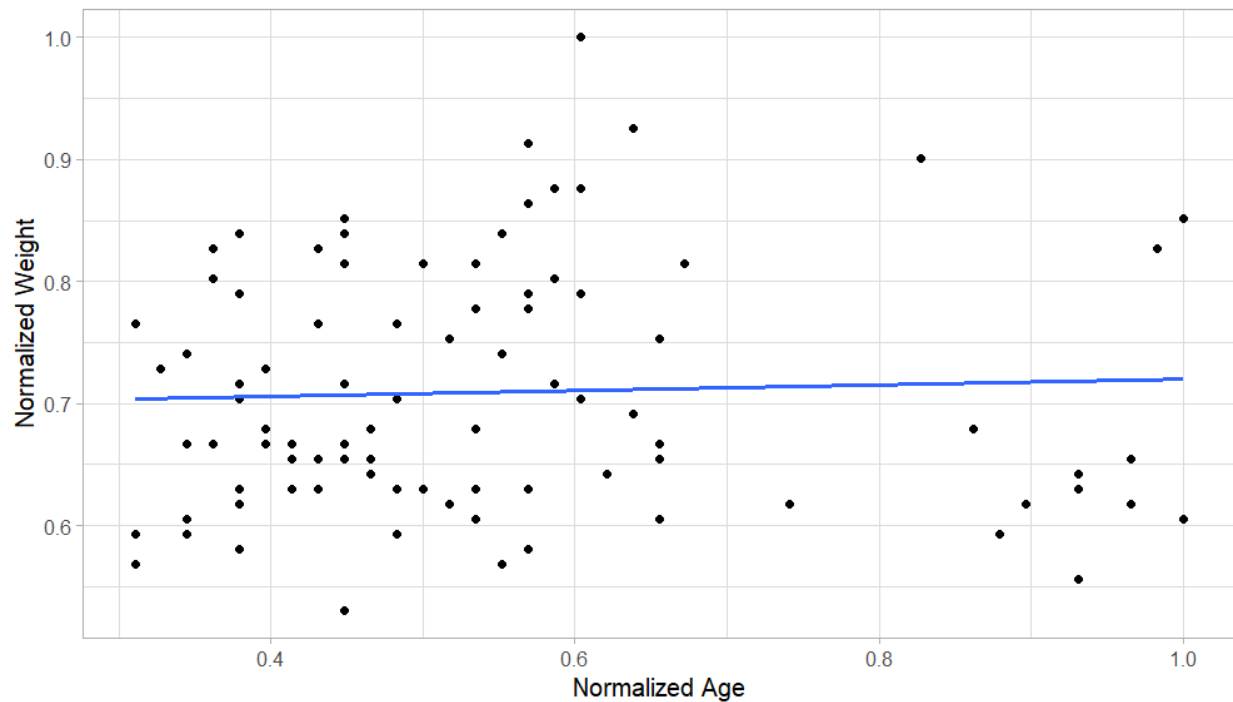
- For hypertensive patients, their mean age and weight are higher than non-hypertensive patients. They have 52 as the average age and 62 as the average weight.



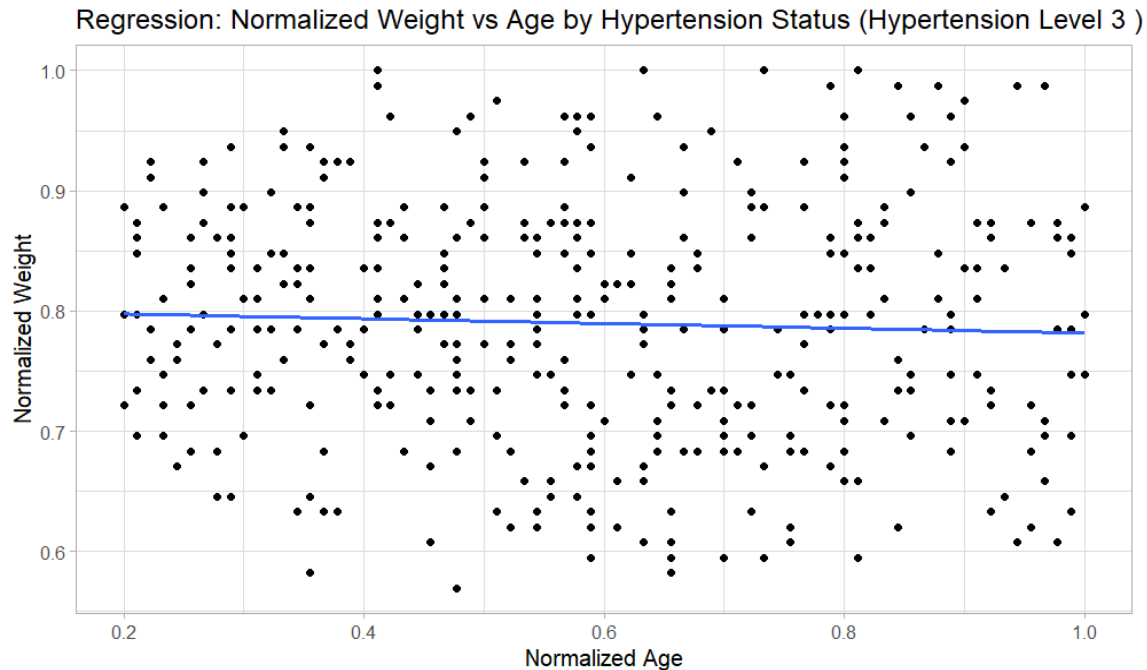
## Simple Linear Regression

- More data points are seen below the normalized age of 0.7 meaning there are more younger people that are non-hypertensive
- The slope is slightly tilted down towards the front meaning as normalized age for hypertensive patients increases the normalized weight also increases.

Regression: Normalized Weight vs Age by Hypertension Status (Hypertension Level 1 )



- The data points are scattered randomly with no visible grouping, trend, or pattern that can be observed meaning age and weight do not have a strong relationship
- The slope is slightly tilted down towards the end meaning as normalized age for hypertensive patients increases the normalized weight decreases.



#### Non-hypertensive patients (Hypertensive level 1)

- The relationship is positive (as age increases, weight slightly increases)
- The p-value is higher than 0.005 so it is not statistically significant.
- $R^2 = 0.0017$  means the model does a very poor job explaining weight using age alone.

Statistic	Value
Intercept	0.6966
Slope	0.0234
$R^2$	0.0017
P-value for slope	0.6849

#### Hypertensive patients (Hypertensive level 3)

- The relationship is negative (as age increases, weight slightly decreases)
- The p-value is higher than 0.005 so it is not statistically significant.
- $R^2 = 0.002$  means the model does a very poor job explaining weight using age alone.

Statistic	Value
Intercept	0.8015
Slope	-0.0198

<b>R<sup>2</sup></b>	0.002
<b>P-value for slope</b>	0.3847

From this, we conclude that there is no meaningful difference in how age relates to weight in hypertensive versus non-hypertensive patients. The null hypothesis is accepted, confirming that age and weight do not significantly correlate in these groups. As a recommendation, future research could include more variables such as gender, physical activity, and body composition, which might better explain weight changes among hypertensive individuals. Additionally, healthcare providers should avoid assuming a direct age-to-weight trend in hypertension without further evidence.