High Income Inequality and the Southern States: A Statistical Analysis of their Effect on the Population

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**Introduction:**

 The goal of this research project is to find if the labels of both being a “high income inequality” member creates a higher chance of infant mortality, poor mental health, poorer life expectancy, and unemployment rates. This will answer the question of whether or not being identified as a state with “high income inequality” can be linked with having a lower life expectancy, a more frequent abundance of mental issues (recorded within a month), more unemployment, and a higher infant mortality rate.

 From the analysis of the relationships between these variables patterns and subsequently ways to fix the issues can be found. For instance if having high income inequality have a positive relation with the lowering of life expectancy measures can be made on whether it is caused by not being able to afford things like healthy food or exercise equipment.. From there implementation of healthy eating or increased exercise programs can be proposed and put into place. Information pertaining to mental health can be used to see whether it is due to high income inequality and what then to do about alleviating the issue. Mental illness in particular can be interesting to observe in terms of what setting has a strong relation to the increase of it because there is a serious stigma that follows the term mental illness and all that identify under it. All of this will be answered by the analysis of the relation between these specific variables.

**Data and Measures:**

 The variables being used in this analysis are “High Income Inequality”, “Percent of Labor Force Unemployed in March 2013”, “Average Life Expectancy at Birth by State for 2000”, “Infant Mortality Rate, 2005”, and “Days Mental Health was Not Good in Last 30 (Days).”

 High Income Inequality is defined as a nominal variable that only has two responses: “High” or “Low.” These are, from the dataset, defined as either being higher than the average score of income inequality or lower than it. This variable, in this analysis, is also defined as an independent variable which will act upon the dependent variables.

 The first of the dependent variables is Life Expectancy which has an interval measurement. There is no zero and the distances are less equal and systematic than they are simply the measurements of the average age for life expectancy. These averages range from 72.63 at the youngest to 79.85 at the oldest. These are the ages which people tend to live till, so there are states which have an extra 7.22 years on the lowest ranked states.

 Infant Mortality is the second dependent variable which is also an interval ratio measuring the number of deaths of infants under one year old per 1,000 live births. Zero then, has no meaning because there is not an absence of infant mortality and these measurements do not have an even spacing. These measurements range from 4.50 at the lowest to 14.10 at the highest, putting a 9.6 difference per death measurement in infants.

 Unemployment rate is the third dependent variable being measured which is an interval ratio. This is because the ratio between each response is not even nor does it have a measurement which is set, rather the numbers are based on percentages that are measured without a scale set in place before hand. The lowest or minimum response was 3.30 percent and the maximum is 9.70 giving a difference of 6.40 between the highest and lowest scores.

 The final dependent variable is Mental Health which is also an interval measured variable. This is because there is no equal or even ratio based difference between the measurements. These measurements show the days, in the last month, that there was a response of mental health being poor. The responses range from 2.80 to 5.30 giving a difference of 2.5 days with more or less frequent reports on having poor mental health.

**Hypothesis:**

 A Null Hypothesis is the difference between the mean scores for two groups equating to zero. The purpose of this hypothesis is to show that the differences in the means from each variable group is null or made by errors such as sampling error. A Research Hypothesis is the alternative to the null hypothesis in which the goal or assumption is that the difference does not equal zero (nondirectional research hypothesis) or that the population mean for one group is greater than the population mean for the other group (directional research hypothesis). From a research hypothesis, whether it be directional or nondirectional, one can learn that there is meaning to the relationship and it is not based on errors.

 Null: Average Life Expectancy does not decrease with the presence of High Income Inequality.

 Directional Research: Average Life Expectancy decreases with the presence of High Income Inequality.

 Null: Infant Mortality Rate does not increase with the presence of High Income Inequality.

 Directional Research: Infant Mortality Rate increases with the presence of High Income Inequality.

 Null: Percent of Labor Force Unemployed does not increase with the presence of High Income Inequality.

 Directional Research: Percent of Labor Force Unemployed increases with the presence of High Income Inequality.

 Null: Days where Mental Health was Poor does not increase with the presence of High Income Inequality.

 Directional Research: Days where Mental Health was Poor increases with the presence of High Income Inequality.

**Results:**

**Table 1: T-Test of Mean Differences Between High Income Inequality States and Low Income Inequality States**

|  |  |  |  |
| --- | --- | --- | --- |
| Survey Items | High Income | Low Income | Difference (High-Low) |
| Average Life Expectancy at Birth by State for 2000 | 76.26 | 77.71 | -1.45 \*\* |
| Infant Mortality Rate, 2005 | 7.76 | 6.43 | 1.33 \* |
| Days Mental Health was Not Good in Last 30 Days | 4.13 | 3.62 | .51 \*\* |
| Percent of Labor Force Unemployed in March 2013 | 7.73 | 6.12 | 1.61 \*\* |

 \*p. ≤ .05 \*\*p. ≤ .01

**Discussion and Conclusion:**

 The Directional Relationship Hypothesis is deemed statistically significant for the relationship between Average Life Expectancy and High vs Low Income Inequality. This hypothesis stated that Average Life Expectancy decreases with the presence of High Income Inequality. This is proven by the difference of the two means (76.26-77.71), between low and high income inequality, which shows an inverse relationship that is also statistically significant. The percent of confidence given by the p value in this situation is 99%.

 In the relationship between the Infant Mortality Rate and the presence of High Income Inequality follows with the Directional Relationship hypothesis which stated that there would be an increase in Infant Mortality Rate with higher Income Inequality. The difference of these two (7.76-6.43) means show a positive correlation that is also statistically significant at the point that this measurement is 95% confident.

 For the relationship between Mental Health and presence of High Income Inequality, the Directional Relationship Hypothesis can be used. This is because when the means of these two variables are calculated for their difference (4.13-3.62) they give a positive correlation and show a statistical significance. From the p. value it can be observed that there is a 99% level of confidence.

 The final relationship between Unemployment Rate and the presence of High Income Inequality follows with the proposed Directional Relationship Hypothesis. The previous mentioned hypothesis stated that the Percent of Labor Force Unemployed increases with the presence of High Income Inequality. This is proven true by calculating the difference between the responses of high income inequality and low (7.73-6.12) which gave a positive correlation and a high statistical significance. This level of statistical significance shows that there is a 99% confidence that this relationship is strong.

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