Relationship between number of times pregnant and diabetes test of Pima Indians

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Background

- In this study I analyzed diabetes test results of 768 adult female Pima Indians living near Phoenix to answer the following question:
- Does the diabetes test result differ depending on number of pregnancy of the woman?
- I hypothesized that the test result is different by pregnancy number:
  - H0: There is no difference in average number of times pregnant between group with diabetes and group not having diabetes.
  - H1: There is difference in average number of times pregnant between group with and without diabetes.
- Previous studies have found that diabetes affect pregnancy : Can it be oppositely said that, the number of pregnancy affects diabetes?

Methods

- Explanatory variable: number of times pregnant of woman
- Response variable: test result of having diabetes
- Explanatory data analysis:
  - Histogram of pregnancy number
  - Bar plot of the test results
  - Box plot of the two variables
  - Jittered Scatterplot between the two variables
- Since the explanatory variable is categorical and the response variable is numerical, I am going to use a t-test to compare woman with the average number of pregnancy who have diabetes to those who don't have diabetes.
- I also performed a linear regression on test result of diabetes with a new version of number of times pregnant as the explanatory variable

Results

- Of the 768 women in the sample, 268 woman had the test results of positive of having diabetes.
- Average number of pregnancy for women not having diabetes was 3.29 (SD = 3.0), while the average number of pregnancy for women having diabetes was 4.86 (SD = 3.7).
- A two-sample t-test (two-sided) revealed that the difference in number of pregnancy by having diabetes of 1.56 (95% confidence interval:) was significantly different from 0. (p-value = 1.057504e-08)
- A linear regression model resulted in the following estimation equation: $\widehat{test} = 0.21 + 0.03 \times pregnant$

	Negative to diabetes <dbl>	Positive to diabetes <dbl>
mean	3.298000	4.865672
st.dev	3.017185	3.741239
sample.size	500.000000	268.000000

Conclusions

- I found lower pregnancy numbers of women who are negative to the test(not having diabetes)
- Other factors that might influence having diabetes are the glucose amount, bmi, insulin amount and other health related complications.
- Caution in pregnancy may have benefits for the Pima Indians not having diabetes.

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Call:
lm(formula = test ~ pregnant.factor, data = data)

Residuals:
    Min      1Q  Median      3Q     Max
-0.5300 -0.2995 -0.2344  0.4700  0.7656

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)     0.215288   0.026236   8.206 9.66e-16 ***
pregnant.factor 0.034764   0.005252   6.619 6.78e-11 ***
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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
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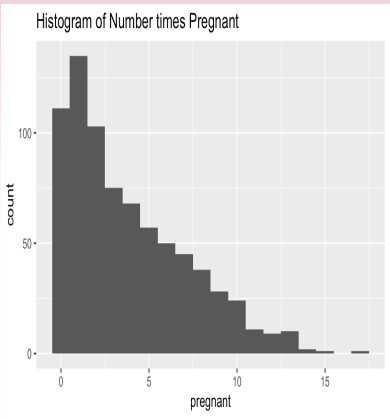

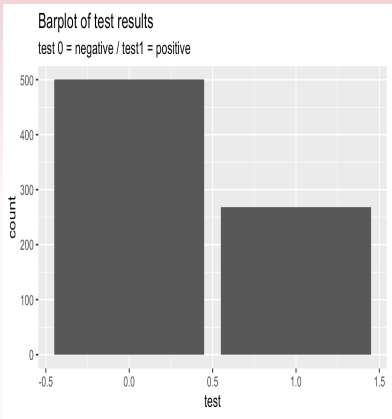

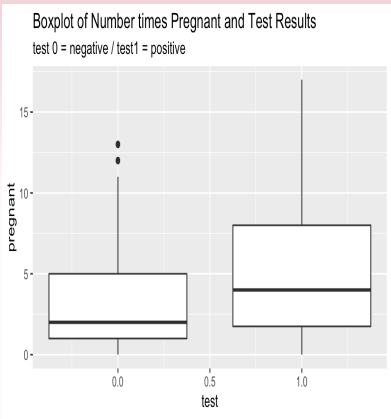

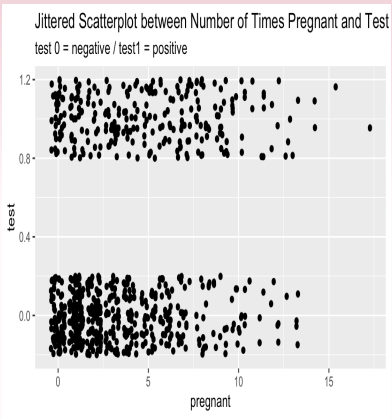

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