## Cross sectional analysis at Month 6:

## Eyeballing the data:

## Chart, line chart Description automatically generated Chart, line chart Description automatically generated

Chart, bar chart

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Looking at these graphs, we can say that the treatment 1 has lowest mean Hamilton depression score as compared to others and treatment 4 has highest depression score.

Goodness of fit assumptions:

* 1. Normality is violated.
  2. HOV assumption met.
  3. Independence met.

Square root transformation is needed to correct the Normality. After square root transformation the normality is corrected as well as other assumptions are also met.

Effect of treatment on the Outcome (Hamilton depression score i.e. SIGHD17)

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The p-value indicate that the four treatments are not significant different from one another in treating the depression.

Graphical user interface, table

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We see that all the treatment has mean depression score less than 7 means -No depression.

Also, none of the treatment is significant different from one another.

Including covariates into the model (PS\_HAM17):

COVARIATE is any continuous variable, which is usually not controlled during data collection. Including covariates, the model allows you to include and adjust for input variables that were measured but not randomized or controlled in the experiment. Adding covariates can greatly improve the accuracy of the model and may significantly affect the final analysis results. Including a covariate in the model can reduce the error in the model to increase the power of the factor tests.

Check for equal slope assumption:

In the ANCOVA Model, there should not exist any interaction between the X and covariate (Z). If it exists, then it’s no longer a ANCOVA model.

We will assume the Consistency of slope assumption has been met.

Normality assumption is violated so we will try to transform it. We took the square root transformation. The variability indicated by the r square has improved by adding the covariate into the model. Also, we see that the baseline HD covariate in significant.

Treatments for the Hamilton depression score at month 6 are not significant different from one another.

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Results after backtransforming:

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We see that treatment 4 has highest depression score and treatment 1 has lowest but they are not significantly different.

Or we can say that the Hamilton depression score at Month 6 does not varies differently across different level of treatments.

**Including the other variables into the model and 2/3-way interaction terms into the model:**

SUBHYPOHESIS: Including the GENDER AND MAR\_STAT into the model for month 6th:

Since the treatment effect was not significant so we removed that from the model and now we are interested in analyzing the two-way interaction for my a priori variables (Gender and Marital Status). 

The graphs look like this:

Chart, line chart

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On eyeballing the graphs: It looks like the married/cohabiting male have the lowest Hamilton depression score and the Married/cohabiting Females have highest depression score.

Results are same for both the months.

Two-way plot:

Chart, line chart

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ZS

1. We are anticipating disordinal INTEARACTION between the gender and marital status without adjusting for the covariate but when we adjusted for the covariate the interaction is no longer significant.
2. Looks like he married female have more depression.

Fitting the ANCOVA MODEL:

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Looks like:

* 1. The interaction between the gender and marital status is NOT significant which means that the on average difference in the SIGHD17 score for male and females DOES NOT vary differentially across different level of marital status (after controlling for covariate).
  2. There is no main effect due to the gender term as well as the mar\_stat term.
  3. The covariate included in the model is also significant.

**Output from the LSMEANS:**

Table

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There is NO significant difference IN ANY OF THE GROUP.

# Conclusion: “Marriage/Cohabiting means less chance of depression for men, opposite for women at month 3 but at month 6 there is no significant difference among the groups.”

Estimates and Contrasts Conclusions

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We also performed the various estimates and contrasts to check the relationship. Again, the results are same:

None of the term is significant means that “male vs female” or “alone vs married” are not significantly different from one another at month 6.

However, at month 3 Male Alone vs Male Married was significant which means being married appears to be associated with a lower risk of Hamilton depressive symptoms in men. Same is not applicable for females.

Back Transformed:

Table

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Table

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Conclusions Being married appears to be associated with a lower risk of depressive symptoms in men, but not in women at month 3 of treatment however there is no significant difference at the month 6.

Including another variable to perform three-way interaction:

We selected the Race variable a priori to include into the model. Now our model has **Race, MAR\_STAT and Gender variable**.

Slice effect for eyeballing the data:



Graphical user interface, table

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Fitting the ANCOVA model:

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It shows that the three-way interaction is not significant. In the other words, on average difference in Y (SIGHD17 score on square root scale) varying as a function of Gender (Male and female) over Marital status (married and living alone) does not varies differential across different level of RACE groups.

With month=3 the race, mar\_stat and the race\*gender was significant but here we see that only race\*gender is significant means that the on average difference in depression score for male and female vary differentially across different levels of gender.

LSMEANS OUTPUT:

Graphical user interface, table

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Estimates and contrasts:

Graphical user interface, table

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Back transformed:

Table

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1. At month=3 Caucasian, Living alone, females have the highest depression score followed by the caucasian, married ,females. However at month=6 none of the groups are significantly different.
2. Looking at he contrats we see that, there is significant difference in the HD score between CAUCASIAN ALONE FEMALE and CAUCASIAN ALONE MALE with the females having more depression at month=3 however at month 6 the difference is not significant..
3. At month=3 There is significant difference in the HD score between CAUCASIAN MARRIED FEMALE and CAUCASIAN MARRIED MALE with the females having more depression.However at month=6 this difference is not significant.

Final Parsimonious Model: we removed all the non-significant variables from the model and re ran the model.

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1. The average depression score for male and female varies differentailly across different levels of the race (Caucasian and Non-Caucasian)

Lsmeans Output:

Graphical user interface, table

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Chart

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Its show that unlike the Caucasian Female who had highest depression score among all other groups in the month=3 isno longer significanlty different from others at month=6.