Biostatistics

Lecture 9 - 10

Prepared by Dr. Ibrahim AL-Jaafari

Parametric Test

- **Parametric test** can be used to estimate the population parameter from the selected sample statistics. The most important assumption for parametric technique is that the variable in the selected sample is normally distributed while non-parametric tests have no assumption about the distribution, it is called distribution free.

One Sample T-Test

One sample t-test is used when we want to compare the sample mean with population mean(known value)

E.g. We suppose that the average weight for males in the population (A) is 75 kg and want to test this value with our sample mean.

One Sample T-Test

Assumption:

1-The dependent variable is normally distributed

2- No outliers in the data

One Sample T-Test

Hypothesis test :

Null hypothesis (H0) : There is no difference between our sample mean and population mean

Null hypothesis : Sample mean = Population mean = Zero

Alternative hypothesis (Ha or H1) : There is a difference between our sample mean and population mean (≠) or (≥) or (≤)

Alternative hypothesis : Sample mean ≠ Population mean ≠ Zero

One Sample T-Test

Sample mean = 80, It is higher than population mean

Significance value is .001 < 0.05

Result : Reject Null hypothesis and accept alternative hypothesis

Out put

	N	Mean	SD	SE of Mean
Weight	200	80	5.5	0.432

	t	df	sig (2-tailed)	Mean difference	95%
Weight		199	.000	5	.....

Two Sample T-Test

Two sample t-test is used when we want to compare two independent sample means.

The requirements for two sample t-test :

1- One dependent continuous variable such as (weight, blood pressure, cholesterol)

2- One Independent categorical variable (Binary) such as gender (male, female) smoking (yes, no)

Two Sample T-Test

Assumption:

1-) The groups must be independent

2-) The measurements must be independent

3-) The outcome variables must be on a continuous scale

4-) The outcome variables must be normally distributed in each group

5-) Homogeneity of variance

Two Sample T-Test

Assumption:

Homogeneity of variance can be determined by conducting **Levene's test**, if the significance level > 0.05 then we can assume that the population variances are approximately equal.

Two Sample T-Test

Examples :

We want to compare the average weight between males and females.

We want to compare the average blood pressure between drug group and placebo.

Null hypothesis (H0) : There is no difference in the average weight between males and females

Alternative hypothesis (Ha) : There is a difference in the average weight between males and females

Two Sample T-Test

Independent variable	Outcome
Sex = Male & Female	Weight
Drug group & Placebo	Blood pressure

Result :

If the significance level < 0.05 then reject null hypothesis and accept alternative hypothesis

If the significance level > 0.05 then accept null hypothesis and reject alternative hypothesis

Paired Sample T-Test

Paired sample t-test is used when we want to compare the means of one group before and after the test.

Assumption:

1-) The outcome variables must be on a continuous scale

2-) The differences between the pairs of measurements are normally distributed

Paired Sample T-Test

Example :

We want to compare the average of blood pressure before and after diet control program in one group.

Null hypothesis : There is no difference in the average of blood pressure before and after the program.

Alternative hypothesis : There is a difference in the average of blood pressure before and after the program.

Paired Sample T-Test

Result :

If the significance level < 0.05 then reject null hypothesis and accept alternative hypothesis

If the significance level > 0.05 then accept null hypothesis and reject alternative hypothesis

Reference

- Prem S. Mann 1998, Introductory Statistics, 7th edn, New York, USA.

Good Luck for All Students

- Please do not hesitate to contact me if you have any questions.
- Dr. Ibrahim AL-Jaafari
- www.Alghamdi-Biostatistics.com
- Email. Bio-stat@Hotmail.com
- Mobile Number : 0553777925

سبحان الله وبحمده سبحان الله العظيم

ذكر الله أعظم ما في الوجود ،، لعل الله يرحمنا بعلم تعلمناه في الحياة الدنيا

أستغفر الله