Step-by-step procedure to conduct meaningful statistical tests

1. Formulate and write your research question (e.g. what are the factors influencing depression and anxiety levels in elderly people?).

2. Select your dependent variable and a number of independent variables which you think might have an influence on the dependent variable (these are usually informed by the existing peer-reviewed literature, i.e. what previous studies on depression in elderly people have found), for example gender, age, social engagement, objective and subjective health status, etc.

3. Carry out descriptive statistics analyses on all the variables and report them, together with their characteristics (e.g. whether categorical or continuous, number of categories, range, mean and sd, median, mode, frequency, etc.).

4. For all the continuous variables, assess the normality of distribution by conducting a **Kolmogorov-Smirnov** test on each of them (if $p \leq 0.05$, we reject the null hypothesis H_0 that the data are normally distributed and we accept the alternative hypothesis H_1 that the data are not normally distributed; vice versa if $p > 0.05$, we cannot reject the H_0 and the data are normally distributed):

If $p \leq 0.05$ → distribution is not normal → use non-parametric tests

If $p > 0.05$ → distribution is normal → use parametric tests

Remember!

5. Before conducting each inferential statistical test (e.g. comparing groups, Chi^2, correlation, regression) remember to state the null hypothesis H_0 (e.g. H_0=there is no relationship between depression scores and gender in later life) and the alternative hypothesis H_1 (e.g. H_1=there is a relationship between depression scores and gender in later life).

6. Report the results of the statistical test correctly, therefore writing the test statistic value, the *df* value and the probability value (remember that when you see a value of ".000" in SPSS you must report it as "$p<0.001$").

7. State whether, after having conducted the statistical test, you are accepting or rejecting the null hypothesis:

If $p \leq 0.05$ → reject H_0 and accept H_1

If $p > 0.05$ → cannot reject H_0

Remember!

List of inferential statistical tests covered in INF6029

1. Statistical techniques to compare groups (continuous variables)	
Parametric	**Non-parametric**
One-sample t-test (Tests for the difference between our mean value and another value found in literature/references, etc.)	***Sign test*** (not covered)
Independent samples t-test (Tests for the difference between the means of two independent groups)	***Mann-Whitney test*** (Compares the difference between the rank totals of two independent groups)
Paired samples t-test (Tests for the difference between the means of two related variables)	***Wilcoxon signed-rank test*** (not covered)
One-way ANOVA (Tests for the difference between the means of three or more independent groups)	***Kruskal-Wallis test*** (Compares the difference between the rank totals of three or more independent groups)
2. Statistical techniques to compare groups (categorical variables)	
Parametric	**Non-parametric**
n/a	***Chi^2 test*** (Tests for the strength of the association between two categorical variables)
3. Statistical techniques to explore relationships among variables	
Parametric	**Non-parametric**
Pearson's correlation (Tests for the strength of the association between two continuous variables)	***Spearman's correlation*** (Tests for the strength of the association between two ordinal variables or two variables that are not normally distributed)
Simple Linear regression (Tests how change in the independent variable predicts the level of change in the dependent variable)	n/a, as all regression analyses are robust tests which can be performed on not normally distributed data
Multiple Linear regression (Tests how change in the combination of two or more independent variables predict the level of change in the dependent variable)	
Logistic regression (Similar to MLR, but the dependent variable is binary)	
Cox regression (Similar to Logistic regression but incorporates additional information about when the event occurred)	

What statistical test (general list)?