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STAT312 – Demography and Biostatistics Assignment

1. What do you understand by hypothesis testing?

**Answer**

 Hypothesis is a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation.

Therefore, **Hypothesis Testing** can be defined as a statement about one or more population set up for the for the purpose of being discredited or approved. In statistics, a method for testing how accurately a mathematical model based on one of a set of data predicts the nature of other data sets generated by the same process. It is also defined as the theory, methods, and practice of testing a hypothesis by comparing it with the null hypothesis.

1. Differentiate between the classical value and the p-value approach for hypothesis testing

**Answer**

**The Classical Approach**

 The Classical Approach is the first approach to hypothesis testing. It computes a test statistic from the empirical data and then makes a comparison with the critical value. It compares a test statistics and a critical value. It is the best used for distributions which gives areas and require to look up the critical value rather than distributions which look up a test statistic to find an area. The Classical Approach also has three different decision rules, depending on whether it is a left tail, right tail, or two tail test. One problem with the Classical Approach is that if a different level of significance is desired, a different critical value must be read from the table.

**While;**

**The P-Value Approach**

 The P-Value Approach, short for Probability Value, approaches hypothesis testing from a different manner. Instead of comparing z-scores or t-scores as in the classical approach, you're comparing probabilities, or areas. The level of significance (alpha) is the area in the critical region. That is, the area in the tails to the right or left of the critical values. The p-value is the area to the right or left of the test statistic. If it is a two tail test, then look up the probability in one tail and double it. If the test statistic is in the critical region, then the p-value will be less than the level of significance. It does not matter whether it is a left tail, right tail, or two tail test. This rule always holds. Reject the null hypothesis if the p-value is less than the level of significance. You will fail to reject the null hypothesis if the p-value is greater than or equal to the level of significance.

 The p-value approach is best suited for the normal distribution when doing calculations by hand. However, many statistical packages will give the p-value but not the critical value. This is because it is easier for a computer or calculator to find the probability than it is to find the critical value. Another benefit of the p-value is that the statistician immediately knows at what level the testing becomes significant. That is, a p-value of 0.06 would be rejected at an 0.10 level of significance, but it would fail to reject at an 0.05 level of significance. It is important to note that: Do not decide on the level of significance after calculating the test statistic and finding the p-value. Here is a proportion to help you keep the order straight. Any proportion equivalent to the following statement is correct.

1. What is the importance of hypothesis testing in research?

**Answer**

 Research without hypothesis is basically like a sailor in the sea without a compass. Its purpose is to guide and give direction to specific research. Research remains unfocused without a hypothesis. One major importance of hypothesis testing is to assist administrators, clinicians and researchers in making wise decisions which usually depends on the statistical decision. Other importance includes:

* It prevents blind research: The use of hypothesis prevents a blind search and indiscriminate gathering of masses of data which may later prove irrelevant to the problem under study.
* A hypothesis helps in selecting pertinent fact.
* It serves as a sort of guiding light: A hypothesis serves as a powerful beacon that lights the way for the research work.
* A hypothesis helps in drawing conclusions.
* Hypothesis as the Investigator’s ‘Eyes’: By guiding the investigator in further investigation it serves as the investigator’s ‘Eyes’ in seeking answers to tentatively adopted generalization.
* Gives help in deciding the direction in which to proceed.
* It focuses research: Without it, research is unfocused research and remains like a random empirical wandering.
* A hypothesis pin points the problem to be solved.
* A hypothesis directs the researcher’s efforts into a productive channel.
* It serves as necessary link between theory and the investigation.
* It places clear and specific goals: A well thought out set of hypothesis is that they place clear and specific goals before the research worker and provide researcher with a basis for selecting sample and research procedure to meet these goals.
* The hypothesis provides the investigator with the most efficient instrument for exploring and explaining the unknown facts.
* A hypothesis provides the framework for drawing conclusions. These hypotheses simulate the investigator for further research studies.
* It links together: It serves the important function of linking together related facts and information and organizing them into wholes.
* The hypothesis indicates not only what to look for is an investigation but how to obtain data. It helps in deciding research design. It may suggest what subjects, tests, tools, and techniques are needed.