

Pg: ①

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PAPER: RESEARCH
METHODOLOGY

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QNO.5

What is hypothesis? Also explain different steps of in testing of hypothesis.

ANSWER:-

HYPOTHESIS:-

In science, a hypothesis is an idea or explanation that you then test through study and experimentation. Outside science, a theory or guess can also be called a hypothesis. A hypothesis is something more than a wild guess but less than a well established theory.

OR

A testable theory, or statement of belief used in evaluation of a population parameter of interest.

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e.g mean of proportion.

• Suppose a study is being conducted to answer questions about differences between two regiments for the management of diarrhea in children.

DIFFERENT STEPS OF TESTING OF HYPOTHESIS: -


The goal of hypothesis testing is to determine the likelihood that a population parameter, such as the mean, is likely to be true.

Step 1: State the hypothesis

Step 2: Set the criteria for a decision

Step 3: Compute the test statistic.

Step 4: Make a decision...

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STEP: 1

Statement of research question in terms of statistical hypothesis (Null and alternate hypothesis)

STEP: 2.

Selection of an appropriate level of significance. The significance level is the risk we are willing to take that a sample which showed a difference was misleading. 5%.

Significance level means that we are ready to take a 5% chance of wrong results.

STEP: 3.

Choosing an appropriate statistics. t test, z test for continuous data, chi square for proportions etc.

Test statistics is computed from the sample data and is used to determine -

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Whether the null hypothesis should be rejected or retained.

Test statistics generate P value

P value: Indicates the probability or likelihood of obtaining a result at least as extreme as that observed in a study by chance alone, assuming that there is truly no association between exposure and outcome under consideration.

By convention the p value is set at 0.05 level. Thus any value of P less than or equal to 0.05 indicates that there is at most a 5% probability of observing an association as large or larger than that found in the study due to chance alone given that there is no association.

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between exposure and outcome. If p value ≥ 0.05 do not reject the null hypothesis.

STEP: 4.

Performing calculations and obtaining P value.

STEP: 5

Drawing conclusions, rejecting null hypothesis if the P value is less than the set significance level.

α and β Error

Test of significance	True Ho Hypothesis	False Ho Hypothesis
Accept Ho Hypothesis	correct Decision ✓	wrong Decision β Error
Reject Ho Hypothesis.	wrong Decision α Error	correct Decision ✓

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Differentiate between Relative Risk and odd ratio with example.

ANSWER:-

DIFFERENCES BETWEEN RELATIVE RISK AND ODD RATIO:-

RELATIVE RISK:-

• Incidence in exposed individual
 $S = a/a+b$ or proportion of exposed people who developed the disease.

• Incidence in non-exposed individuals
 $S = c/c+d$ or proportion exposed of non-exposed people who develop disease.

Relative Risk = $\frac{\text{Incidence in exposed}}{\text{Incidence in non-exposed}}$

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$$RR = \frac{a/a + b}{c/c + d}$$

EXAMPLE:-

	CHD+	CHD-	Total
Smoker	112	176	288
Non-smoker	88	224	312

$$\begin{aligned} \text{Incidence in exposed} &= a/a + b \\ &= 112/288 = 0.38 \end{aligned}$$

$$\begin{aligned} \text{Incidence in non-exposed} &= c/c + d \\ &= 88/312 = 0.28 \end{aligned}$$

$$RR = 0.38/0.28 = 1.38$$

2nd OIE DIFFERENCE

ODD RATIO:-

Incidence cannot be measured in case control studies because we start with the disease people cases and non diseased people (controls), here we calculate OR

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EXAMPLE OF ODD RATIO:-

	Case	control	
Exposed	a	b	a+b
Non-exposed	c	d	c+d

$$OR = \frac{a/c}{b/d}$$

$$ad/bc$$

			Total
Exposed	140a	370c	510
Non-exposed	140c	234d	274

$$odds = 140/40 = 3.5$$

$$odds = 370/234 = 1.6$$

$$OR = 3.5/1.6 = 2.2$$

compared to the control the odds of being a passive smoker are 2.2 > in a best case.

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Nine students take a test.
 Their scores out of 100 are:
 50, 79, 70, 48, 90, 68, 89, 92, 77.
 Find out the mean, Median
 and modes of their scores.

ANSWER:-

50, 79, 70, 48, 90, 68, 89, 92, 77

Mean = $\frac{\text{Sum of values}}{\text{Number of values}}$
 putting the values

Mean

$$\text{Mean} = \frac{50, 79, 70, 48, 90, 68, 89, 92, 77}{9}$$

first they will arrange in order

$$\text{Mean} = \frac{48, 50, 68, 70, 77, 79, 89, 92}{9}$$

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$$\text{Mean} = \frac{633}{9}$$

$$\text{Mean} = 73.66$$

Now find the median.

Median = 50, 79, ~~79~~, 70, 48, 90,
68, 89, 92, 77
first they will arrange


Median = 48, 50, 68, 70, 77, 79,
89, ~~90~~, 90, 92

Median = 77

The Median is 77

Mode = NO mode

Hence there is no
mode in this question

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What is meant by prevalence in research?
Also explain point and Period prevalence.

ANSWER:-

PREVALENCE IN RESEARCH.-

The proportion of individuals in a population having a disease or characteristic. Prevalence is a statistical concept referring to the number of cases of a disease that are present in a particular population at a given time, where as incidence refers to the number of new cases that develop in a given period of time.

OR

It is concerned with the

disease status.

It is the proportion of people affected with a disease or exposed to a particular drug in a population at a given time.

It is usually determined by surveying the population of interest.

- Prevalence varies b/w 0-1, it can also be expressed as a percentage.

TYPES OF PREVALENCE.-

There are two types of prevalence.

- 1- Point prevalence
- 2- Period prevalence.

1- POINT PREVALENCE:-

Prevalence can be thought of as the status of the disease in population at a point in time and as such ~~is~~ is also referred to as point prevalence.

This point can refer to a specific point in calendar time or to a fixed point in the course of events that varies in real time from person to person, such as the onset of menopause or puberty or the third postoperative day.

OR:-

Point prevalence refers to the prevalence measured at a particular point in time. It is the proportion of persons with a particular disease or attribute on a particular date.

2. PERIOD PREVALENCE:-

It represents the proportion of ~~class~~ cases that exist within a population at any time point during a specified period of time.

The number numerator thus includes cases that were present at the start of the period plus new cases that develop during this time.

E.g. Frequency of patients receiving Psychiatric RX
b/w May 31 - Dec 1 2008

OR:-

Period prevalence refers to prevalence measured over an interval of time.

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QNO: 2

Write a short note on
Presentation of ^{research} Data?

ANSWER:-

PRESENTATION OF DATA:-

This refers to the organization of data into tables, graphs or charts, so that logical and statistical conclusions can be derived from the collected measurements.

DATA COLLECTION METHODS:-

The data may be presented into 3 methods

- 1- Textual
- 2- Tabular
- 3- Graphical.

1. TABULAR PRESENTATION:-

Method of presenting data using the statistical table.

A systematic organization of data in columns and rows.

2. TEXTUAL PRESENTATION:-

The data gathered are presented in paragraph form.

Data are written and read.

It is a combination of texts and figures.

~~Part 4~~ TABULATION:-

It is a systematic and logical arrangement of classified data in rows and columns.

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"what sports do you play?"

SPORT	PEOPLE
Soccer	106
Tennis	45
Gymnastics	54
Swimming	82
Track	68

SIGNIFICANCE OF TABULATION:-

- Simplifies complex data
- Unnecessary details and repetitions of data avoided in tabulation
- Facilitates comparison
- Gives identity to data
- Reveals pattern with the figures which cannot be seen in the narrative form.

GRAPICAL PRESENTATION:-

It is the another way to summarize and display data is through the use of graph or pictorial representations of numerical data. Graps should be designed so that they convey at a single glance the general patterns in a set of data.