“t” TEST

Prof. Shivaprasad Halemani
M. Sc Nursing
MES College of Nursing, Lote

INTRODUCTION

- It is a familiar parametric test for small sample.
- The sample size less than(<) 30.
- It was introduced by Prof. William Gosset, with name of pen ‘t’.
- It is used for testing the significance of difference between sample mean with population.
- Difference between the two independent sample mean.
- Difference between two set of paired outcomes.

- Based on the no of groups, samples mean and paired outcomes, it is of
- One sample t test
- Two sample t test.
  - Paired ‘t’ test and unpaired ‘t’ test

ONE SAMPLE “t” TEST.

- It is used for comparing the sample mean with population mean.

PROCEDURE

- Situation:
- “n” is small
- Population mean is given.
- The data is interval or ratio.
- The da set is given as
- Sample mean (x)
- SD
- Population mean (u)

HYPOTHESIS

- H_0: There is no significant difference between the sample mean and population mean.
- Vs
- H_1: There is significant difference between the sample mean and population mean.

TEST STATISTICS

- $tcal = \frac{/X-u/}{S/\sqrt{n}}$

$$t = \frac{\bar{x} - \mu}{\frac{S}{\sqrt{n}}}$$

- Where X is sample mean
- u: population mean
- S: standard deviation of sample mean.

DECISION RULE

- If $t_{cal} < t_{tab\ n\text{-}1\ df}$ then accept the H_0 or otherwise reject the H_0.

EXAMPLE

- SBP readings of 10 persons in the age group 40 to 50 years were given as
- 148, 128, 147, 127, 150, 145, 124, 140, 142, and 149. the average SBP of the population of subject between 40- 50 years of age is given as 150.
- Test is there any statistical significant difference between mean SBP of sample mean.

SOLN.

- Data: population mean(μ) = 150.
- sample mean =?
- SD of sample mean=?
- Step I. find the mean and SD of sample.
- Step II. Feed the data set in the formula,
- Step III. Compare the cal value with table value.

Sample	Mean	X-X	(X-x)2
148	140	-8	64
128	140	12	144
147	140	-7	49
127	140	13	169
150	140	-10	100
145	140	-5	25
124	140	16	256
140	140	0	0
142	140	-2	4
149	140	-9	81
Mean 140			892

SD= 9.95.

$$tcal = \frac{/X - u/}{s/\sqrt{n}}$$

$$tcal = \frac{/140 - 150/}{9.95/\sqrt{10}}$$

$$tcal = \frac{/-10/}{9.9/3.16}$$

$$tcal = \frac{/10/x3.16}{9.95}$$

$$tcal = \frac{31.6}{9.95}$$

$$tcal = 3.17.$$

- $t_{cal} < t_{tab,}$ hence the H_0 is accepted.
- Hence there is no significant difference between the sample mean with population mean.