

# Stastical Testing of Cancer Patients in J&K and Rajasthan with Punjab

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**Abstract – Objective of study is to examine the cause of cancer prone to water impurities, pesticides and fertilizers by studying the data provided by the authorities and the Mathematical Modelling and a connotation of testing through the Hypothetical Testing. MAX SUPER SPECIALITY HOSPITAL, BATHINDA is a unit of Hometrail Buildtech Pvt. Ltd. It is a Cancer and Cardiac hospital in Bathinda. A study on Max super speciality hospital, Bathinda (Punjab) about cancer patients may be based on drinking water's impurities and upshot of fertilizers. The graph representation and connotation of student's t-test for comparative study between Punjab and H.P., Haryana & Rajasthan are based on the data given by the authorities of the max super speciality hospital, bathinda. We want s study to know the number of cancer patients in the above mentioned hospital is more as compared to other hospital. As the hospital is situated in Punjab, the momentous number of cancer patients of Punjab is more in comparison to other state patients. In this study of Mathematical modelling gives the reason of cancer.**

**So the study about the max super speciality hospital, bathinda is very momentous to help the study of cancer patient's nature prone to impure water and the measures of the quantities are grown day by day in this region.**

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## INTRODUCTION

The data is taken for cancer patients recorded by Max Super Speciality Hospital Bathinda. The authentic reason of the cancer is never recorded but by the old circumstances of Punjab, Haryana, Himachal Pradesh and Rajasthan, it seems to cause by the water impurities and mixture of polluted water and ground water.

We are not able to recognise the causes of cancer till the date but perhaps it causes due to smoking, non shrubbery, drinking of liquor, impurities of water (solidity of the water), and soil mixture of fertilizers and many other reasons to cause the cancer. We are going to use only data of Max Super Speciality hospital customary in Punjab and comparative study between Punjab and other (J&K and Rajasthan), through Max Super Speciality hospital is customary in Punjab, and so patients of Punjab are higher than other states in it. We like to inform you the circumstances of Punjab is very decisive than other states regarding cancer patients.

## DATA PROVIDING BY THE AUTHORITIES:

Below is the comparative statistical survey of cancer patients of Punjab with J&K and Rajasthan in Max Super speciality Hospital, Bathinda.

Table

NO. OF CASES PER YEAR			
YEAR	PUNJAB	J&K AND RAJASTHJAN	TOTAL
2014	86	6	92
2015	289	21	310
2016	414	36	450
2017	620	46	666
2018	418	33	451
2019	368	20	388
TOTAL	2195	162	2357

Statistical Analysis:

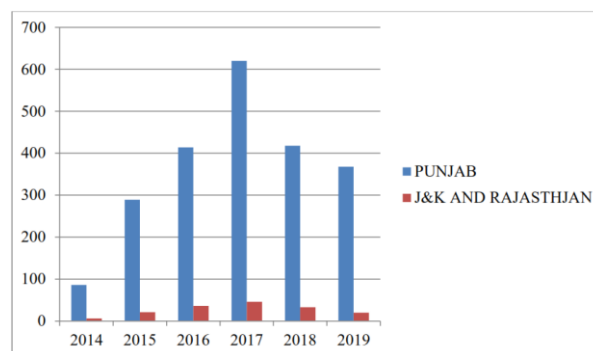


Figure 1: Bar graph representation for the above data

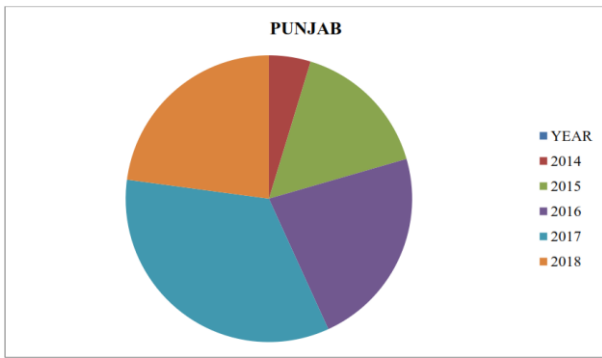


Figure 2: pie chart representation of above data for Punjab

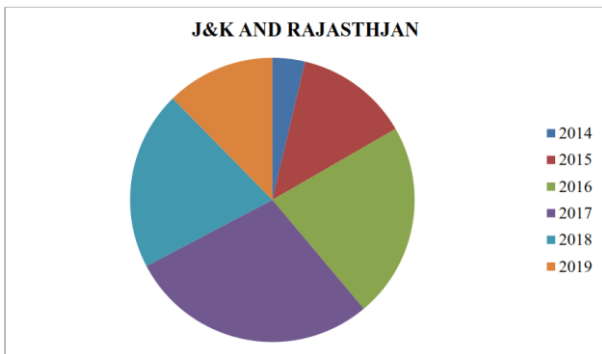


Figure 3: pie chart representation of above data for HP, Haryana and Rajasthan

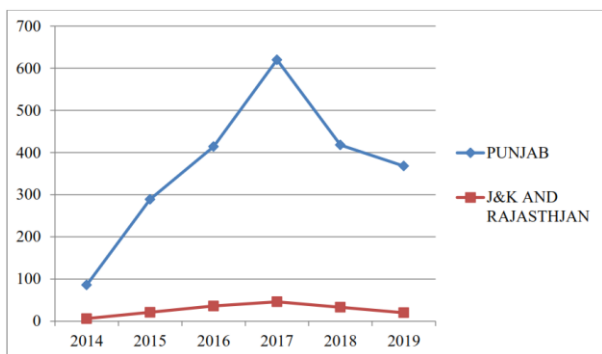


Figure 4: Ogive representation of the above data

The connotation test, student t-test is as follows:

### STUDENT'S T- DISTRIBUTION

W.S. Gosset (1876-1937) in the early 1900 worked on t- distribution theoretically. Gosset was employed by the Guinness and Sons, a Dublin under their own names. So Gosset adopted the pen name "student" and published his findings under this name. So the t- distribution is commonly known as Student's t- distribution or t-distribution.

The Student's t- distribution is used when the sample size is 30 or less and the population standard deviation is unknown.

### PROPERTIES OF STUDENT'S T- DISTRIBUTION

1. The variable t- distribution ranges from minus infinity to plus infinity.
2. The constant c is actually a function of v (pronounced as nu). So for a particular value of v, the distribution of f (t) is completely specified. Thus f(t) is a family of functions, for each value of v.
3. The variance of t- distribution is greater than 1, but approaches 1 as the number of degrees of freedom; therefore the sample size becomes large. Thus as the sample size increases, the variance of t- distribution approaches the variance of the standard normal distribution. For infinite value of v, the t- distribution and normal distribution are exactly equal. Hence there is a widely practised rule of sample size n > 30 may be considered as large and the standard normal distribution may appropriately be uses as an approximation to t- distribution. Where the latter is the theoretically correct functional form.

### THE T- TABLE

The t- table is the probability integral of t- distribution. It gives, over a range of values of v, the probabilities of exceeding by chance values of t at different levels of connotation. The t- distribution has a different value for each degree of freedom. When the degree of freedom is infinitely large, the t- distribution is equivalent to normal distribution and probabilities shown in the normal distribution tables are applicable.

### APPLICATION OF THE T- DISTRIBUTION

Student's t- distribution is generally used to test the connotation of the various results obtained from small samples.

Testing difference between means of two samples: given two independent random samples of size n<sub>1</sub> and n<sub>2</sub> with means  $\bar{X}_1$  and  $\bar{X}_2$ , and standard deviations S<sub>1</sub> and S<sub>2</sub> we may interested in testing the hypothesis that the samples come from the same normal population. To carry out the test, we calculate the statistics as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S} \times \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

Where

$\bar{X}_1$  = mean of the first sample

$\bar{X}_2$  = mean of the second sample  $\bar{X}_1$

$n_1$  = number of observations in the first sample

$n_2$  = number of observations in the second sample

S = combined standard deviation.

If the calculated value of t is  $> t_{0.05} (t_{0.01})$ , the difference between the sample means is said to be momentous at 5% (1%) level of connotation otherwise the data are said to be consistent with the hypothesis.

Here in data of Max Super Speciality Hospital Bathinda,  $n_1 = n_2 = 6$ ,

After calculation, we get

$$\bar{X}_1 = 364.8, \bar{X}_2 = 27.7, S = 125.15$$

And using all these values in the Student's t test, we get

$$t = \frac{365.83 - 27}{9.7362} \sqrt{\frac{6 \cdot 6}{6 + 6}} = 20.0924$$

But,  $t_{0.05} (v = 10) = 1.372$

## CONCLUSION AND RESULTS:

Since the decisive value is  $<$  the actual value

So the hypothesis at 95% confidence is rejected and is momentous.

Hence the Result of comparison is failed which is only because the patients are generally admitted to the nearest hospital that provides more facilities with basic requirements It is nature of human beings that more comfort and facility with minimum expenditure is preferred. Although the result is not according to the expectation but still there is need to study about the results of cancer as people are going to impinge on by cancer in Punjab, Haryana and Rajasthan at very high rate.

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