

Statistical Analysis on Cancer Patients of Max Super Speciality Hospital with Water Causes



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Abstract

Objective of study is to analyse the cause of cancer prone to water impurities, pesticides and fertilizers by studying the data provided by the authorities and the Mathematical Modelling of significance of testing (Statistical Analysis). MAX SUPER SPECIALITY HOSPITAL, BATHINDA is a unit of Hometrail Buildtech Pvt. Ltd. It is the best Cancer and Cardiac hospital in Bathinda. An intuitive study of MAX SUPER SPECIALITY HOSPITAL, BATHINDA of cancer patients likely to be based on drinking water impurities and fertilizers impact. The graph representation and significance 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 shall come to know that number of cancer patients admitted in the above mentioned hospital are more as compared to other states. As the hospital is situated in Punjab, the significant number of cancer patients of Punjab are more in comparison to other state patients. But the Mathematical modelling gives the relation between cancer patients of those states with Punjab.

So the study about the MAX SUPER SPECIALITY HOSPITAL, BATHINDA is very significant to help the study of cancer patient's nature prone to impure water.

Keywords: Statistical Analysis, Cancer Patients, Hospital

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 scenario 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 veg, drinking of liquor, impurities of water (hardness 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 established in Punjab and comparative study between Punjab and other (HP, Haryana and Rajasthan). As Max Super Speciality hospital is established in Punjab, so patients of Punjab are higher than other states in it. But we like to inform you the scenario of Punjab is very critical than other states regarding cancer patients.

Review of Literature

The data of cancer patients is obtained from the authorities of MAX SUPER SPECIALITY HOSPITAL, BATHINDA. In this data expected number of cancer patients of Punjab and other states are given. The data that, I have obtained from authorities is from 2011 to 2016. In this data number of patients of Punjab and other states are given year wise as shown in the table below.

Data Provided by the Authorities

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

Table

Expected No. of Cases Per Year			
Year	Punjab	Hp, Haryana and Rajasthan	Total
2011	84	6	90
2012	288	22	310
2013	413	37	450
2014	621	45	666
2015	419	32	451
2016	364	24	388
Total	2189	166	2355

Aim of the Study

Aim of study is the statistical survey of cancer patients to know the extent of patients affected by cancer in the Punjab region and neighbouring states, to find the reasons behind the spread of disease cancer. also aimed of study is the prevention from disease like cancer. So that the pepole get aware and don't pollute water & other natural sources

Statistical Analysis

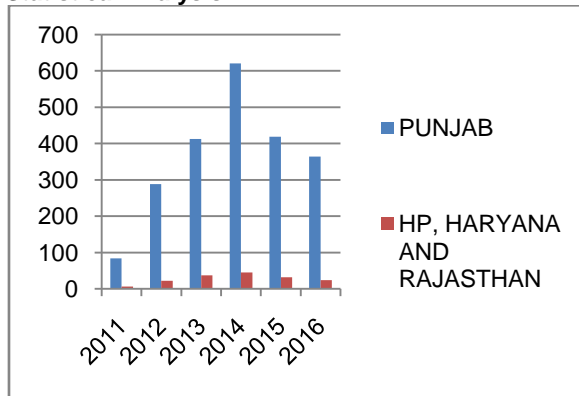


Figure 1: Bar graph representation for the above data

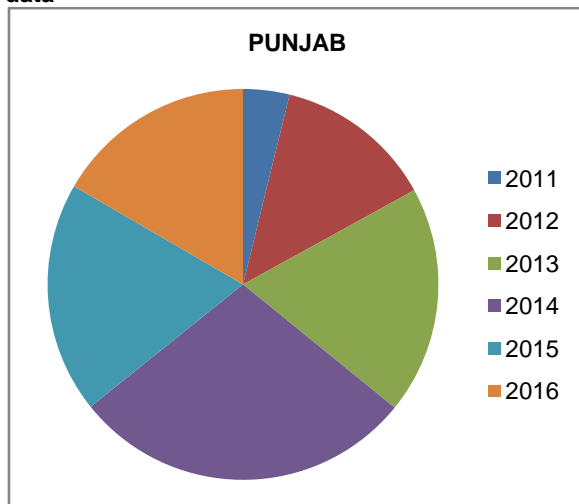


Figure 2: pie chart representation of above data for Punjab

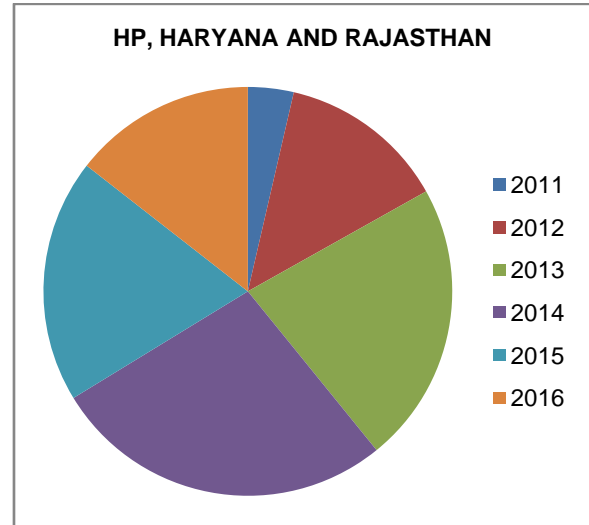


Figure 3: pie chart representation of above data for HP, Haryana and Rajasthan

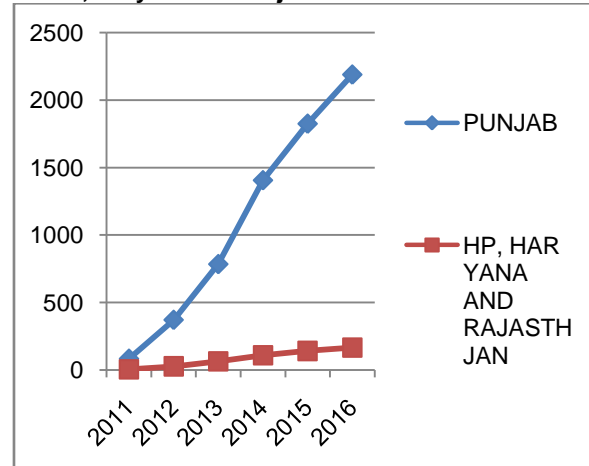


Figure 4: ogive representation of the above data

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

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 ν , 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 used 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 ν , the probabilities of exceeding by chance values of t at different levels of significance. 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 significance of the various results obtained from small samples.

Testing difference between means of two samples: given two independent random samples of size n_1 and n_2 with means \bar{X}_1 and \bar{X}_2 , and standard deviations S_1 and S_2 we may be 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:

The t-table

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

Where \bar{X}_1 = mean of the first sample
 \bar{X}_2 = mean of the second sample
 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 significant at 5% (1%) level of significance 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

$$= \frac{364.8 - 27.7}{125.15} \times \sqrt{\frac{6 \times 6}{6 + 6}} = 4.665$$

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

Conclusion and Results

Since the critical value is $<$ the actual value So the hypothesis at 95% confidence is rejected and is significant.

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 needs. 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 be affected by cancer in Punjab, Haryana and Rajasthan at very high rate.

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