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E: ISSN NO.: 2455-0817 *Remarking An Analisation*

Mathematical Modelling and Stastical Analysis Causes Cancer Due to Soil Fertilizers and Impurities

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Abstract

The purpose of this study is to investigate cancer incidence and its correlations with numerous variable, including demographic parameters - gender (male- female) and age. Here the focus is on significant relation and not on causation. Cancer data for a period of six years (2011-2016) was collected from MAX SUPER SPECIALITY HOSPITAL, BATHINDA of damaged and impurities supplied in soil with using grocery fertilization in Punjab, North India. The collected data has been tabulated. A study among 1289 cancer patients, 1222 females and 967 males were divided into six age group (20-29, 30-39, 40-49, 50-59, 60-69, 70-79). For studying the stastically significant relationship between cancer patient's ages with their gender, Chi-square ($\chi 2$) test was used (the significance level of test was 0.05). In our study, the statistical test was significant indicating that there is some significant realtionship between age and gender of the cancer patients.

Keywords: Cancer, Fertilizers and Impurities, Analysis

Introduction

"Research is a process of steps used to collect and analyze information to increase or decrease our understanding of a topic or issue''

Punjab, the grain bowl of India is now under the focus for its increasing incidence of cancer deaths due to the fertilization used and mixed heavy pesticide and herbicide are used to procure the fertility but the soil is damaged. The cotton belt of Punjab has now become the cancer belt. Cancer is an important health issue in Punjab and many other parts of India. There are at least 90 cancer patients for every 100,000 population in Punjab. Cancer incidence in the state is higher than the national average of 80 per 100,000 populations, reveals a survey by the Punjab government. The situation is so serious that on an average, a family has at least one cancer patients.

According To Dr. Pritpal Singh (Baba Farid Centre for Special Children, Faridkot) "we can say that Punjab is dying now. There is no doubt. Punjab is the food basket of India. Now we can say it is the disease basket"

The data were obtained from the Max Super Specialty Hospital, Bathinda to determine whether difference in cancer incidence associated with gender by age and time. The study did not try and ascertain causes of cancer, but merely looked into correlation. Along with the increase in reported cancer deaths, excessive use of mineral fertilizers and pesticides for over five decades has led to its soil contamination and water being rendered suspect in a number of studies.

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 male and female cancer patients of Punjab is available for different age group is given. The data that, I have obtained from authorities is from 2011 to 2016. In this data number of patients of Punjab given year wise as shown in the table1 below.

Aim of the Study

Aim of study is the statistical survey of cancer patients to evaluate the relevance of cancer disease in male and female subjects of different age groups. This research aims at studing the significant correlation of age with gender of the cancer patients.

Methodology

From September 2011 to November 2016, the study covers 2,189 cancer registries at Max Super Speciality Hospital, Bathinda. Record of

each patient was noted like name, age, sex, the registration number, date of diagnosis, and type of cancer etc. Record was organized in tabulated form and analyzed statistically. In order to examine the hypothesis of the present study, Chi-square-Test was applied to compare the association between different variables or demographic parameters (gender, age).

Statistical Analysis

The Pearson Chi-Square Statistical test (χ2) is also known as the chi-square t one of the simplest and the most widely used non-parametric tests. The (χ2) test was first used by Karl Pearson in the year 1990. The (χ 2) describes the independency between the sub categories of two variables of r*c (Row*Column). The chi-square test is based on the difference between the observed and the expected values for each category. The chi square statistic is defined as

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where O_i is the observed number of cases in category i, and E_i is the expected number of cases in category i. This chi square statistic is obtained by calculating the difference between the observed number of cases and the expected number of cases in each category. This difference is squared and divided by the expected number of cases in that category. These values are then added for all the categories, and the total is referred to as the chi squared value. The degree of freedom (d.f.) is obtained as:

d.f. = (r-1) (c-1)

where r = no.of rows, c = no.of columns.

Results and Conclusion

Table 1

Representing Distribution of Cancer Cases According To Years (2011-2016)

Year	No. of Cancer Patients
2011	84
2012	288
2013	413
2014	621
2015	419
2016	364
TOTAL	2189

Table 2

Gender wise distribution of cancer patients (2011-2016)

Gender	Frequency	Percentage
Male	967	44.175
Female	1222	55.825
Total	2189	100.000

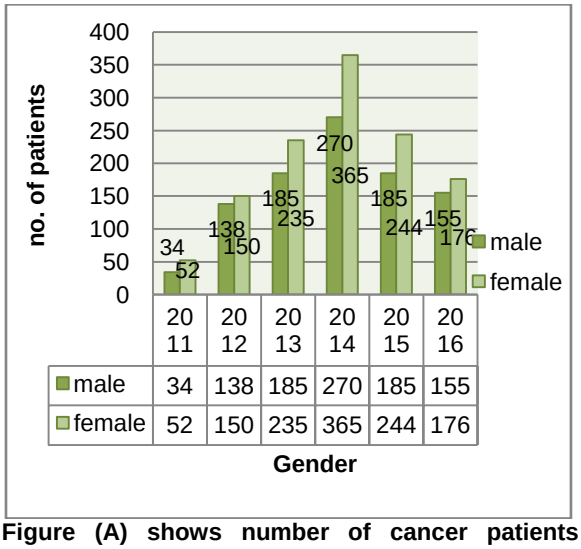


Figure (A) shows number of cancer patients according to their gender and time (2011-2016)

Figure (A) indicates the classification of cancer Patients data according to their gender - male and female. From 2011-2016, there are 1222 (56%) females and 976(44%) males cancer patients in Max Super Specialty Hospital, Bathinda.

Hypothesis 1

Hypothesis 1 seeks to ascertain whether there is a significant relation between male and female cancer incidence.

$H1_0$

There is no significant relation between male and female cancer incidence.

$H1_1$

There is a significant relation between male and female cancer incidence.

Table 3

Results of chi-square test at 5% level of significance

Chi-Square Test				
Variable	**Calculated Value**	**Level of Significance**	**Degree of Freedom**	**Tabulated Value**
Gender	26.467	5%	1	3.84

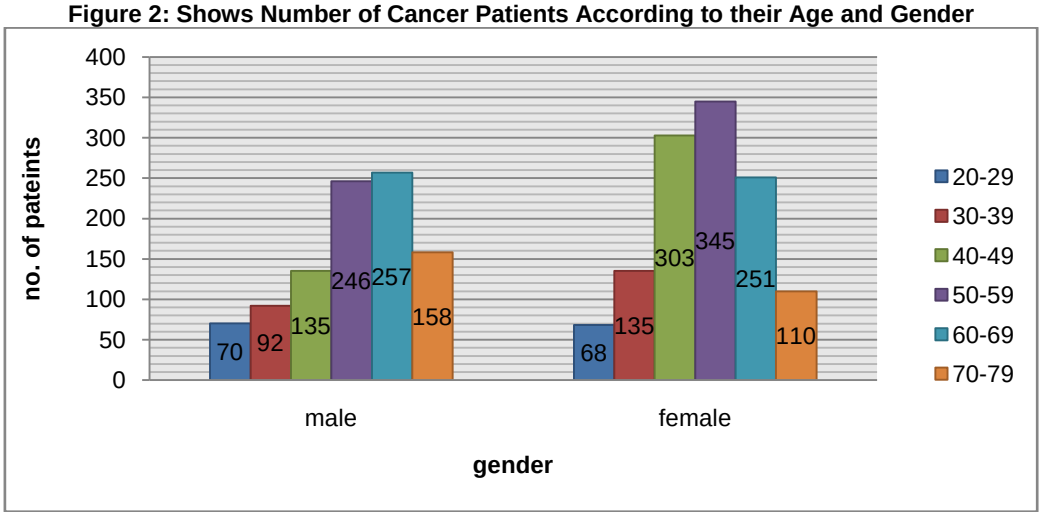
As calculated value is more than tabulated value (29.73 > 3.84) at 5% level of significance. We have to reject null hypothesis ($H1_0$) and accept alternative hypothesis ($H1_1$).Its shows that there is a significant relation between male and female cancer Incidence.

Table 4

Age and Gender wise distribution of cancer patients

		Age-Group In Years						
		20-29	**30-39**	**40-49**	**50-59**	**60-69**	**70-79**	**Total**
Gender	**Male**	70	92	135	246	257	58	958
	Female	68	135	303	345	251	110	1212
	Total	**138**	**227**	**438**	**591**	**508**	**268**	**2170**

Figure 2: Shows Number of Cancer Patients According to their Age and Gender



Hypothesis 2

Hypotheis 2 seeks to ascertain whether there is a significant relation between gender and Age.

$H2_0$

There is no significant relation between gender and Age of cancer patients.

$H2_1$

There is a significant relation between gender and Age of cancer patients.

Table 5

Results of chi-square test at 5% level of significance

Chi-square Test				
Variable	**Calculated value**	**Level of significance**	**Degree of freedom**	**Tabulated value**
Gender	69.05	5%	5	11.1

Statistics indicates that between the age of 40 and 70 years the incidence of cancer is higher amongst females whereas after 50 year of age the incidence of cancer in males. From table 5, as calculated value is more than tabulated value (69.05>11.1) at 5% level of significance .We have to reject null hypothesis ($H2_0$) and accept alternative hypothesis ($H2_1$).Its shows that there is a significant relation between gender and age.

Conclusions

This study evaluates the incidence of cancer in male and female subjects of various age groups. Cancer is a major health problem in the Punjab. The correlation of the increasing rate of cancer cases to consumption of polluted water and soil are not yet finally established. However, the well known factors contributing to this disease are tobacco consumption, alcohol intake, heavy metals, occupational exposures and environmental factors like excessive use of pesticides etc. The subject needs a state wide more intensive and detailed study.

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