VIVEKANAND COLLEGE [AUTONOMOUS] KOLHAPUR.

DEPARTMENT OF STATISTICS

2021-2022

Case study as a part of practical fulfillment towards practical paper-VI

ANALYSIS OF DIABETIC PATIENTS BY STATISTICAL METHOD.

CERTIFICATE

This is to certify that,

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3	Pooja Dhanaji Gurav	7905
4	Akanksha Chandrakant Jadhav	7907
5	Sejal Sudhir Shinde	7931
6	Sakshi Subhash Solase	7932

Have satisfactorily carried out the required case study as part of practical fulfilment towards practical paper- IV on Statistical study **" Analysis of DIABETIC PATIENTS"** prescribed by the Shivaji University,
Kolhapur for B.Sc. III course in statistics and this project represents their bonafide work in the year 2021-2022.

Date: 14/07/2022

Teacher in charge   Head of the department

ACKNOWLEDGEMENT

We take great pleasure in submitting this project report on **"ANAYLSIS OF DIABETIC PATIENT.** It is our foremost duty to express our deep sense of gratitude and respect to the supervisor**Prof.P.C.Patil, Head Of The Department V.V. Pawar madam** for their up-lifting tendency and inspiring us for making of this project work complete and successful. We are indebted to the library personal for offering allthe help in completing the project work. Last but not the least we are thankful to our colleagues and those helped us directly or indirectly throughout this project work.

Sincerely,

Project Team

DECLARATION

We undersigned, hereby declare that the project report entitled "Analysis of Diabetic Patients by Statistical Method" Written and submitted to Vivekanand college, Kolhapur partial fulfilment of B.Sc. III (Statistics) under the guidance of Prof.Poonam Patil Mam are our original work. The empirical results in this project are based on the data collected by ourselves.

We understand that any copying is liable to be published as the authorities deem fit.

Date: 14/07/2022

Place: Kolhapur

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INTRODUCTION

Our project subject is "Analysis of Diabetic Patients". Diabetes is a serious disease that occurs when your body has difficulty properly regulating the amount of dissolved sugar in your blood stream.

Diabetes is caused due to hypertension, obesity, inactive lifestyle, also it may be genetic. Diabetes can lead to heart problems, cholesterol problems, blood pressure, high blood glucose levels can cause damage to organs, stroke, eyesight defects.

A fasting blood sugar level of 99mg/dL or lower is normal, 100 to 125mg/dL indicates you are pre diabetic, and 126mg/dL or higher indicates you are diabetic.

The prevalence of diabetes in India has remained at 11.8% in last 4 years according to National Diabetes and diabetic retinopathy survey report.

Kerala is the diabetic capital of India in prevalence of 20% of diabetes as compared to national average.

The present study was conducted to assess the awareness of diabetes in on various aspects among Type-2 diabetes mellitus patients to evaluate the treatment.

METHODOLOGY AND DATA COLLECTION

Our Geographical area under consideration is city and villages in Kolhapur. For this project we have collected primary data by visiting people affected with diabetes. Also we visited diabetic specialist hospital (Shri Mahalaxmi Diabetes Care Center, Service Hospital K||Bawada). The collected data was later analyzed to obtain the required interpretation and findings. We have taken data of 201 people for our study.

STATISTICAL TOOLS:

Graphical Tools:

1) Multiple Bar Diagram

2) Pie Chart

3) Bar Diagram

4) Rader Diagram

Testing of Hypothesis:

1) Pearson chi square Test

2) Population Proportion Z Test (Two Sample)

3) Proportion Z Test (One Sample)

4) Chi-Square Test for Independence

AIM & OBJECTIVES

AIM:

Analysis of Diabetic Patients By Statistical Method.

OBJECTIVES:

1)To determine how much percent of diabetes is caused due to inheritance.

2)To study which age group is most affected due to diabetes.

3)To study whether diabetes is responsible for the cause of any other medical condition.

4)To analyze which type of medication is more preferable by patients.

HEREDITARY

Hereditary	No. of Patients
No	89
Yes	112

HERIDITARY
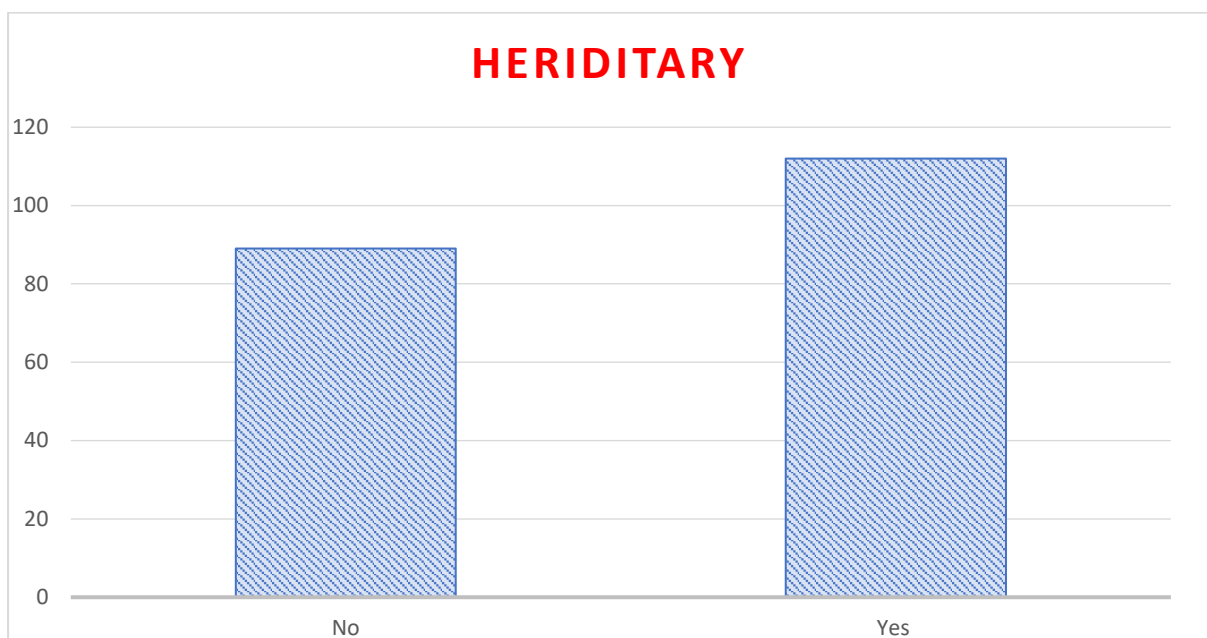
CONCLUSION : From above bar diagram we conclude that inheritance is the reason for occurrence of diabetes.

❖ To determine whether diabetes is hereditary or not by using proportion z-test .

x : number of patients got diabetic due to family.

x = 112

n : total number of sample.

n = 201

P : proportion of diabetic patients due to family.

p : proportion of diabetic patients in a sample.

p = 0.56

As n is large p $\rightarrow$ N(P,PQ/n)

The corresponding standard normal variate is

$$z = \frac{p-P}{\sqrt{\frac{PQ}{n}}} \rightarrow N(0,1)$$

Here, we have to test

H_0: P = ½ i.e. there is no relation between hereditary and diabetes

v/s H_1 : P ≠ ½ i.e. there is relation between hereditary and diabetes

Under H_0 test statistic is,

R COMMAND

x=112;x

n=201;n

prop.test(x,n,p=0.5,alternative="less".conf.level=0.05)

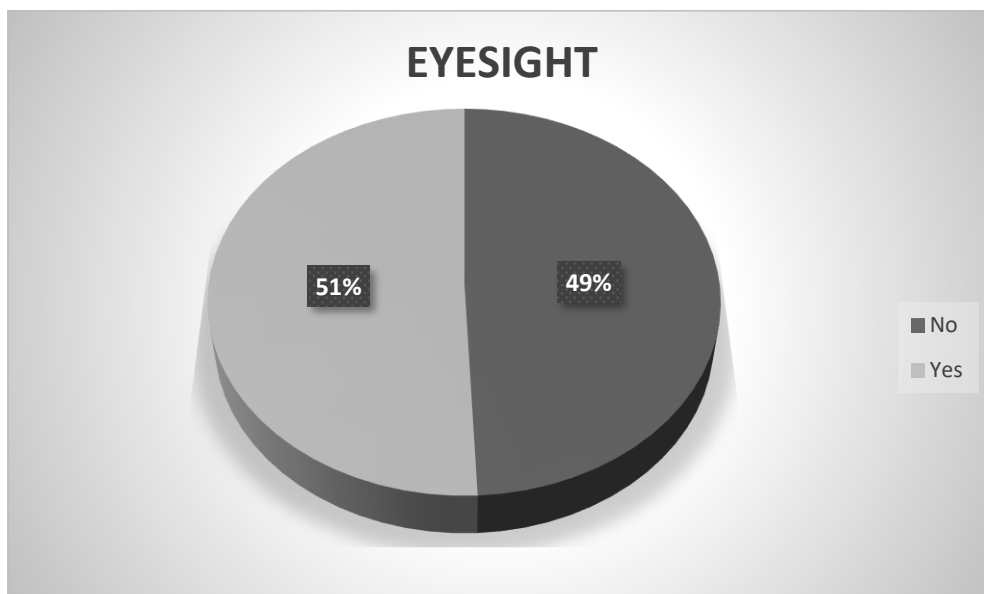X-squared=2.408, df=1, p-value=0.9396

Alternative hypothesis: true p is greater than 0.05

Reject Alternative Hypothesis H_0.

CONCLUSION : There is relation between hereditary and diabetes.
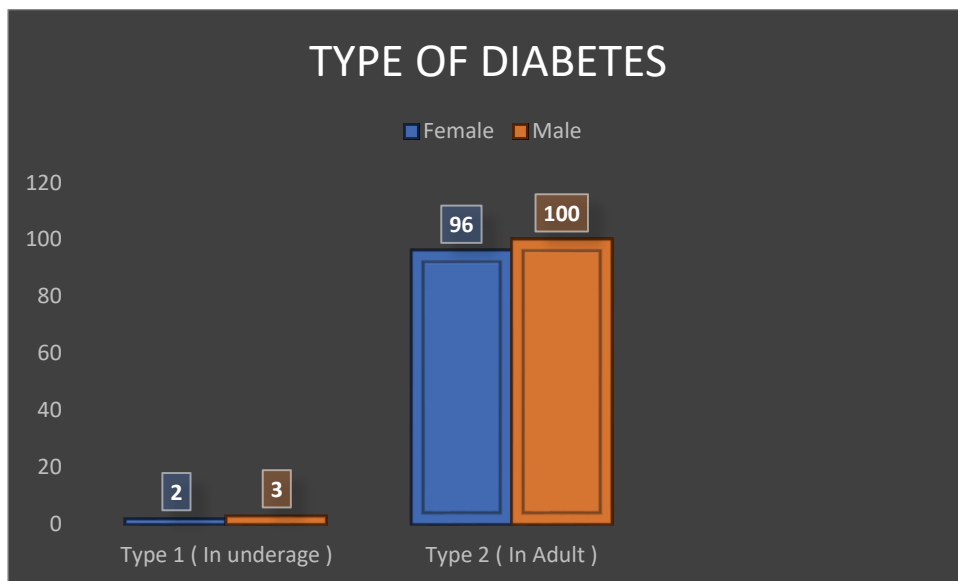
EFFECT ON EYESIGHT

Eyesight	Patients
No	99
Yes	102

CONCLUSION: From above pie chart we can see that people can face eyesight problems (51%) due to diabetes
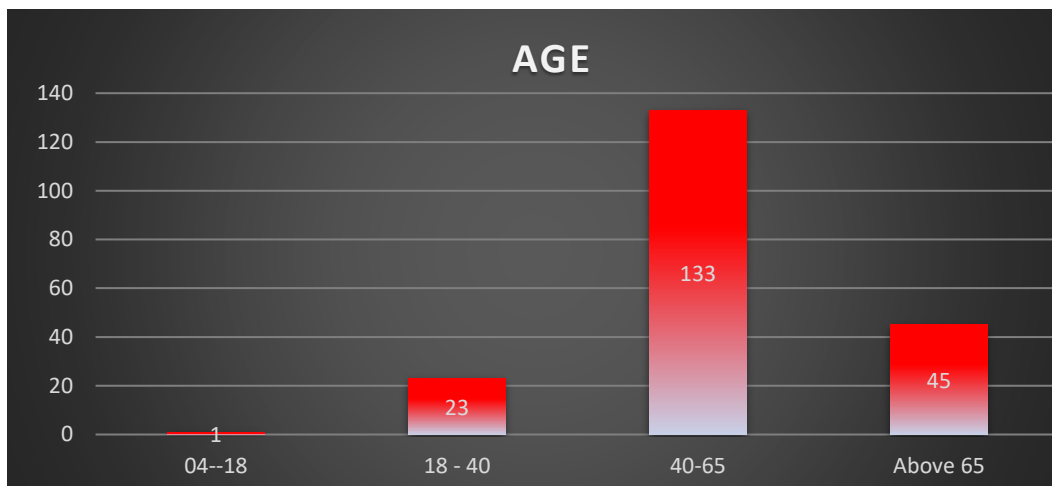
TYPES OF DIABETES

	Female	Male
Type 1 (In underage)	2	3
Type 2 (In Adult)	96	100

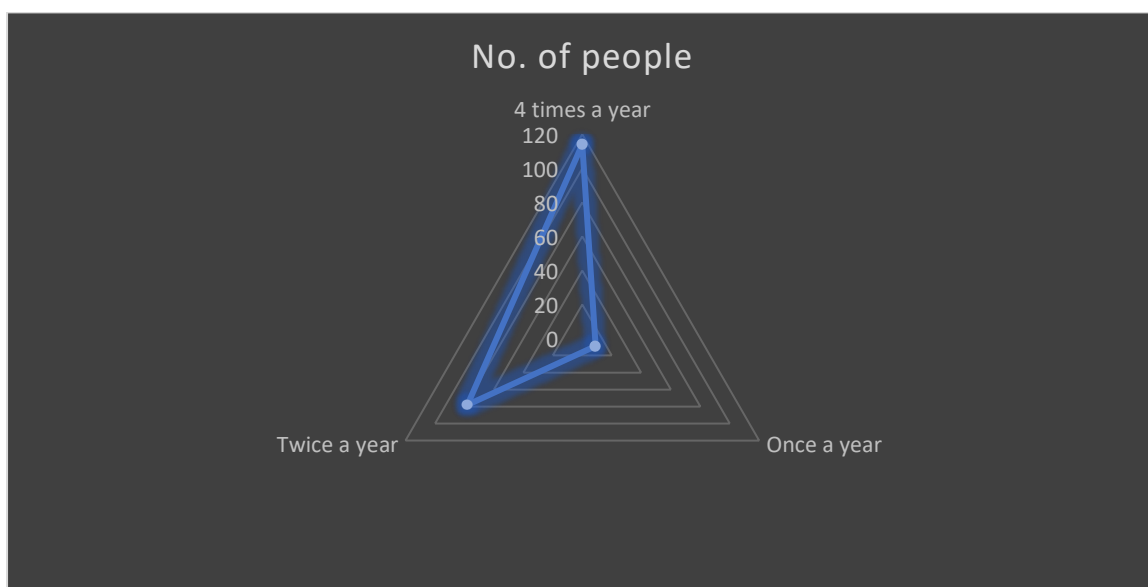**_CONCLUSION_** *:* From above bar diagram we can conclude that diabetes occurs mostly in adults.

AGE

Age	No, of patients
04--18	1
18 - 40	23
40-65	133
Above 65	45

CONCLUSION : From above bar diagram we can conclude that *40 – 65* is the age interval for maximum chance of occurrence of diabetes.

NUMBER OF VISITS TO DOCTOR

| Visits in a year	No. of people
4 times a year	114
Once a year	9
Twice a year	78

CONCLUSION: From above radar diagram, number of people visiting doctor 4 times a year are more i.e. that people are aware about diabetes.

Test for Relation between Area and Type of Medication

(Pearsons Chi-Square test)

Area/Medication	City	Village	Total
Alopathic	93	90	183
Ayurvedic	5	1	6
Homeopathic	2	10	12
Total	100	101	201
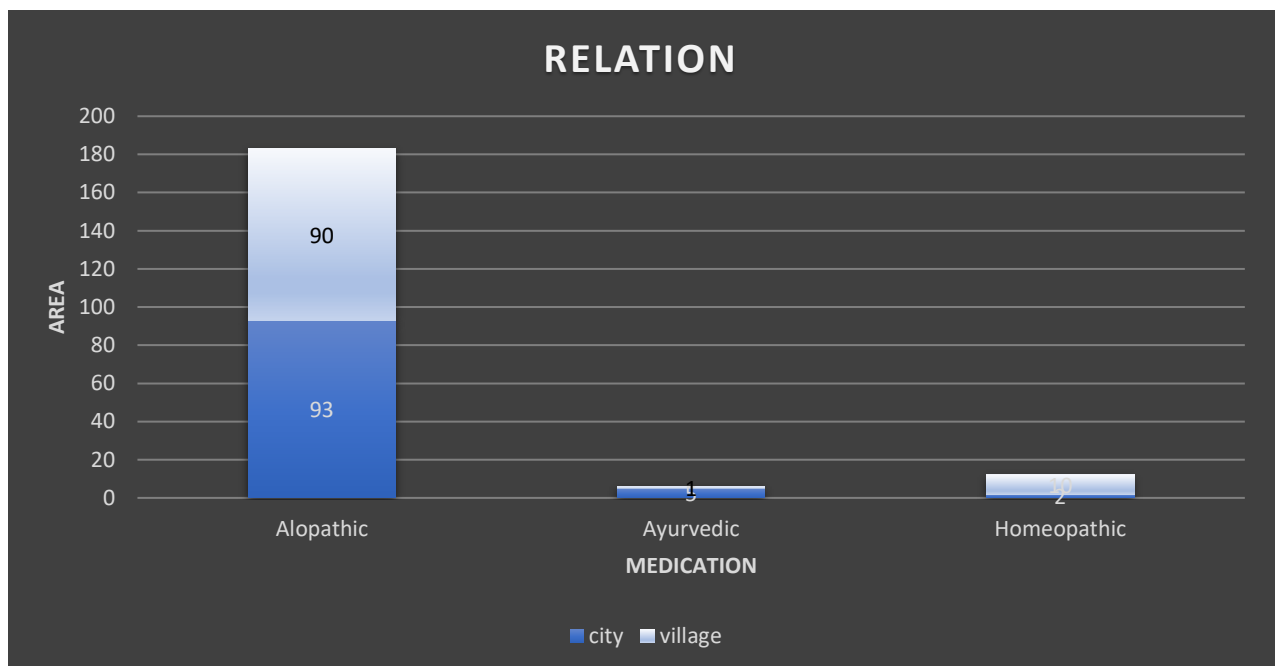
CONCLUSION : From above bar diagram we conclude that the most used medication in both city as well as village is ALOPATHY .

PEARSON'S CHI SQUARE TEST

Hypothesis:

H_0: There is no significant difference between area

And type of medication.

 H_1: There is significant difference between area and

Type of medication.

Calculate test statistic

$$\chi 2 = \frac{\sum (fo - fe)2}{fe}$$

$$fe = \frac{fcfr}{n}$$

R-command:

Input

>x= c (93, 90, 5, 1, 2, 10);x

>m=matrix(x, 2, 3); m

>chisq.test(m, correct=F)

X-squared = 8.0444, df = 2, p-value = 0.01791

Tabulated $\chi 2$ is

$\chi 2_{2,0.05}$=5.9914

If p-value is less than 0.05

Reject the null hypothesis H_0.

CONCLUSION : In this population of diabetic patients, there is a relation between Type of medication & Area of patient.

PROPORTION Z-TEST

H_0:P1=P2 i.e., There is no significant difference due to exercise on Male and Female diabetic patients.

Vs

H_1:P1 ≠ P2 i.e., There is significant difference due to exercise on Male and Female diabetic patients.

Calculate test statistic,

n_1= 98 , X_1= 65

$\hat{p}_2$ = X_1/n_1= 0.66

n_2 = 103, X_2= 76

$\hat{p}_2$ = X_2/n_2 = 0.74

P= $\dfrac{x1+x2}{n1+n2}$

Z= $\dfrac{(\hat{p}1+\hat{p}2)-(p1-p2)}{\sqrt{\left(\frac{1}{n1}+\frac{1}{n2}\right)}}$ ~N(0,1)

R COMMAND :

>x =c(65,76) ;x

>n =c(95,103) ;n

>prop.test(x,n)

x-squared = 1.0021, d.f = 1, p-value = 0.316895

95 percent confidence interval: (-0.21092188, 0.06172434)

sample estimates:

  prop 1   prop 2

0.6632653 0.7378641

Reject null hypothesis H_0

CONCLUSION : There is significant difference due to regular exercise on male and female diabetic patients.Both group have responded equally to daily exercise.

Chi Square Test for Independence

H_0 = There is no relation between diabetes and other disease.

H_0 = There is relation between diabetes and other diabetes.

Calculate test statistic

$$\chi 2 = \frac{\sum (Oi - Ei)2}{Ei2}$$

PROBLEM'S	0i	Ei	$(Oi - Ei)^2$	$(Oi - Ei)^2/Ei$
Blood pressure	92	28.71	4005.62	139.52
Blood pressure, Cholestrol Problem	11	28.71	216.38	7.53
Cholestrol Problem	14	28.71	279.22	9.73
Heart Problems	12	28.71	94.2841	3.28
Heart Problems, Blood pressure	19	28.71	767.8441	26.74
Heart Problems, Cholestrol Problem	1	28.71	313.64	10.92
None	52	28.71	542.42	18.89
TOTAL	201			$\sum$ = 216.61

$\chi 2$ = 216.3278df=6

$\chi 2_{6,0.05}$= 12.592

Tabulated value of $\chi 2$ for 6 degrees of freedom at 5% level of significance is 12.592.

Calculated value of $\chi 2 \succ$ Tabulated value of $\chi 2$

We Reject null hypothesis H_0 at 5% level of significance.

CONCLUSION : There is relation between diabetes and other diseases.

CONCLUSION

- Diabetes can be caused due to inheritance.
- There is significant difference due to regular exercise on male and female diabetic patients
- In this population of diabetic patients , there is a relation between type of medication and area of patient
- The most used medication in both city and village I ALOPATHY
- There is relation between diabetes and other diseases i.e., Diabetes can lead to problems like blood pressure, heart problem, cholesterol, etc.
- 40 – 65 is the age interval for maximum chance for occurrence of diabetes.
- People can face eyesight problems due to diabetes.

Bibliography

❖ Fundamental of mathematical statistics, Gupta and Kapoor from chi square test.

❖ Statistical programming in R from that R code.

❖ Programmed statistics of BL Agarwal from that statistical tools.

❖ Statistical methods and use of R-software.