A PROJECT REPORT ON,

STATISTICAL ANALYSIS OF "TO STUDY THE EFFECT ON HEALTH AFTER DIABETES."

Submitted to,

DEPARTMENT OF STATISTICS,

SHIVAJI UNIVERSITY, KOLHAPUR.

For the partial fulfillment of degree

M. Sc.-II in STATISTICS 2021-2022
By,

MR. HAVAL ANUP NANDKUMAR

MISS. PATIL VARSHA BHIMRAO

MISS. DAMAKLE VARSHA SHIVAJI

Under the Guidance of,

Prof. S. K. Ganjave.   **Dr. Prof. S. B. Mahadik**
Project guide   **Head**
Adjunct Professor   **Department of Statistics**
Shivaji University, Kolhapur   **Shivaji University, Kolhapur**

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

CERTIFICATE

This is to certify that this project report on,

STATISTICAL ANALYSIS OF

"TO STUDY THE EFFECT ON HEALTH AFTER DIABETES"

Is submitted by,

Sr. No.	Name of Students	PRN
1	MR. HAVAL ANUP NANDKUMAR	2020060688
2	MISS. PATIL VARSHA BHIMRAO	2020059773
3	MISS. DAMAKLE VARSHA SHIVAJI	2020060701

As a partial fulfillment for the award of M.Sc., in statistics, under my supervision and guidance as per rules and regulations of the shivaji university, Kolhapur. During the academic year 2021-2022 and submitted the same. This work represents the bonafide work of these students. To the best of my knowledge the matter represented here in the project has not been submitted earlier.

Prof. S. K. Ganjave.   **Dr. Prof. S. B. Mahadik**
Project guide   **Head**
Adjunct Professor   **Department of Statistics**
Shivaji University, Kolhapur   **Shivaji University, Kolhapur**

Date-
Place-

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

<u>ACKNOWLEDGEMENT</u>

INDEX

INTRODUCTION

The burden of diabetes is high and increasing globally, and in developing economies like India, mainly fueled by the increasing prevalence of overweight/obesity and unhealthy lifestyles. The estimates in 2019 showed that 77 million individuals had diabetes in India, which is expected to rise to over 134 million by 2045. Approximately 57% of these individuals remain undiagnosed. Type 2 diabetes, which accounts for majority of the cases, can lead to multiorgan complications. The risk for diabetes is largely influence by ethnicity, age, obesity and physical inactivity, unhealthy diet, and behavioral habits in addition to genetics and family history. Good control of blood sugar can prevent and/or delay the onset of diabetes complications.

There are three types of diabetes namely Type 1, Type 2 and Gestational. In type 1 diabetes body doesn't make insulin. This occurs in young children between age 4-14 years old. In type 2 diabetes body cells doesn't responds well to insulin. And gestational diabetes occurs in pregnant women due to high level of sugar. To test blood sugar level HbA1c is most common test which takes average of three months sugar.

There are several common myths about diabetes among people like Diabetes is caused by eating too much sweet food , people with diabetes can't eat sugar , type 2 diabetes only affects fat people , type 2 diabetes is mild , people with diabetes should only eat diabetic food , patients on insulin have more serious diabetes than those on oral medications etc. Due to such myths people are unaware and careless about diabetes. That's why diabetes remains untreated and tends to cause more complications.

Thus, effective health promotion and primary prevention, at both, individual and population levels are the need of the hour to curb the diabetes epidemic and reduce diabetes-related complications in India.

AIM

To study overall impact of Diabetes and its treatment on patients health.

OBJECTIVES

➢ To check whether Diabetes caused due to genetic inheritance or stress factor.

➢ To check the impact on the HbA1c of patients after regular follow up by doctor.

➢ To study other complications caused due to Diabetes.

➢ To study effect of medicine on patients.

➢ To study standard age of Diabetes occurrence.

Data Collection Methodology

We have collected primary data from Hormocare clinic having population of size 4752. From this we have collected sample of size 167. We have framed our questionnaire in such a way that, we asked them questions about their symptoms, genetic back-history, diet, other complications after diabetes, medicine, stress factor, addiction and effect on their health after consulting Dr. For collection of data, we have chosen January to March time period randomly. And whoever patients were visited at that time to the clinic we have collected data from them.

Statistical tools used for Analysis

Statistical Technique

➤ **Graphical Presentation:**

- Histogram
- Pie Chart
- Bar Diagram
- Scatter Plot
- Box Plot
- Word Cloud

➤ **Tests :**

- To check Proportion of Genetic Inheritance

$$Z = \frac{p - P_0}{\sqrt{\frac{P_0 Q_0}{n}}}$$

- Wilcoxon signed-rank test to check effect between Previous and Current year Medicine

$$W = \sum_{i=1}^{N_r} [\text{sgn}(x_{2,i} - x_{1,i}) \cdot R_i]$$

- Wilcoxon signed-rank test to check effect between Previous and Current year Hba1c

$$W = \sum_{i=1}^{N_r} [\text{sgn}(x_{2,i} - x_{1,i}) \cdot R_i]$$

➤ **Confusion matrix**
➤ **Association rule**

➤ **Statistical software & Tools:**

- MS-Excel
- MS-Word
- SAS
- Python


<u>Overall summary of patients</u>

	Count	Weight			Hba1c			% of Complications
		Min	Max	Average	Min	Max	Average	
Gender								
Male	76	40	111	69	5.70%	13.80%	7.60%	47%
Female	76	41	106	65	5.60%	13.90%	7.80%	53%
Age Group								
26-30	4	50	81	64	6%	8.60%	7.15%	2.29%
31-40	16	40	102	72	5.80%	13.90%	8.10%	9.16%
41-50	42	47	111	70	5.90%	10.40%	7.40%	28.24%
51-65	59	45	95	66	5.60%	13.80%	7.80%	38.17%
66-85	30	41	83	63	5.70%	11.70%	7.70%	22.14%
Occupation								
Job	26	47	111	65	5.80%	11.80%	7.50%	16.03%
Business	34	40	95	71	5.90%	13.80%	7.90%	19.85%
Retired	21	46	83	68	5.70%	11.70%	7.50%	14.50%
Housewives	62	41	106	65	5.60%	13.90%	7.80%	45.04%
Farmer	8	57	95	74	6.40%	7.70%	6.90%	4.58%
Addiction	33	40	111	69	5.90%	11.80%	7.80%	20.61%

From above table we can see that,

- Age group 26-30 has low Hba1c level. While age group 31-40 has high Hba1c level.
- Female have high chances of getting complications than male.
- Age group of 51-65 has more percentage of having complications.
- Patients who are running business have high Hba1c level than others.
- Patients who are farmers have low Hba1c level.
- Housewives have more complications than others.

Graphical Representation

Pie chart for type of diabetes

1
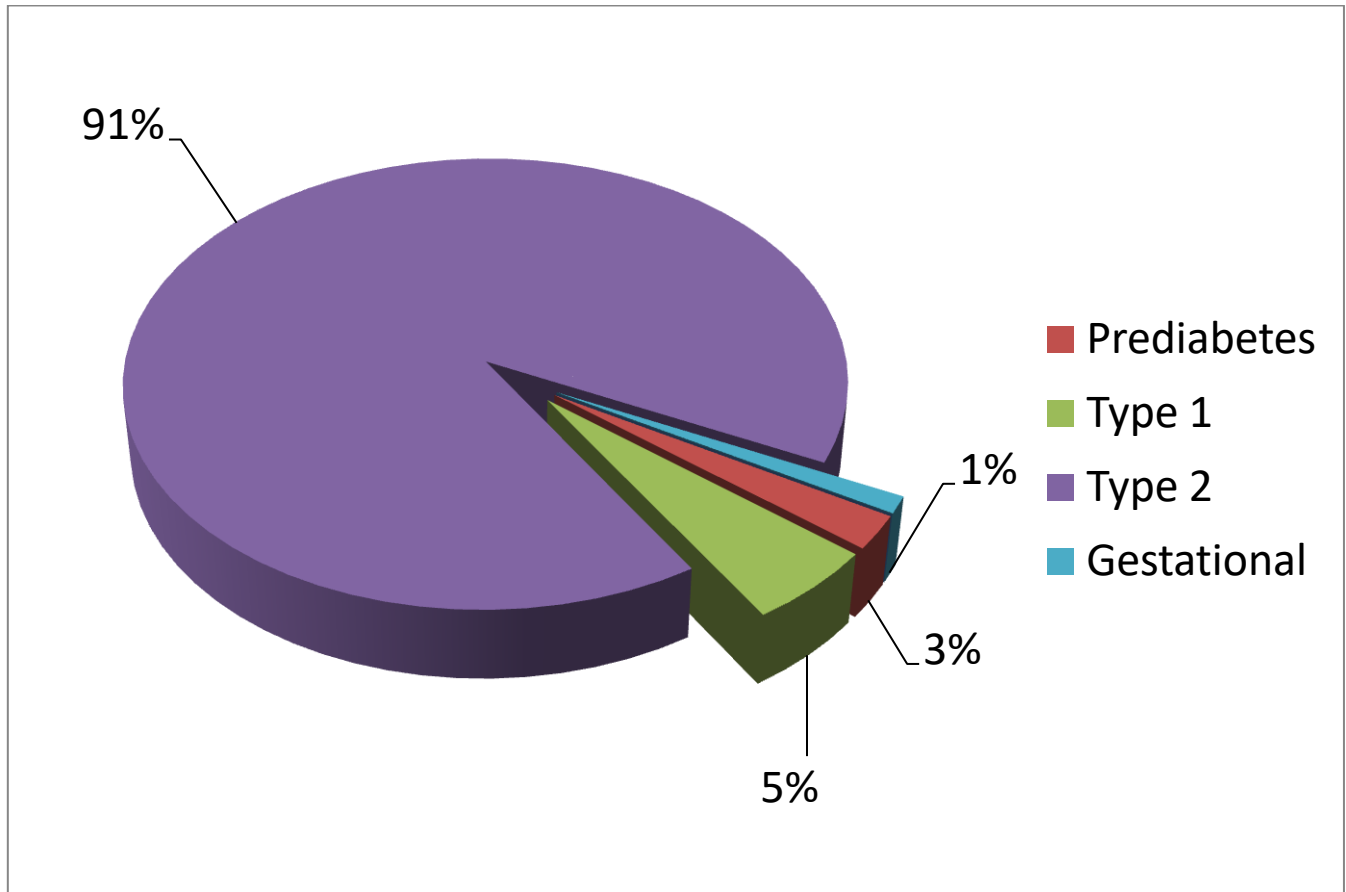
Conclusion:

From above chart, we can observe that 91% patients having Type-2 diabetes and 5% patients having Type-1 diabetes.

Bar Plot for Symptoms

Summary-

Type of Symptoms	Count	Percentage
Sudden weight loss	37	24%
Stress	97	64%
Excessive Hunger	69	45%
Urinary incontinence	90	59%
Weakness	99	65%
Throat dryness	103	68%
Feet infection	21	14%
Feet Burning	32	21%
Slow wound healing	24	16%
Nausea/vomiting	32	21%
Dizziness	46	30%

Symptoms

2
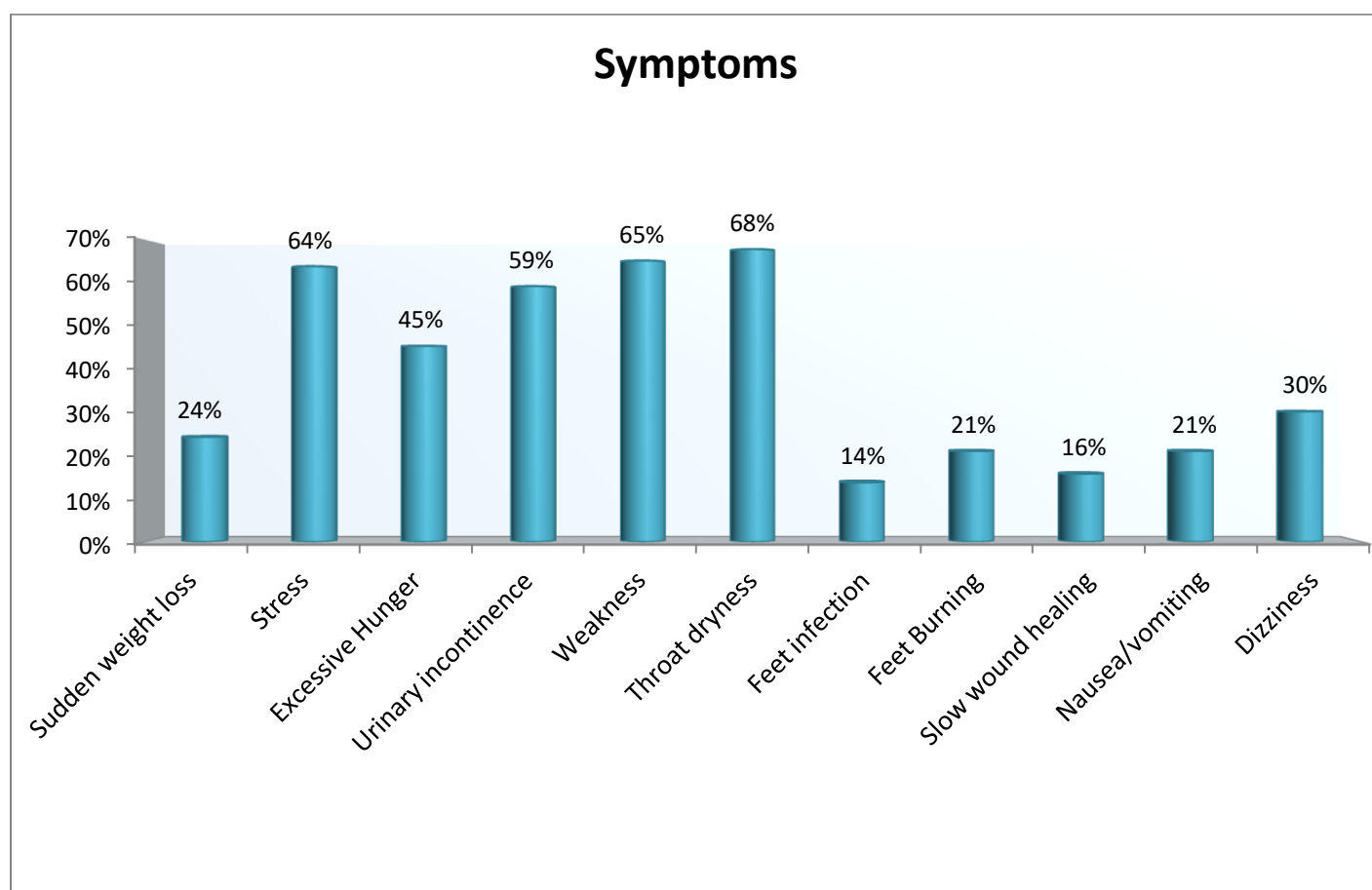
Conclusion: From above chart, we can conclude that Throat dryness, Weakness, Stress, Urinary incontinence are major symptoms among patients before diabetes.

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

Histogram of Standard Age

Distribution of std_age

3
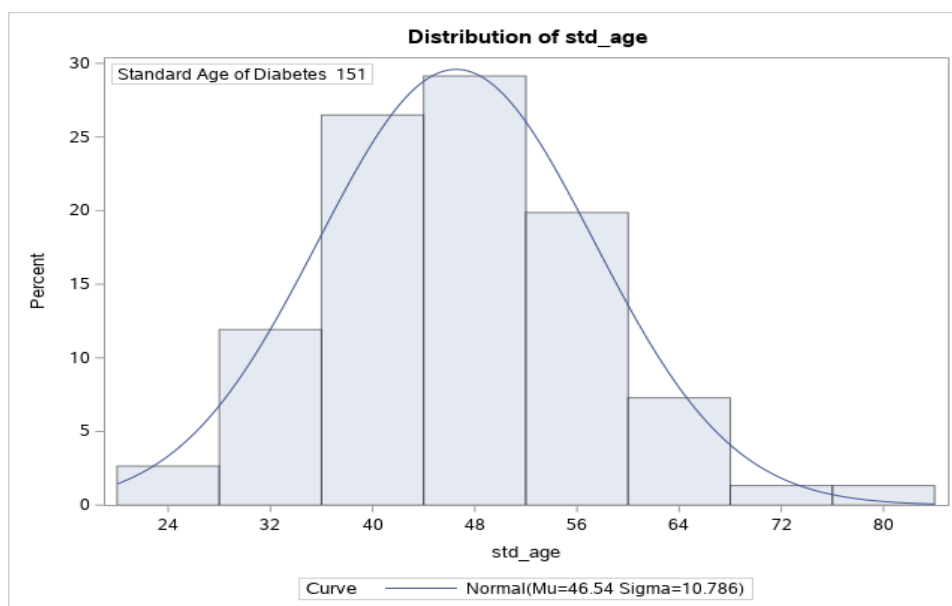
Conclusion: From above chart, we can observe that standard age of diabetes occurrence is 46 year.

Histogram of Standard Age of Male and Female
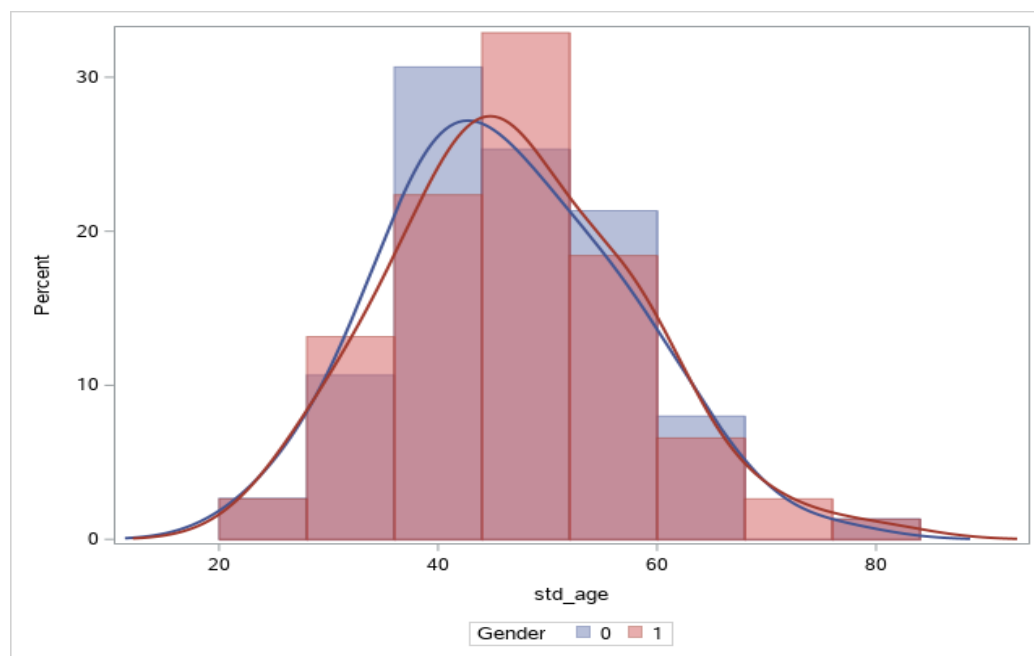
4

Conclusion: From above chart, we can conclude that standard age of diabetes occurrence in males & female is approximately 46 year

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

Histogram of Standard Age having Genetic Inheritance
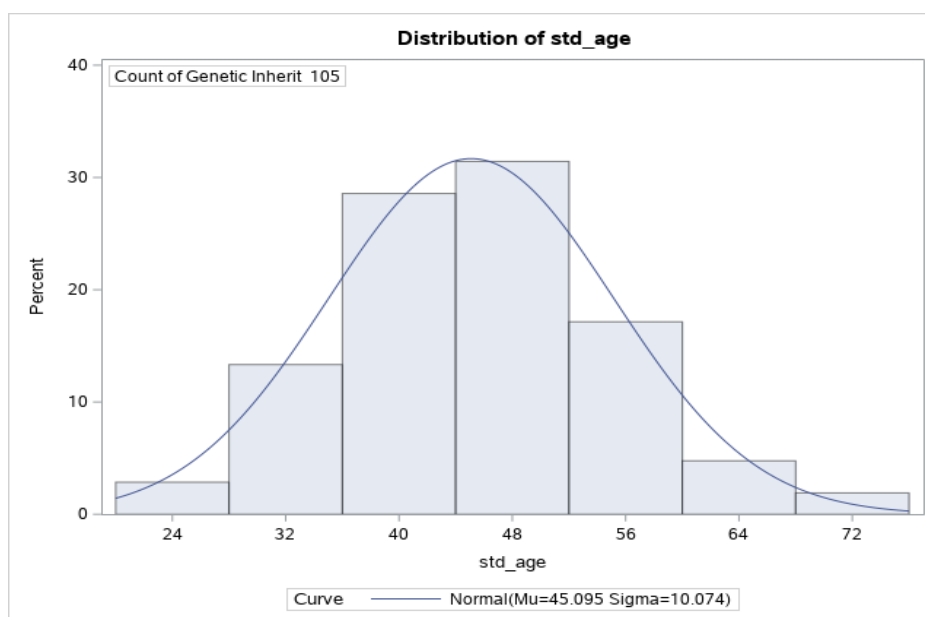
5

Conclusion: From above chart, we can observe that standard age of diabetes occurred due to genetic inheritance is 45year.

Histogram of Standard Age of Male and Female having Genetic Inheritance
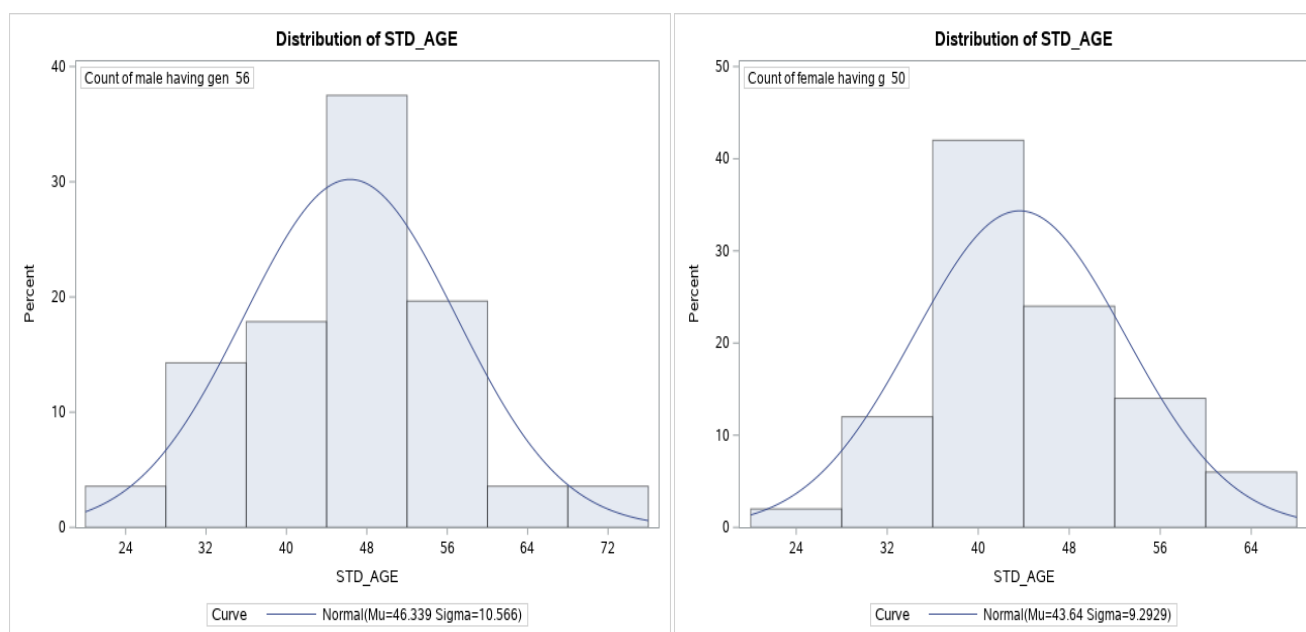
6

Conclusion: From above chart, we can conclude that standard age of diabetes occurred due to genetic inheritance in male is 46 & female is 43 years.

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

Histogram of Standard Age of Patients having Stress

Distribution of std_age
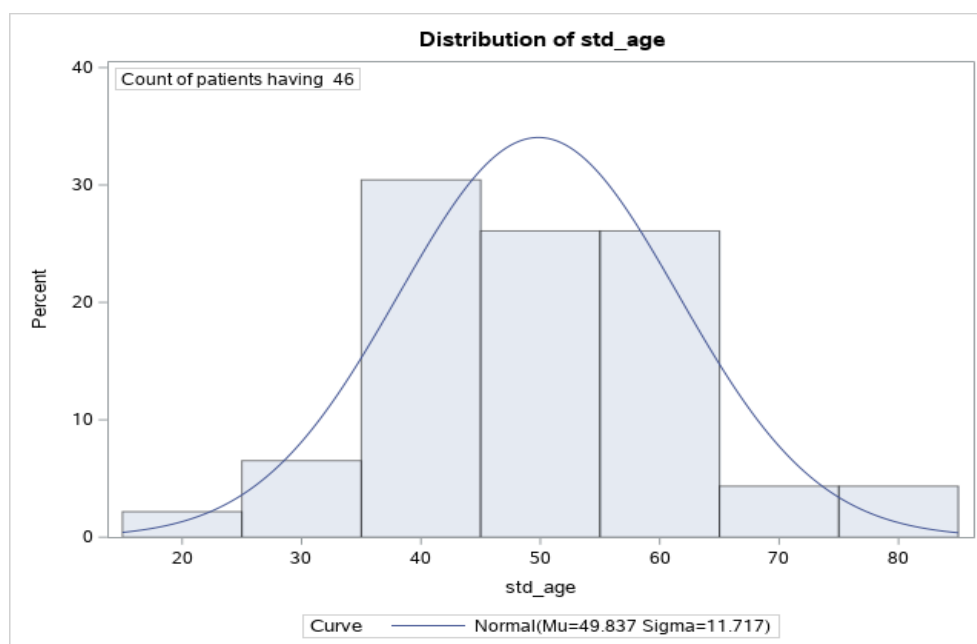
7

Conclusion: From above chart, we can observe that standard age of diabetes occurred due to stress is 49 year.

Histogram of Standard Age of Male and Female having Stress

Distribution of STD_AGE
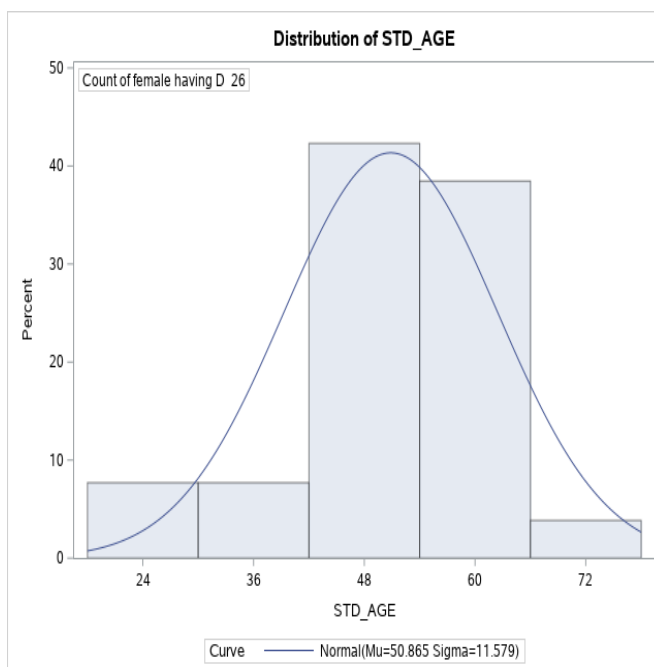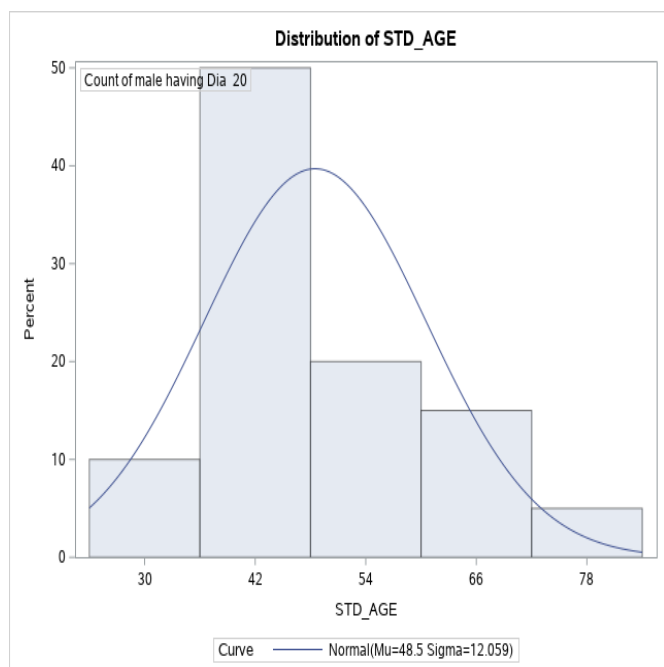
8

Conclusion: From above chart, we can conclude that standard age of diabetes occurrence due to stress in males is approx 48 & in female is 50 years.

Occupation wise Standard age of having Stress

Distribution of job_std_age — Count of T2 DM patients 6 — Curve Normal(Mu=41.833 Sigma=4.2622)

Distribution of business_std_age — Count of T2 DM patients 6 — Curve Normal(Mu=42.167 Sigma=8.5421)

Distribution of Retired_std_age — Count of T2 DM patients 8 — Curve Normal(Mu=62.5 Sigma=8.6355)

Distribution of Housewives_std_age — Count of T2 DM patients 21 — Curve Normal(Mu=50.071 Sigma=12.079)

Distribution of Farmers_std_age

Count of T2 DM patients   4

Curve —— Normal(Mu=49.25 Sigma=7.3655)

9

Conclusion:

- The standard age of patients who do job and having diabetes due to stress is 42.
- The standard age of patients who have business and having diabetes due to stress is 42.
- The standard age of patients who are retired and having diabetes due to stress is 62.
- The standard age of patients who are housewives and having diabetes due to stress is 50.
- The standard age of patients who are farmers and having diabetes due to stress is 49.

Bar Plot of Complications Occurred After Diabetes.

Summary-

Complications	Count	Percentage
Heart disease	11	7%
BP	75	49%
Kidney	20	13%
Neuropathy	87	57%
Eyesight	55	36%
Cholesterol	34	22%
Feet Wound	13	9%
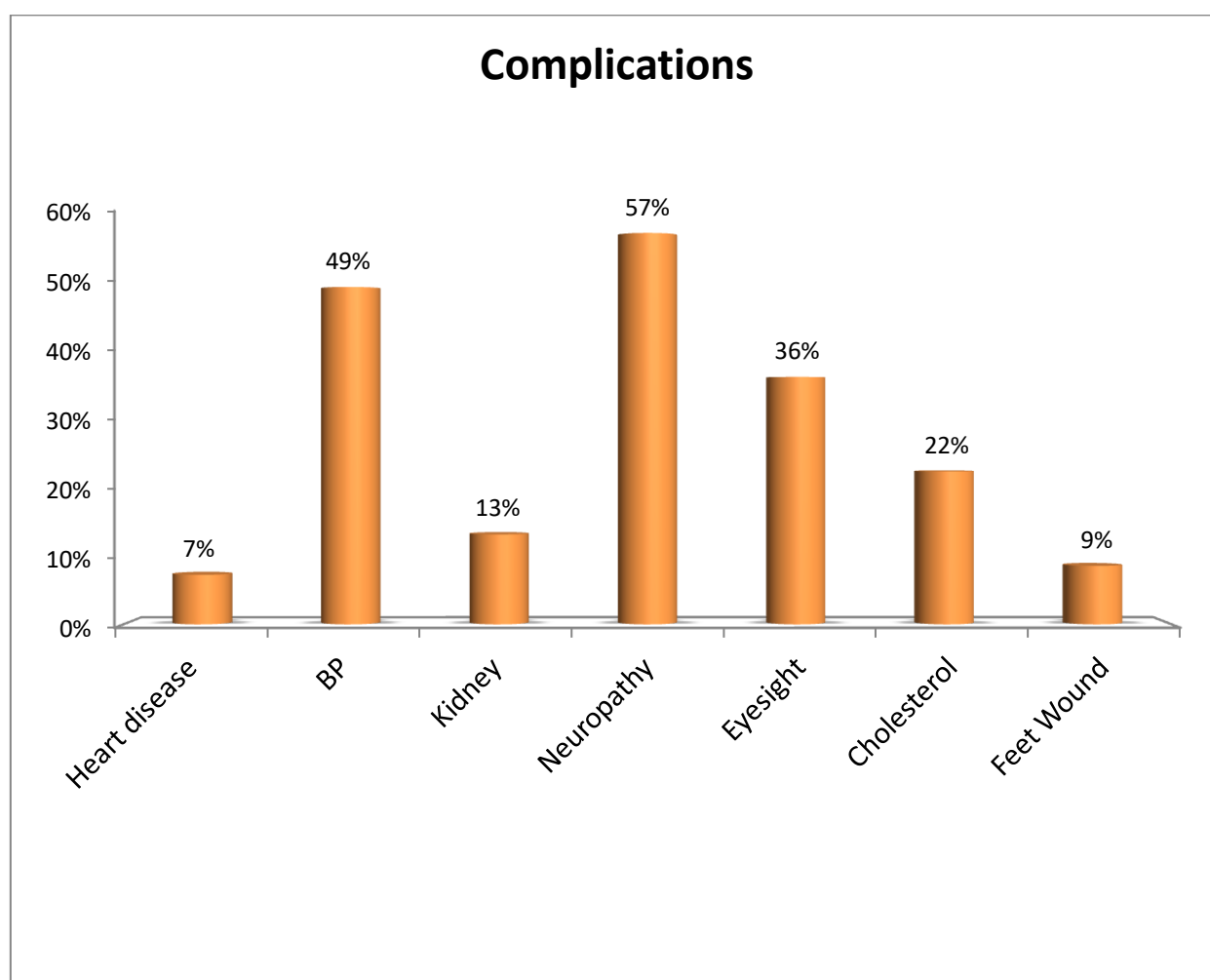
10

Conclusion: From above chart, we can conclude that Neuropathy, BP, Eye-sight are most occurred complications after diabetes.

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

Gender wise complications after diabetes

Summary-

Complications	Male	Female
Heart disease	2%	6%
BP	**27%**	31%
Kidney	8%	7%
Neuropathy	25%	**41%**
Eye sight	20%	22%
Cholesterol	11%	15%
Feet wound	5%	5%
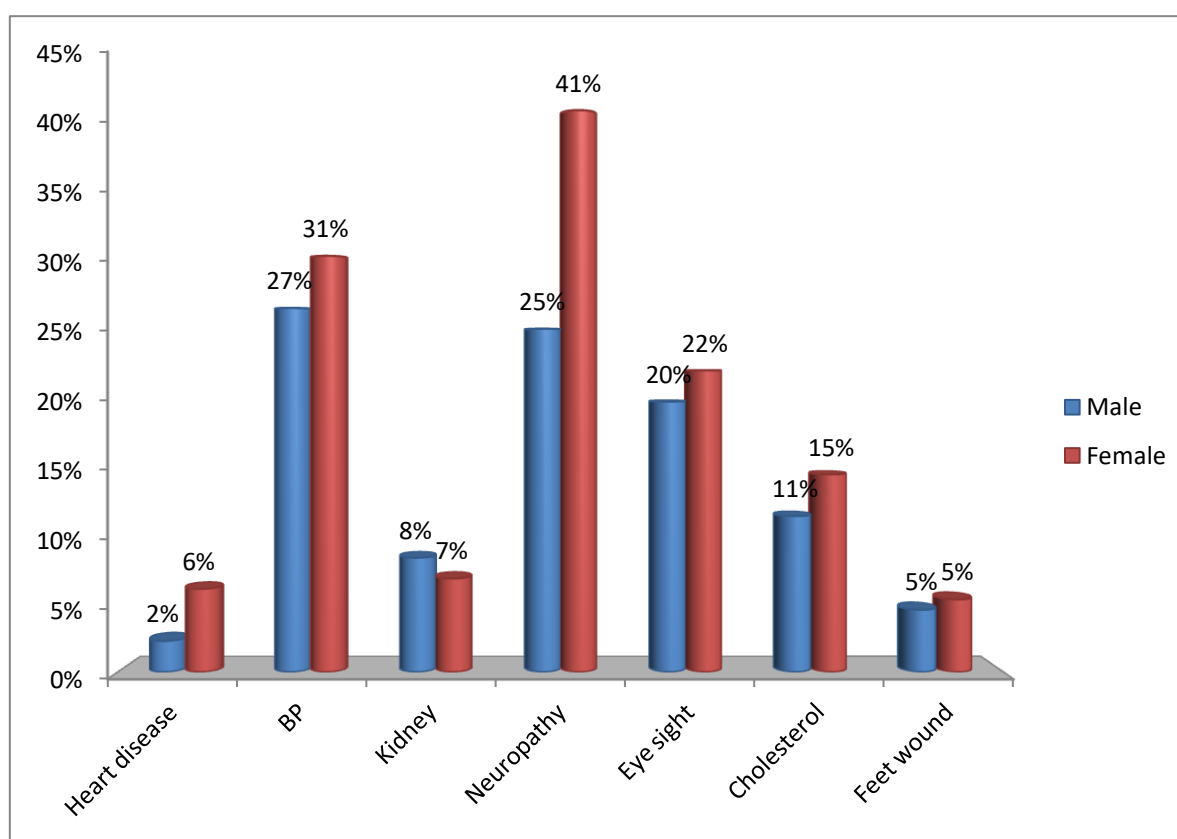
11

Conclusion-

From above chart we can observe that, Neuropathy is mostly occurred complication in female and BP is mostly occurred complication in male.

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

Gender wise Box Plot of current Hba1c
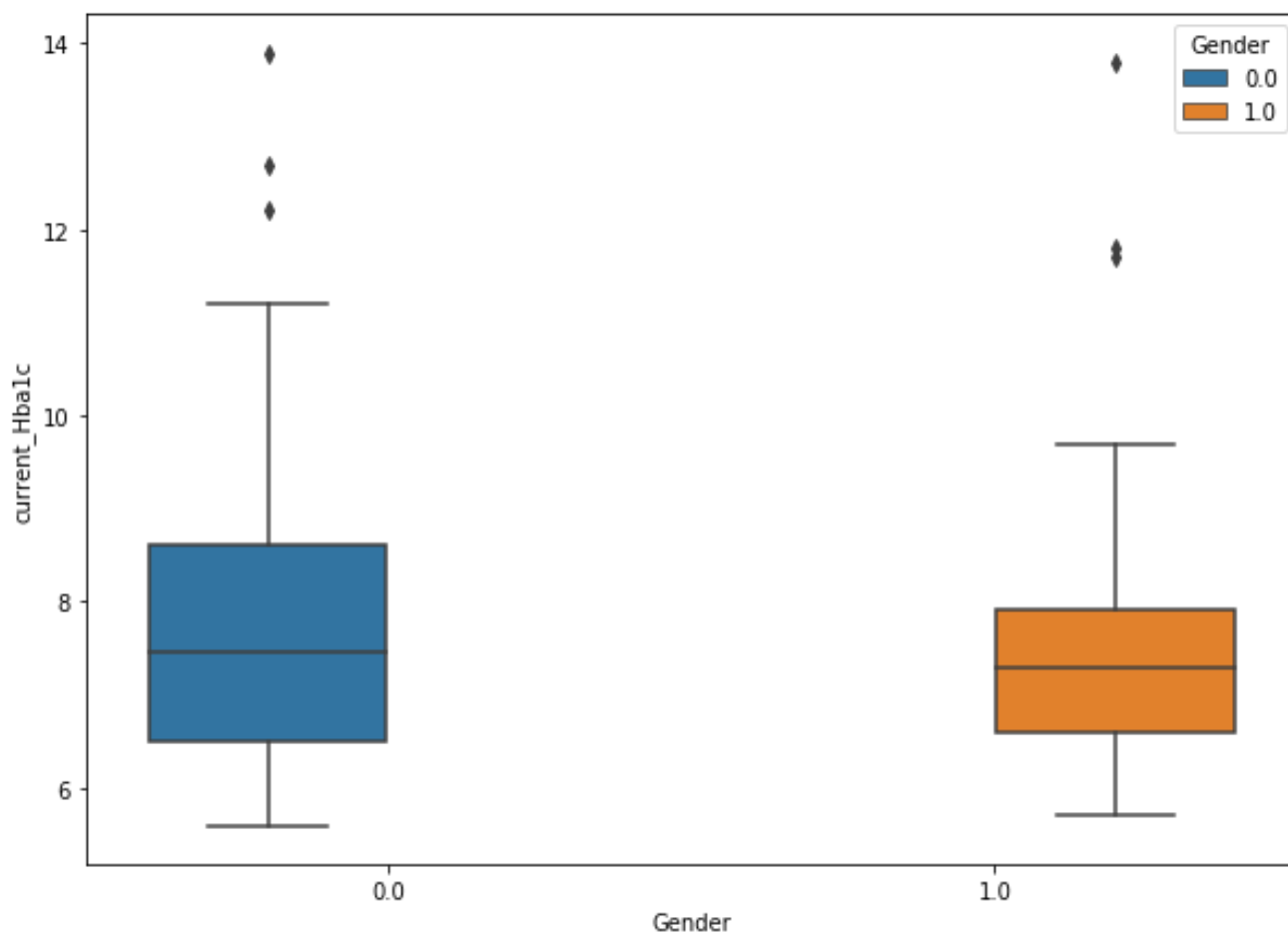
12

Conclusion:

From above chart, shows that dispersion in female is more than male. Male Hba1c is nearly normally distributed.

Scatter plot of male & female for number of complications versus current Hba1c
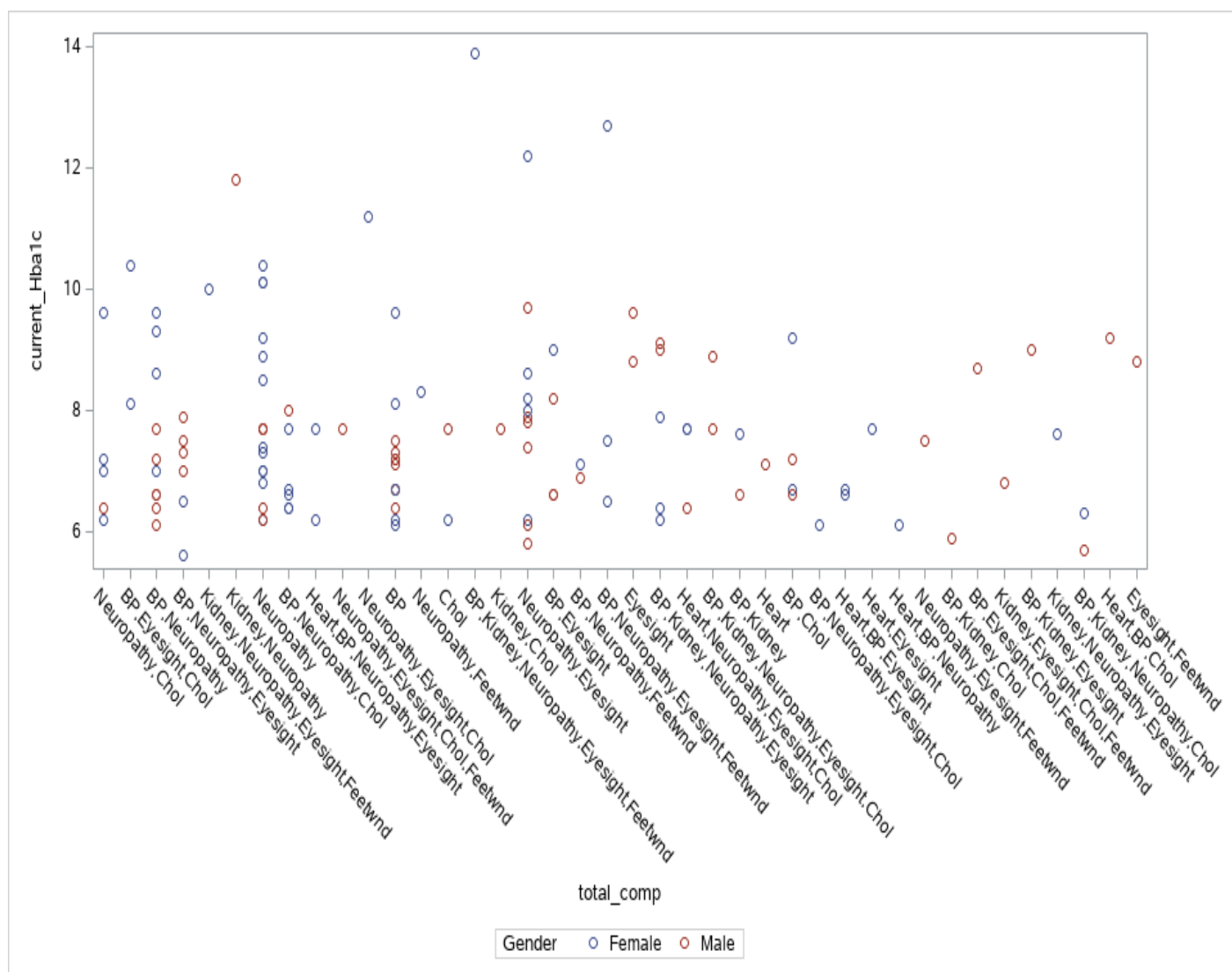
13

Conclusion:

From above chart of HbA1c versus number of complications,

- Female with 5 complications namely BP, Kidney, Neuropathy, Eye-sight, Feet wound and with 4 complications namely BP, Neuropathy, Eye-sight, Feet wound and with 2 complications namely Neuropathy, Eye-sight have Extreme Poor HbA1c Level.
- Neuropathy is most commonly seen complication in female than male.
- The scatterness of female HbA1c is more than male HbA1c

Word Cloud Image For Other Symptoms.

14
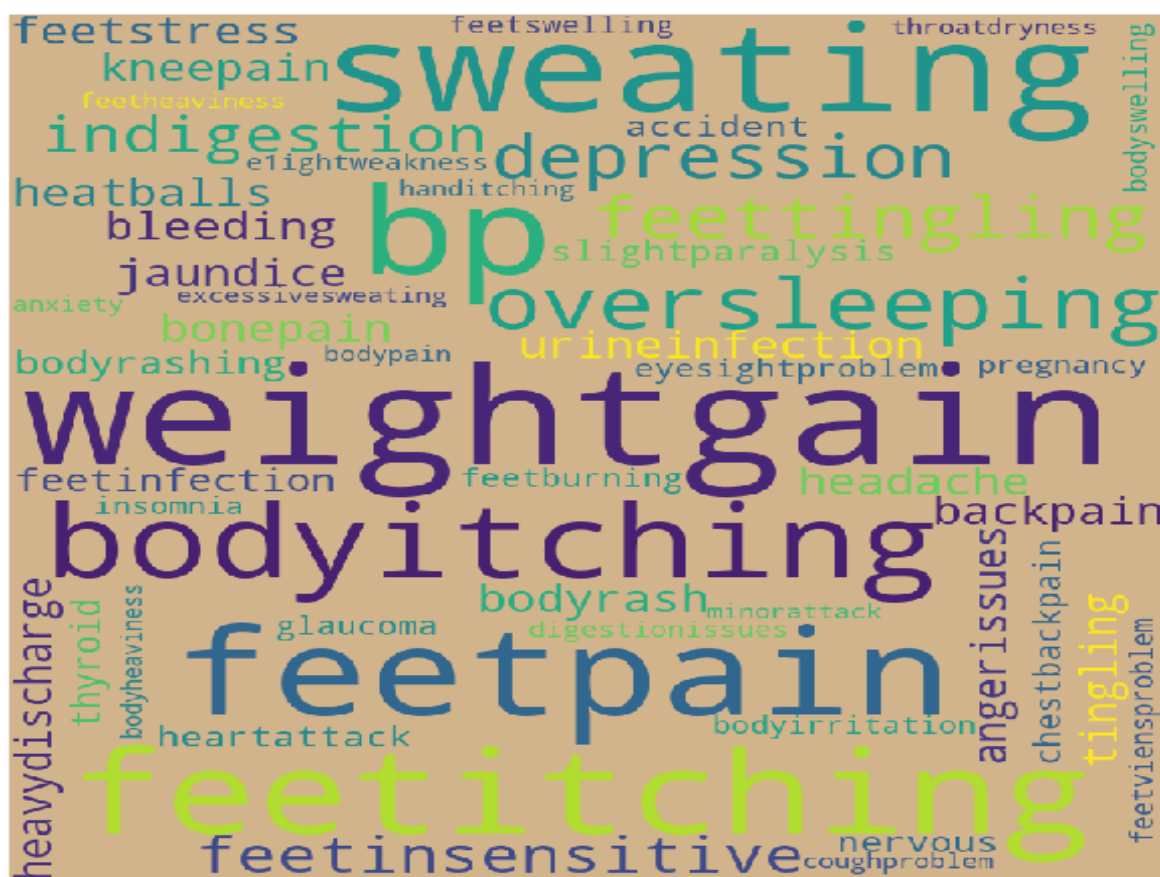
Conclusion:

This word cloud shows that weight gain, Body itching, feet pain, feet itching, sweating and oversleeping are most occurred other symptoms than common one.

Word Cloud Image For Other Complications.

15

Complications:

Above word cloud shows that Thyroid, Stomach problem, Knee pain, Weakness are most occurred other complications than common one.

Statistical Analysis

To check Proportion of Genetic Inheritance

Hypothesis: We have to test,

H_0: There is no significant difference of occurrence of diabetes due to genetic inheritance.

v/s

H_1: There is significant difference of occurrence of diabetes due to genetic inheritance.

Under H_0, Test statistic is,

P = Proportion of patients expecting having Genetic Inheritance.

n = 152 $P_0 = 0.60$ & $Q_0 = 0.40$

```
z_stat: 0.536, p_value: 0.296
```

p-value is greater than 5%

Interpretation:

```
     Fail to reject the null hypothesis - Hence in our sample
pure genetic inheritance is equal 58.4%
```

Result:

From above, we can conclude that in our population diabetes occurrence due to genetic inheritance is more than 50%.

Wilcoxon signed-rank test to check effect between Previous and Current year Medicine

Hypothesis: We have to test,

H_0: There is no significant difference between current year and previous year medicine
v/s

H_1 : There is significant difference between current year and previous year medicine

Formula:

Under H_0, Test statistic is,

$$W = \sum_{i=1}^{N_r} [\text{sgn}(x_{2,i} - x_{1,i}) \cdot R_i]$$

n = 152
x_1 = Current year medicine.
x_2 = Previous year medicine.

W = test statistic

nr = sample size, excluding pairs where x1 = x2

sgn = sign function

R_i = rank i

```
WilcoxonResult(statistic=1226.0, pvalue=1.0406905542787404e-06)
```

As our p-value is less than 5%

Interpretation:

```
        Hence we reject the null hypothesis – there is
significant difference between current year and previous year
medicine.
```

Result:
            Here we can conclude that, dosage of medicines in previous year and current year is different.

Wilcoxon signed-rank test to check effect between Previous and Current year Hba1c

Hypothesis: We have to test,

H_0: There is no significant difference between current year and previous year Hba1c

 v/s

H_1: There is significant difference between current year and previous year Hba1c

Formula:

Under H_0, Test statistic is,

$$W = \sum_{i=1}^{N_r} \left[\text{sgn}(x_{2,i} - x_{1,i}) \cdot R_i \right]$$

n = 152
x_1 = Current year Hba1c.
x_2 = Previous year Hba1c.

W = test statistic

nr = sample size, excluding pairs where x1 = x2

sgn = sign function

R_i = rank i

```
WilcoxonResult(statistic=796.5, pvalue=1.7766946434785548e-22)
```

Interpretation:

```
     Hence we reject the null hypothesis – there is
significant difference between current year and previous year
Hba1c.
```

Result:
Here we can conclude that, level of Hba1c in previous year is high as compared to current year.

Confusion matrix for cross checking between Precautionary Measurements and Hba1c.

Matrix-

```
[ 34, 101]
[  3,  14]
```

Seaborn Confusion Matrix with labels
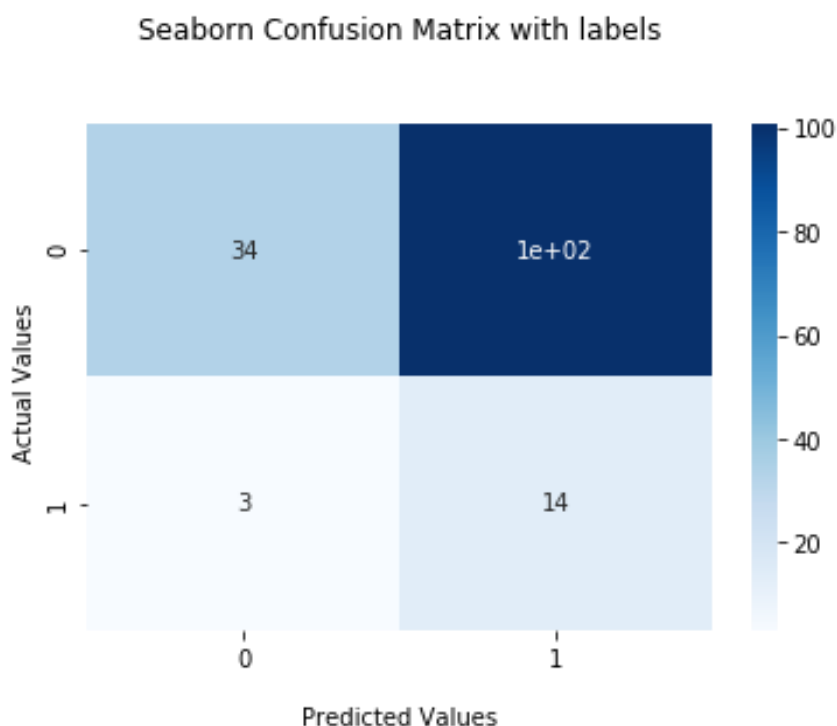
16

Report Table-

	precision	recall	f1-score	support
0	0.92	0.25	0.40	135
1	0.12	0.82	0.21	17
accuracy			0.32	152
macro avg	0.52	0.54	0.30	152
weighted avg	0.83	0.32	0.37	152

Conclusion: Here we can conclude that, 101 patients pretend that they follow all precautionary measurements but their HbA1c is out of control.

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

To check association between complications

Here we are checking is there any relationship between complications.

Index	support	itemsets
0	0.493421	(bp)
1	0.572368	(Neuropathy)
2	0.361842	(Eyesight)
3	0.223684	(Cholesterol)
4	0.289474	(Neuropathy, bp)
5	0.210526	(Eyesight, bp)
6	0.263158	(Neuropathy, Eyesight)

antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction
(Neuropathy)	(bp)	0.572368	0.493421	0.289474	0.505747	1.024981	0.007055	1.024939
(bp)	(Neuropathy)	0.493421	0.572368	0.289474	0.586667	1.024981	0.007055	1.034593
(Eyesight)	(bp)	0.361842	0.493421	0.210526	0.581818	1.179152	0.031986	1.211384
(bp)	(Eyesight)	0.493421	0.361842	0.210526	0.426667	1.179152	0.031986	1.113066
(Neuropathy)	(Eyesight)	0.572368	0.361842	0.263158	0.45977	1.270637	0.056051	1.181271
(Eyesight)	(Neuropathy)	0.361842	0.572368	0.263158	0.727273	1.270637	0.056051	1.567982

Interpretation-

- The probability of occurrence of Neuropathy is 57%.
- The probability of occurrence of BP is 49%.
- We can say that support of both of them is measured as 29%.
- 50% of those who have Neuropathy will also have BP.
- Their correlation with each other is seen as 1.02.

Tree Diagram of precautionary measurements

Population Size

N = 4752

Sample Size

n = 152

Male= 76

Female=76

Diet Follow-Up =46%

Diet Follow-Up =41%

Regular Exercise =41%

Regular Exercise =41%

Alertness about regular follow-up =48%

Alertness about regular follow-up =48%
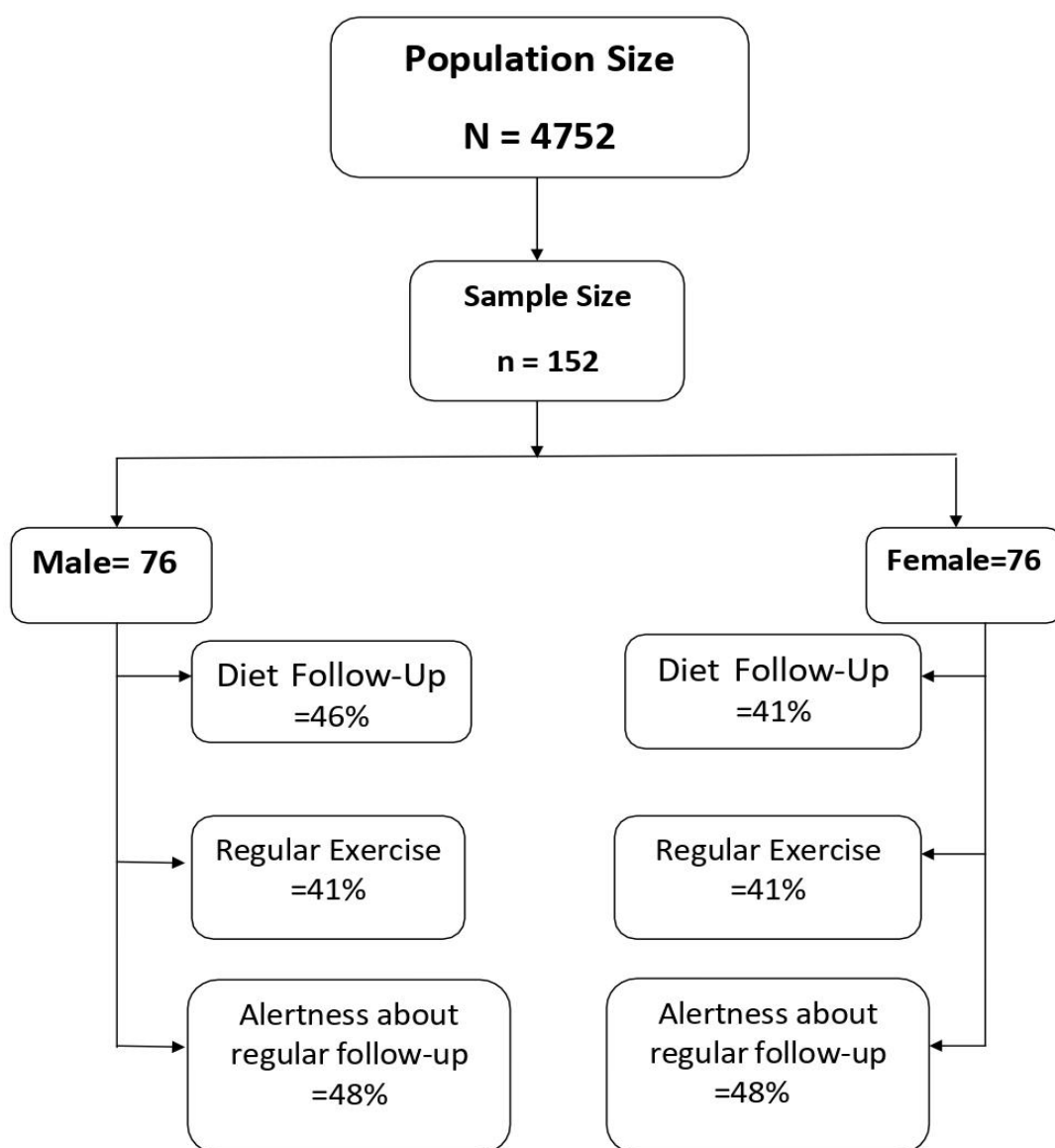
Male are more diet conscious than female.

DEPARTMENT OF STATISTICS, SHIVAJI UNIVERSITY, KOLHAPUR.

Tree Diagram for key elements of Diabetes

```
                    ┌─────────────────┐
                    │   Population    │
                    │                 │
                    │    N=4752       │
                    └────────┬────────┘
                             │
                    ┌────────▼────────┐
                    │    Sample       │
                    │    n=152        │
                    └────────┬────────┘
              ┌──────────────┴──────────────┐
     ┌────────▼────────┐           ┌────────▼────────┐
     │    Male=76      │           │   Female=76     │
     └────────┬────────┘           └────────┬────────┘
      ┌───────┴───────┐             ┌───────┴───────┐
┌─────▼─────┐  ┌──────▼─────┐  ┌────▼──────┐  ┌─────▼─────┐
│Genetic=37%│  │ Stress=13% │  │Genetic=33%│  │Stress=17% │
└─────┬─────┘  └──────┬─────┘  └────┬──────┘  └─────┬─────┘
┌─────▼─────┐  ┌──────▼─────┐  ┌────▼──────┐  ┌─────▼─────┐
│Standard   │  │Standard    │  │Standard   │  │Standard   │
│Age        │  │Age         │  │Age        │  │Age        │
│=46 yrs    │  │=48 yrs     │  │=43 yrs    │  │=50 yrs    │
└─────┬─────┘  └──────┬─────┘  └────┬──────┘  └─────┬─────┘
┌─────▼─────┐  ┌──────▼─────┐  ┌────▼──────┐  ┌─────▼─────┐
│Complicat. │  │Complicat.  │  │Complicat. │  │Complicat. │
│BP=27%     │  │BP=26%      │  │BP=24%     │  │BP=44%     │
│Neuro=27%  │  │Neuro=21%   │  │Neuro=40%  │  │Neuro=41%  │
│Eyesight=22│  │            │  │Eyesight=23│  │           │
└───────────┘  └────────────┘  └───────────┘  └───────────┘
```
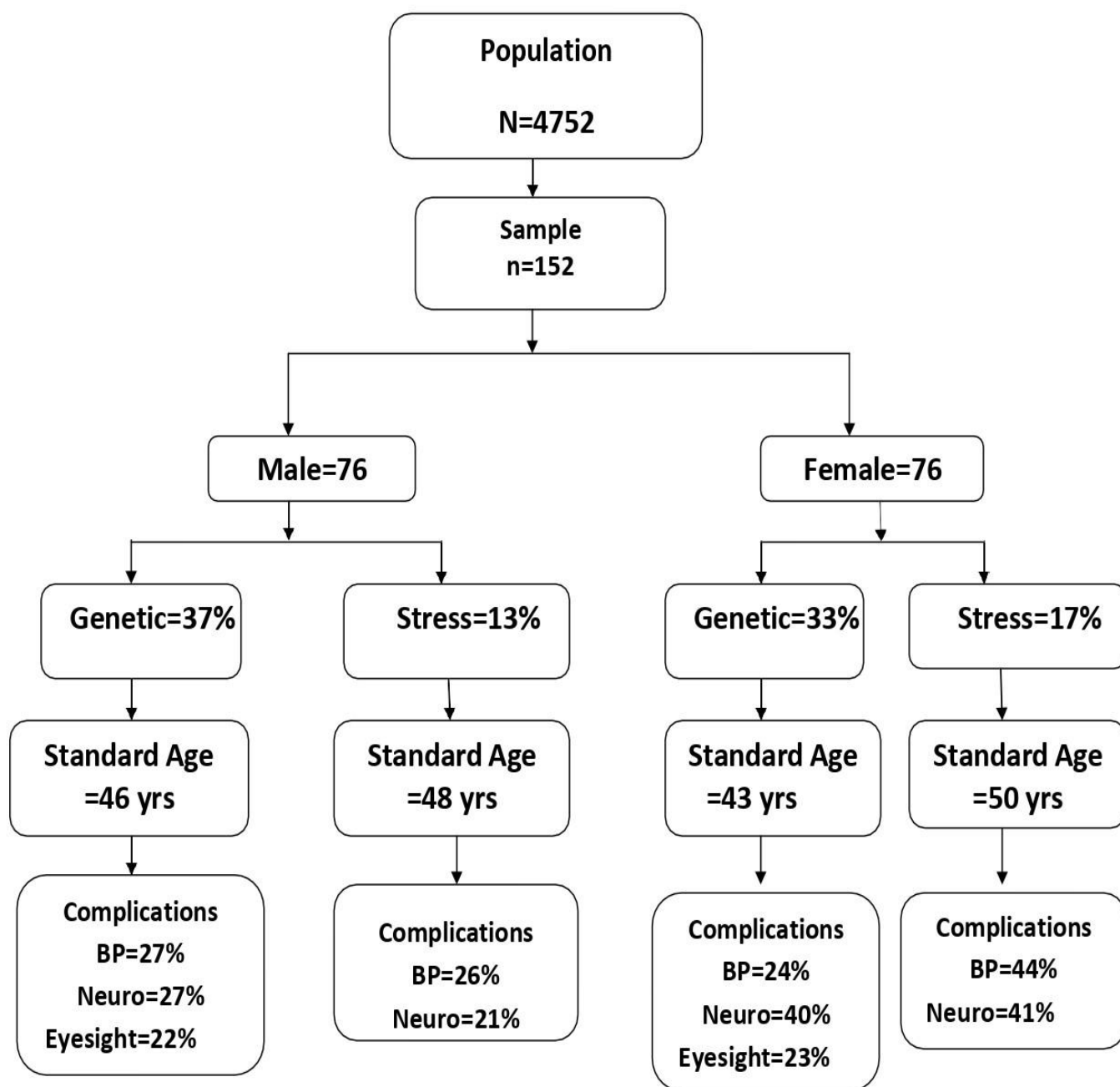
- Diabetes occurrence due to genetic inheritance is more than due to stress.
- Standard age of diabetes occurrence due to stress in female is late which is 50 years.
- Complications caused due to genetic inheritance are more than stress.

Major Findings

- In our data, we found that more than 50% patients have genetic inheritance.
- People have disbeliefs about their precautionary measurements and have high Hba1c level. Hence they are unaware about their risk of diabetes.
- While talking about complications, there is 50% chance of occurring neuropathy if patients have BP.
- Overall standard age of occurrence of diabetes is 46 years.
- Standard age of diabetes occurred due to genetic inheritance in male is 46 & female is 43 years whereas standard age of diabetes occurrence due to stress in males is approx 48 & in female is 50 years.
- The standard age of patients who are employees and businessmen is 41 & 42 respectively.
- We found that, male have good control over their Hba1c while female don't.
- About general symptoms, Throat dryness, weakness & stress are frequently occurred. About other symptoms, weight gain is commonly occurred.
- More number of complications are present in female.
- Neuropathy is mostly occurred complication in female while male have BP and about other complication Thyroid is mostly occurred.

Scope and limitations

- Due to insufficient time, the study was limited to small sample size.
- We couldn't get enough back history up to five years for analysis purpose.
- Some patients didn't provide enough information.
- This study can be extended for large population using large sample size by considering more factors.

References

- Diabetes – (https://en.wikipedia.org/wiki/Diabetes)
- Fundamentals of statistics- S. C. Gupta.
- Association Rules with Python by Merve Torkan (https://medium.com/@mervetorkan/association-rules-with-python-9158974e761a)

Methodology

- ## Codes for analysis(SAS)

```
PROC UNIVARIATE DATA = Diabetes.graph;

HISTOGRAM std_age / NORMAL CFILL = bgr;

INSET N = 'Standard Age of Diabetes';

qqplot;

ppplot;

RUN;


proc sgplot data=diabetes.all;

  where gender in (0, 1);     /* restrict to two groups */

  histogram std_age / group=gender transparency=0.5;     /* SAS 9.4m2 */

  density std_age / type=kernel group=gender; /* overlay density estimates */

run;


PROC UNIVARIATE DATA = Diabetes.genetic1;

HISTOGRAM std_age / NORMAL CFILL = bgr;

INSET N = 'Count of Genetic Inheritance';

title 'Standard Age of patients having Genetic Inheritance';

RUN;


PROC UNIVARIATE DATA = Diabetes.geneticm;

HISTOGRAM std_age / NORMAL CFILL = bgr;

INSET N = 'Count of male having genetic inheritance';
```

```
title 'Standard Age of male having genetic inheritance';

RUN;


PROC UNIVARIATE DATA = Diabetes.geneticf;

HISTOGRAM std_age / NORMAL CFILL = bgr;

INSET N = 'Count of female having genetic inheritance';

title 'Standard Age of female having genetic inheritance';

RUN;


PROC UNIVARIATE DATA = Diabetes.stress;

HISTOGRAM std_age / NORMAL CFILL = bgr;

INSET N = 'Count of patients having Diabetes due to Stress';

title  'Standard Age of patients having Diabetes due to Stress';

RUN;


PROC UNIVARIATE DATA = Diabetes.stressm;

HISTOGRAM std_age / NORMAL CFILL = bgr;

INSET N = 'Count of male having Diabetes due to Stress';

title  'Standard Age of male having Diabetes due to Stress';

RUN;


PROC UNIVARIATE DATA = Diabetes.stressf;

HISTOGRAM std_age / NORMAL CFILL = bgr;

INSET N = 'Count of female having Diabetes due to Stress';
```

```
title  'Standard Age of female having Diabetes due to Stress';

RUN;


PROC UNIVARIATE DATA = Diabetes.os0;

HISTOGRAM job_std_age / NORMAL CFILL = bgr;

INSET N = 'Count of T2 DM patients having job and stress';

title 'Standard Age of patients having job and stress';

RUN;


PROC UNIVARIATE DATA = Diabetes.os1;

HISTOGRAM business_std_age / NORMAL CFILL = bgr;

INSET N = 'Count of T2 DM patients having buisness and stress';

title 'Standard Age of patients having buisness and stress';

RUN;


PROC UNIVARIATE DATA = Diabetes.os3;

HISTOGRAM std_age3 / NORMAL CFILL = bgr;

INSET N = 'Count of T2 DM patients who are retired and having stress';

title 'Standard Age of patients who are retired and having stress';

RUN;


PROC UNIVARIATE DATA = Diabetes.os4;

HISTOGRAM std_age4 / NORMAL CFILL = bgr;

INSET N = 'Count of T2 DM patients who are housewives and having stress';
```

title 'Standard Age of patients who are housewives and having stress' ;

RUN;

PROC UNIVARIATE DATA = Diabetes.os5;

HISTOGRAM std_age5 / NORMAL CFILL = bgr;

INSET N = 'Count of T2 DM patients who are farmers and having stress';

title 'Standard Age of patients who are farmers and having stress';

RUN;

• **Codes for analysis(Python)**

```
c=confusion_matrix(y_pred, y_act)

print(metrics.classification_report(y_pred, y_act))

ax = sns.heatmap(c, annot=True, cmap='Blues')

ax.set_title('Seaborn Confusion Matrix with labels\n\n');

ax.set_xlabel('\nPredicted Values')

ax.set_ylabel('Actual Values ');


stat, p_value = proportions_ztest(count=sample_success, nobs=sample_size,
value=null_hypothesis, alternative='larger')

print('z_stat: %0.3f, p_value: %0.3f' % (stat, p_value))


test=sc.wilcoxon(med,med1)

test1=sc.wilcoxon(data.current_Hba1c,data.hba1c_1)
```

```
df = apriori(data3, min_support = 0.2, use_colnames = True, verbose = 1)

df_ar = association_rules(df, metric = "confidence", min_threshold = 0.4)


fig = plt.figure(figsize =(10, 7))

sns.boxplot(x='Gender',y='current_Hba1c',hue='Gender',data=data)
```

Appendix

To study the effect on health after Diabetes

1) रुग्ण क्रमांक
2) लिंग
     Male   Female   इतर
3) वय
4) वजन
5) उत्पनाचे साधन
     नोकरी व्यवसाय   विद्यार्थी निवृत्त गृहिणी शेती इतर
6) तुम्ही किती वर्षा पासून मधुमेहग्रस्त आहात ?
7) मधुमेहाचा प्रकार -
     Prediabetes Type-1 Type-2 Gestational
8) Pregnancy वेळी तुम्हाला मधुमेह झालेला का?
     हो   नाही
9) तुम्हाला मधुमेहावेळी / मधुमेहाआधी कोणत्या प्रकारची लक्षणे आढळली ?
     i) अचानक वजनात घट :   हो   नाही
     ii) मानसिक तणाव: हो   नाही
     iii) जास्त भूक: हो   नाही
     iv) लघवी सारखी येणे:   हो   नाही
     v) थकवा जाणवला का:   हो   नाही
     vi) तहान जास्त लागणे :   हो   नाही
     vii) पायाला इन्फेकशन :   हो   नाही
     viii) पायाला आग होणे:   हो   नाही
     ix) जखम हळू बरी होणे:   हो   नाही
     x) मळमळ किंवा उल्टी :   हो   नाही
     xi) चक्कर येणे:   हो   नाही
     xii) इतर

10) तुमचा घरामध्ये मधुमेह अजून कुणाला आहे /झाला होता का ?   हो   नाही
     i) आई   हो   नाही
     ii) वडील   हो   नाही
     iii) भाऊ   हो   नाही
     iv) बहीण   हो   नाही
     v) मुलगा   हो   नाही
     vi) मुलगी   हो   नाही
     vii) आज्जी (आई ची आई)   हो   नाही
     viii) आजोबा (आई चे वडील)   हो   नाही
     ix) आज्जी (वडिलांची आई)   हो   नाही
     x) आजोबा (वडिलांचे वडील)   हो   नाही

11) तुम्ही डॉक्टरांच्या च्या सल्ल्यानुसार आहार घेता का?   हो   नाही

12) तुमचा आहाराचा आराखडा काय?   नाष्टा   दुपारी जेवण   संध्याकाळी नाष्टा   रात्री जेवण

13) जर तुम्हाला गोड खायची इच्छा झाली तर तुम्ही साखर / गुळापासून बनवलेले पदार्थ खाता का?   हो
नाही

14) तुम्ही Sugar-free पदार्थ खाता का ?   हो   नाही

15) तुम्ही डॉक्टरच्या सल्ल्यानुसार नियमित व्यायाम करता का ?   हो   नाही

16) तुम्ही कोणत्या प्रकार चा व्यायाम करता -
    i) चालणे   हो   नाही
    ii) पळणे   हो   नाही
    iii) पोहणे   हो   नाही
    iv) Yoga   हो   नाही
    v) Mediation   हो   नाही
    vi) इतर

17) तुम्ही सरासरी किती वेळ व्यायाम करता? (minutes)
    i)10-20   ii)20-30   iii)30-45   iv)60+

18) तुम्ही मधुमेह होण्या आधी व्यायाम करायचा ?   हो   नाही

19) तुम्हाला मधुमेहानंतर इतर कोणत्या समस्या जाणवल्या का?   हो   नाही
    i)हृदयरोग   हो   नाही
    ii)रक्तदाब   हो   नाही
    iii)Kidney   हो   नाही
    iv)पाय दुखणे / मुंग्या किंवा गोळे येणे / इतर अवयव दुखणे   हो   नाही
    v)Eyesight   हो   नाही
    vi)Cholesterol   हो   नाही
    vii)पायाची जखम   हो   नाही
    viii)इतर

20)तुम्ही डॉक्टरांनी सांगितलेल्या वेळे नुसार त्यांची भेट घेता का?   हो   नाही

21) तुम्ही डॉक्टरांच्या सल्ल्यानुसूर नियमित Sugar / Eye / इतर तपासणी करता का ?   हो
नाही

22) तुम्ही कोणत्या प्रकारची औषधे घेता ?
    i)Medicine   ii)Insuline

23) Insulin किती वर्ष पासून घेता ?

24) Insulin घेण्याचे प्रमाण काय?(ml)

25) डॉक्टरांच्या सल्ल्यानुसार औषधे घेतल्यावर तुम्हाला साखरेच्या पातळी मध्ये फरक जाणवला का?   हो
नाही

A)आधीपेक्षा कमी झाली ?   हो   नाही
    i)डॉक्टरांच्या सल्ल्यानुसार नियमित आहार घेतला ?   हो   नाही
    ii)नियमित व्यायाम केला ?   हो   नाही
    iii)नियमित औषधे घेतली ?   हो   नाही

B) आधीपेक्षा वाढली ?   हो   नाही
    i)डॉक्टरांच्या सल्ल्यानुसार नियमित आहार घेतला नाही ?   हो   नाही
    ii)नियमित व्यायाम केला नाही ?   हो   नाही
    iii)नियमित औषधे घेतली नाही ?   हो   नाही
    iv)इतर शारीरिक समस्या   हो   नाही

26) तुमची सध्याची HbA1c काय आहे ?
27) तुम्हाला CGMS मशीन लावले आहे का?होनाही
28) तुम्हाला अता कोणत्या प्रकारचा मानसिक तणाव आहे?
i)घर   ii)काम   iii)इतर
मानसिक तणावाचा तुमचा sugar level वर परिणाम होतो का?   हो   नाही

रुग्णाची पार्श्वभूमी

घटक	सध्या	पूर्वीची परिस्थिती				
		1 वर्ष	2 वर्ष	3 वर्ष	4 वर्ष	5 वर्ष
वजन						
HbA1c						
Cholesterol						
Triglyceride						
Creatinine						

व्यसन करता का?

कोणतेव्यसन करता?

पूर्वीची परिस्थिती

	घटक	
	औषधे (गोळ्या)	औषधे (इन्सुलिन)
सध्या		
1 वर्ष		
2 वर्ष		
3 वर्ष		
4 वर्ष		
5 वर्ष		