



ANEKANT EDUCATION SOCIETY'S
Tuljaram chaturchand college Of Arts, Science and Commerce
(Autonomous), Baramati.

A PROJECT REPORT ON
“STUDY OF HEALTH & wellness OF IT PROFESSIONAL”
UNDER THE GUIDENCE OF
MISS. NILAMBARI JAGTAP

T.Y.B.Sc (Statistics)

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(Autonomous), Baramati.

C E R T I F I C A T E

This to certify that **Dixit Rohit Mahendra**, student Of T.Y.BSc Statistics have successfully completed their project on “**STUDY OF HEALTH & WELLNESS OF IT PROFESSIONAL**” Under the guidance of **Miss. Nilambari Jagtap** and have submitted this project report, for the degree of “Third Year of Bachelor Science (**Statistics**)” from Tujaram Chaturchand College, Baramati in the academic year 2021-2022.

This project has been conducted under my supervision & guidance.

DATE : 19 April 2022

PLACE : Baramati.

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Project Guide,
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We take this opportunity to express our sense of gratitude to **Miss. Nilambari Jagtap** for her valuable guidance and help provided us during the completion of project.

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ABSTRACT

The aim of this project is to find out health problems of IT employees. Now a days work load in IT sector is much more. Which has adverse effect on employee's body. we had collected IT employee's health problem questionnaire and health report.

There are many factors affecting on health of employees, such as working hours, lack of exercise, sleeping hours, acidity problem, travelling time, working type etc.

So, we decide to study on which factor affecting on health of an IT employees. We fit logistic regression model to predict acidity problem.

Keywords :

Two sample t-test, Chi square test, Proportion Test, Multiple logistic regression, Multiple linear regression.

INTRODUCTION

India's IT services industry was born in Mumbai in 1967 with the establishment of Tata Consultancy Services. India is the world's largest qualified technical graduate in the world. Two main components of Information Technology (IT) are software and hardware. The software has emerged as the major industry in the field of electronics.

As we can see, the IT sector is growing at a rapid pace these days. It grows to be one of the most important fields of work. Our younger generation is drawn to the computer and information technology fields. Students are more interested in the IT sector than in any other field. However, working in the IT industry is not for the faint of heart. To maintain this high level of performance in the IT sector, the work load is significantly higher, which has a negative impact on the physical and mental health of IT sector employees. It's possible that doing labour on a regular basis is having an influence on their bodies. They couldn't possibly be aware of those facts. Their way of living may have a variety of effects on their bodies.

These personnel suffer from a variety of health problems at a young age, including eye blindness, backbone discomfort, joint pain, headaches, acidity, and so on. They didn't always get enough sleep, and they didn't always eat their meals properly. What is the source of these issues?

It is important to look the reason of underweight and overweight. In the most cases, the overweight people are able to lose a lot of weight if they eat less, but more healthy food and do more exercise. If employees are in unhealthy health condition, they can also get affected by several health/personal problems.

The aim of this project is to find out health problems of IT employees. So, we decide to study on which factor affecting on health of an IT employees.

OBJECTIVES

- To analyse the comparison between BMI of youngster & older.
- To predict the acidity problem of an employee by logistic regression model.
- To check impact of which factor affect on job satisfaction.
- To predict the multiple linear regression model for the health (BMI)
- Is there association between family satisfaction & salary satisfaction?
- Is there relationship between the body pain due to Age, working hours & travelling time(home-office)?
- Is there correlation between age & BMI?

MOTIVATION

The main purpose of the project is to analyze which factor have an impact on health of IT sector employees.

We would like to focus on this issue in our project. We observe that most of employees face many health problems. Because of covid pandemic suddenly changes in their work(online). We also observe that most of youngster's face so many health problems like acidity problem, body pain, obesity, etc. so we decided to analyze which factor have an impact on health of employees.

IT industry is known as the emerging industry. Now a days, it enhances the growth and development of the country. It has the potential to play an important role in economic growth as well as other dimensions of economic and social development.

METHODOLOGY

This project undergoes with primary data collection. The questionnaire was filled by the IT sector employees from different city of Maharashtra through google form services. We had collected data from 100 participants and analysis was carried out on it.

Data contains variables like age, height, weight, working hours, exercise time, exercise type, working type, travelling time, salary, Boss & family satisfaction score, etc. we sort the data parameter wise. We divided our analysis in health analysis and job satisfaction.

Firstly, we calculate BMI ratio of each employee to get basic idea about their fitness. Body Mass Index (**BMI**) is a person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness. By WHO criteria, BMI between 18.5-24.9 can be considered as healthy/Fit, BMI below 18.5 can be considered as underweight & BMI above 25 can be considered as overweight. BMI can be used to screen for weight categories that may lead to health problems but it is not diagnostic of the body fatness or health of an individual.

In some situation we may come across that outcome or response variable is dichotomous or binary. Dichotomous or binary is the variable that can assume only one of two mutually values. These values are coded as 0 & 1. Where $y=1$ for success & $y=0$ for failure. Since y takes only two values. so that we apply logistic regression analysis regression.

We use association test, proportion test, student t test. For such analysis we use some software like R-software, MS-word, MS excel.

Keywords:

SH : Sleeping hours

TT : Travelling time

E : Exercise

wrkT : Work type

wrhHr : Working hour

l.o.s. : Level of significance

Here we coded likert scale -

Acidity	code
Yes	1
No	0

Exercise	code
Yes	1
No	0

Salary satisfaction	code
Yes	1
No	0

Work Type	code
Offline	1
Online	0

Working time satisfaction	Code
Yes	1
No	0

Job satisfaction	code
Yes	1
No	0

Family satisfaction	code
Never	1
Rarely	2
Sometimes	3
Often	4
Every time	5

Boss Satisfaction	code
Not at all	1
Marginally	2
Moderately	3
Very well	4
Significantly	5

EXPLORATORY DATA ANALYSIS :

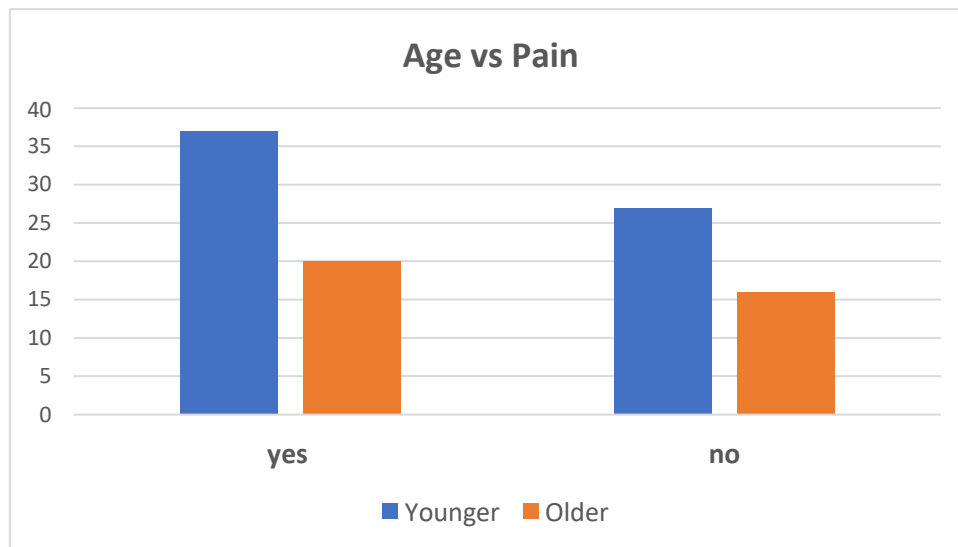
Descriptive Statistics :

	<i>Age</i>	<i>Weight (in kg)</i>	<i>Height (in cm)</i>	<i>BMI</i>
Mean	28.84	66.41	167.72	23.61
Sample Variance	41.87	167.4	102.73	18
Range	26	55	64	25
Minimum	19	40	126	13.3
Maximum	45	95	190	38.95

	<i>Experience</i>	<i>SH</i>	<i>Working Hr</i>
Mean	4.58	7.2	9.82
Sample Variance	21.544	0.5253	1.6238
Range	20	2	4
Minimum	0	6	8
Maximum	20	8	12

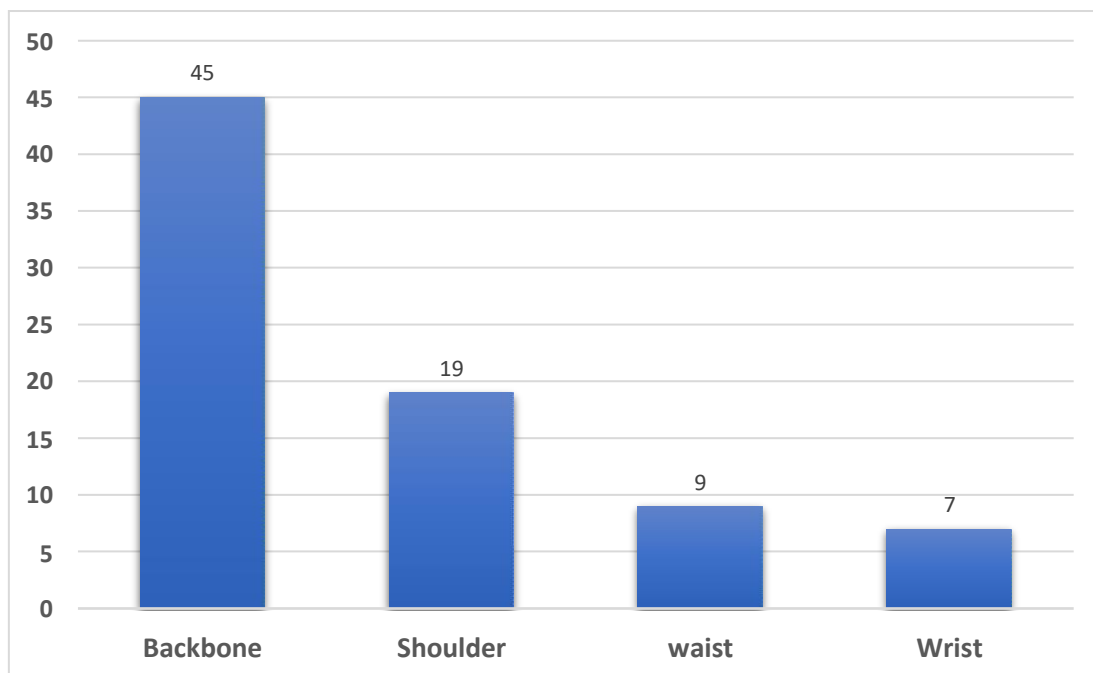
Graphical Representation :

Age vs Pain



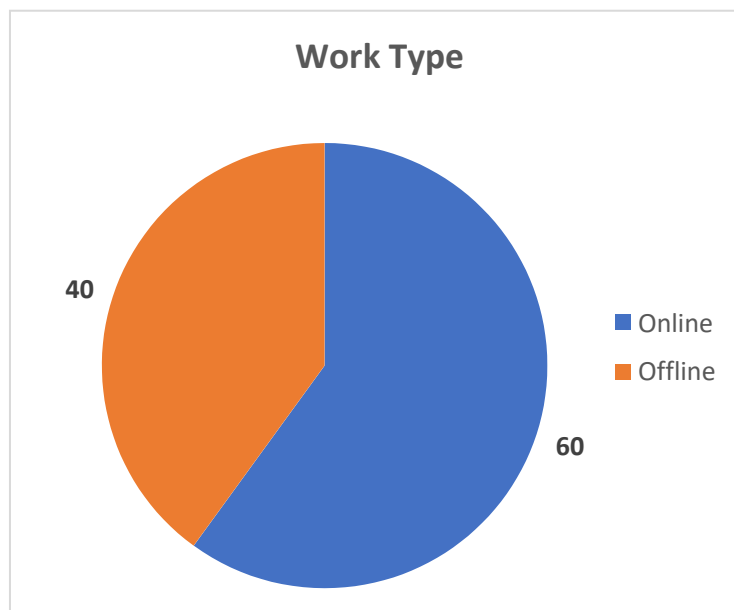
Interpretation: Younger employees have more pain than older employees.

Type of Pain :



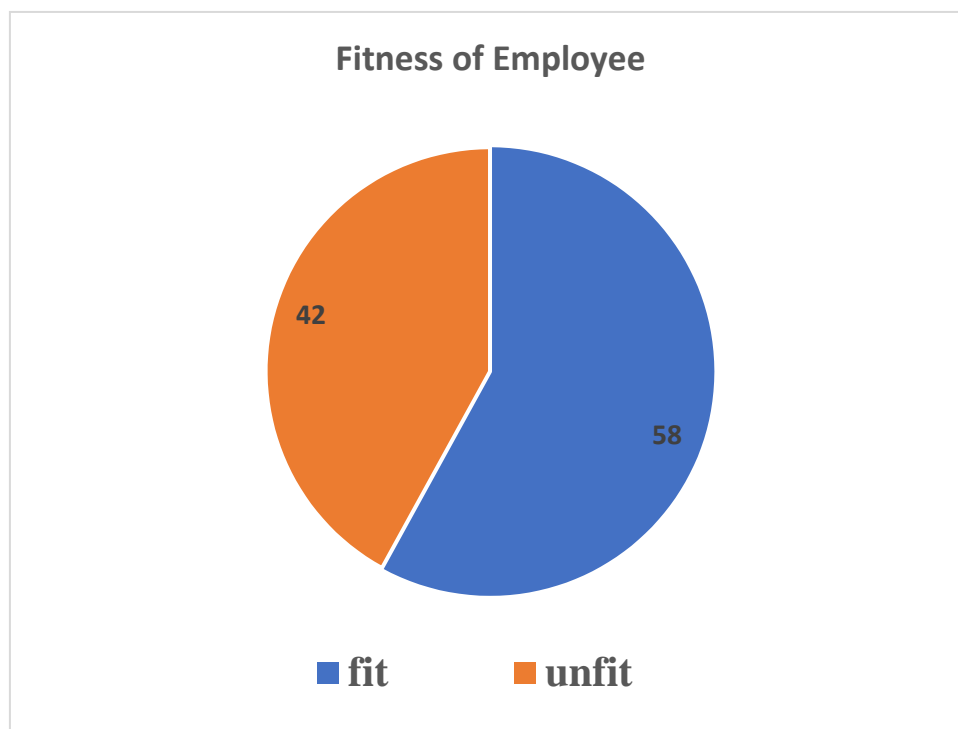
Interpretation: Most of the employees have Backbone issue.

Mode of working Type:



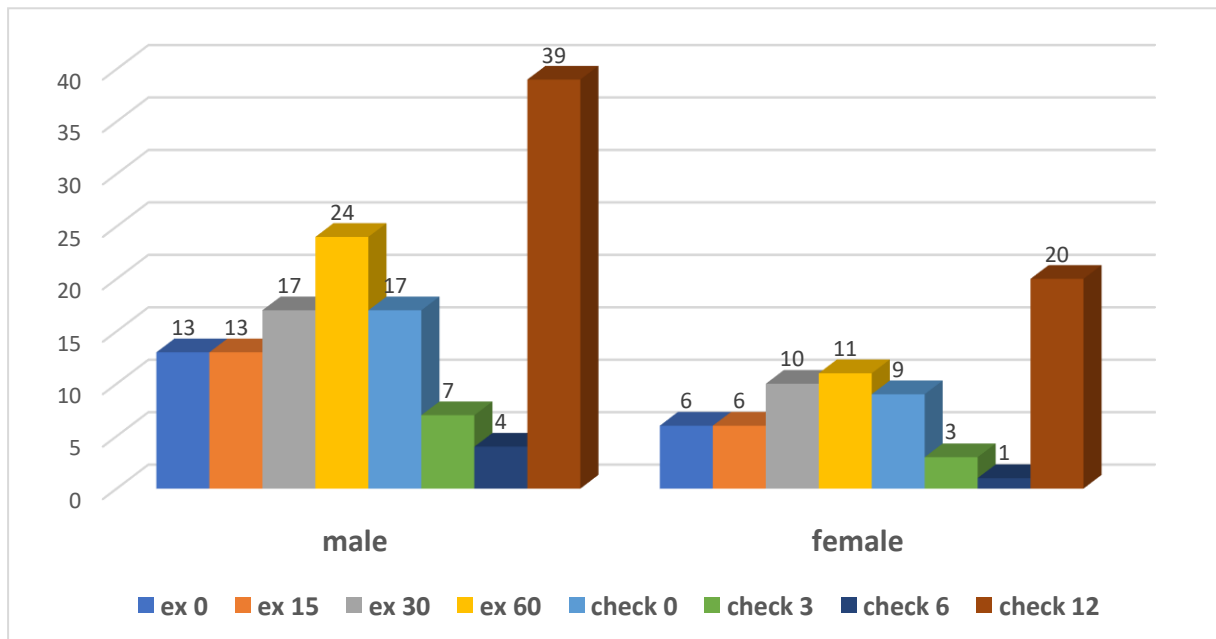
Interpretation: Most of the employees (60%) like to do online work.

Fitness of employees :



Interpretation : Most of the employees (58%) are seems to be fit.

Gender wise Health Consciousness:



Interpretation: From our data, we observe that male employees are more health conscious than female employees.

Statistical Analysis :

Two sample t-test for BMI of Youngster vs BMI of older.

Test Statistic :

m1 = average BMI of youngster. **against**

m2= average BMI of older.

To Test :

H0 : average BMI of youngster = average BMI of older **against**

H1 : average BMI of youngster > average BMI of older

Given Output :

Shapiro-Wilk normality test

p-value = 0.9026

Two Sample t-test

data: x and y

t = 146.99, df = 88, **p-value < 2.2e-16**

>The given data is from normal distribution

>Reject Ho at 5% l.o.s.

Interpretation :

Here we observed that level of significance 5% i.e. 0.05 Is greater than p-value(2.2e-16), so we reject H0, therefore we accept H1.

Conclusion :

Average BMI of Youngster is greater than Average BMI of Older.

Testing of hypothesis

Chi square test

1] Aim: to check whether there is association between family satisfaction & salary satisfaction.

To test :

H₀: There is no association between family satisfaction & salary satisfaction.

H₁: There is association between family satisfaction & salary satisfaction.

		Family satisfaction				
		1	2	3	4	5
salary satisfaction	1(Yes)	0	2	6	9	40
	0 (No)	3	3	13	13	11

R- software

Pearson's Chi-squared test

data: mx

X-squared = 21.457, df = 4, p-value = 0.000257

Here p-value < alpha(0.05)

Here we Reject H₀ at 5% l.o.s.

Conclusion: There is association between family satisfaction & salary satisfaction .

2] Aim: to check whether there is association between pain and age.

H0: There is no association between pain and age. **against**

H1: There is association between pain and age.

		Age	
		younger(<30)	Older (>30)
pain	YES	37	20
	NO	27	16

R- software

Pearson's Chi-squared test

data: mx

X-squared = 0.047883, df = 1, p-value = 0.8268

Here pvalue>alpha(0.05)

Here we Accept H0 at 5% l.o.s.

Conclusion : There is no association between pain and age.

3] Aim :to check whether there is association between pain and working hours.

H0: There is no association between pain and working hours.

H1: There is association between pain and working hours.

		Working Hours		
		8	10	12
pain	Yes	12	32	13
	No	13	27	3

R-software

Pearson's Chi-squared test

data: mx

X-squared = 4.8488, df = 2, p-value = 0.08853

Here pvalue > alpha(0.05)

Here we Accept H0 at 5% l.o.s.

Concluion: There is no association between pain and working hours.

4] Aim: To check whether association between pain and travelling time.

H₀: there is no association between pain and travelling time.

H₁: there is association between pain and travelling time.

		Time in minutes		
Pain		0-19	20-39	40 & ABOVE
	YES	16	20	21
	NO	14	16	13

R software

Pearson's Chi-squared test

data: mx

X-squared = 0.51013, df = 2, p-value = 0.7749

Here p value > alpha(0.05)

Here we Accept H₀ at 5% l.o.s.

Conculsion: There is no association between pain and travelling time.

Proportion Test:

Single population proportion Test-

1] Aim : To check population proportion of employees who prefer online work.

Let “P” be the Population proportion of employees who prefer online work

X : Number of employees who prefer online work

Alpha=0.05

H0: $P_e = P_0(0.50)$ against

H1: $P_e > 0.50$

i.e.

H0 : Proportion of employees of online preference = 50% against

H1 : Proportion of employees of online preference > 50%

R-software code:

```
> n=100
```

```
> x=60
```

```
> p=0.5
```

```
> pe=x/n
```

```
> z=(pe-p)/sqrt(p*(1-p)/n)
```

```
> z1=pnorm(z,0,1,lower.tail=F)
```

```
> z1
```

```
0.02275013
```

Here P value < alpha

so we reject H0 at 5% l.o.s.

Conclusion: Majority that is more than 50% employees prefer online work.

Multiple logistic regression model of Acidity on sleeping hour, exercise, tea.

R-software code :

```
data=read.csv("C:/Users/arsha/OneDrive/Desktop/Acidity.csv",header=T)
> a=glm(formula=Acidity~SH+E+tea, family="binomial", data=data)
> summary(a)
```

Call:

```
glm(formula = Acidity ~ SH + E + tea, family = "binomial", data = data)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.3377	-0.9804	-0.8856	1.3216	1.6153

Coefficients:

	Estimate	Std.Error	z value	Pr(> z)
(Intercept)	1.5133	2.218	0.682	0.495
SH	-0.2544	0.2916	-0.872	0.383
E	-0.4666	0.43	-1.085	0.278
tea	0.0764	0.1639	0.466	0.641

(Dispersion parameter for binomial family taken to be 1)

Null deviance: **133.75** on 99 degrees of freedom

Residual deviance: **131.45** on 96 degrees of freedom

AIC: 139.45

Number of Fisher Scoring iterations: 4

Logistic regression model is given by,

$$h(x) = 1.5133 - 0.2544 * \text{Sleeping Hours} - 0.4666 * \text{Exercise} + 0.0764 * \text{Tea}$$

β_1 can be interpreted as follows.

For increase in the value of Sleeping hour , there is decrease of -0.2544 in log odds of response variable Acidity.

$$\psi = e^{\beta_1}$$

$$\psi = 0.7753$$

i.e. for increasing in Sleeping hour, Acidity decreases by 22.47%.

Similarly,

β_2 can be interpreted as follows.

For increase in the value of Exercise hours , there is decrease of -0.4666 in log odds of response variable Acidity.

$$\psi = e^{\beta_2}$$

$$\psi = 0.6271$$

i.e. for increasing in exercise hour, Acidity decreases by 37.29%.

Similarly,

β_3 can be interpreted as follows.

For increase in the cup of tea, there is decrease of 0.0764 in log odds of response variable Acidity.

$$\psi = e^{\beta_3}$$

$$\psi = 1.0793$$

i.e. for increasing in cup of tea, Acidity increases by 7.9%.

Multiple logistic regression model of Job satisfaction on salary, family, Boss, working type & working hours.

R-software code :

```
data=read.csv("C:/Users/arsha/OneDrive/Desktop/JobS.csv",header=T)
a=glm(formula=Job~salary+fam+Boss+wrkT+WorkHr,family="binomial",data
=data)
summary(a)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.4833	0.3016	0.4276	0.593	2.0826

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-3.59137	2.86148	-1.255	0.20945
salary	0.64789	0.61053	1.061	0.28861
fam	0.04795	0.29894	0.16	0.87256
Boss	0.69026	0.32162	2.146	0.03186 *
wrkT	1.9065727	0.6327	2.619	0.00881**
workHr	0.06317	0.25114	0.252	0.80142

Signif. codes: 0.001 ‘***’ 0.01 ‘*’

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 107.855 on 99 degrees of freedom

Residual deviance: 82.426 on 94 degrees of freedom

AIC: 94.426

Number of Fisher Scoring iterations: 5

Logistic regression model is given by,

$$h(x) = -3.59137 + 0.64789*salary + 0.04795*fam + 0.69026*Boss + 1.65727*wrkT + 0.06317*workHr$$

β_1 can be interpreted as follows.

For increase in the value of salary satisfaction, there is increase of 0.64789 in log odds of response variable job satisfaction.

$$\psi = e^{\beta_1}$$

$$\psi = 1.9080$$

i.e. for increasing in salary satisfaction, job satisfaction increases by 90%.

Similarly,

β_2 can be interpreted as follows.

For increase in the value of family satisfaction, there is increase of 0.04795 in log odds of response variable job satisfaction.

$$\psi = e^{\beta_2}$$

$$\psi = 1.04911$$

i.e. for increasing in family satisfaction, job satisfaction increases by 4.9%.

Similarly,

β_3 can be interpreted as follows.

For increase in the value of boss satisfaction, there is increase of 0.69026 in log odds of response variable job satisfaction.

$$\psi = e^{\beta_3}$$

$$\psi = 1.9941$$

i.e. for increasing in boss satisfaction, job satisfaction increases by 99.4%.

Similarly,

β_4 can be interpreted as follows.

For increase in the preference of work type, there is increase of 1.9065727 in log odds of response variable job satisfaction.

$$\psi = e^{\beta_4}$$

$$\psi = 6.7294$$

i.e. for increasing in preference of work type, job satisfaction increases by 572%.

Similarly,

β_5 can be interpreted as follows.

For increase in the value of working hour, there is increase of 0.06317 in log odds of response variable job satisfaction.

$$\psi = e^{\beta_4}$$

$$\psi = 1.0618$$

i.e. for every unit increasing in working hours, job satisfaction may be increases by 6.1%.

To test the significance of regression : we wish to test the hypothesis

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 \quad \text{Vs}$$

$$H_1 : \text{At least one } \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 \neq 0 ;$$

Null deviance: 107.855 on 99 degrees of freedom

Residual deviance: 82.426 on 94 degrees of freedom

G = Null deviance - Residual deviance

$$G = 25.429$$

$$\chi^2_{2,0.05} = 11.0705$$

$$G > \chi^2_{1,0.05}$$

We reject H_0 at 5% l.o.s.

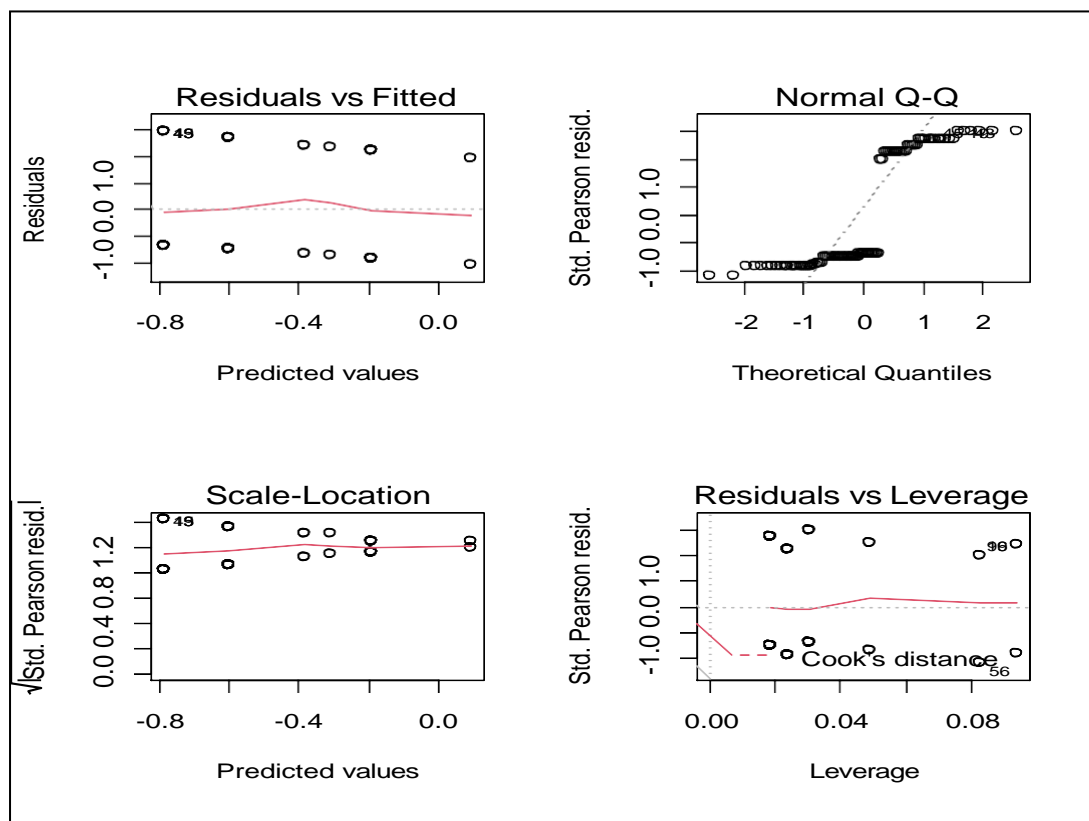
Conclusion :

From given model we conclude that contribution of salary satisfaction, Boss satisfaction & Working type are highly contributed to job satisfaction.

Normality Assumptions for fitted model :

R-Software :

```
data=read.csv("C:/Users/arsha/OneDrive/Desktop/JobS.csv",header=T)
a=glm(formula=Job~salary+fam+Boss+wrkT+WorkHr,family="binomial",data
=data)
summary(a)
par(mfrow=c(2,2))
plot(a)
```



Interpretation :

Here residual against fitted values graph indicates that all points in horizontal band, hence our model is adequate.

Multiple linear regression model of health on sleeping hours, travelling time & exercise

<i>Regression Statistics</i>	
Multiple R	0.288632
R Square	0.083309
Adjusted R Square	0.054662
Standard Error	4.125037
Observations	100

ANOVA					
	<i>d.f.</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	148.45	49.485	2.9081	0.0385
Residual	96	1633.5	17.016		
Total	99	1782			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	16.318	4.2973	3.7971	0.0003	7.7874	24.848
SH	1.1757	0.5769	2.0381	0.0443	0.0306	2.3208
TT	-0.008	0.0147	-0.564	0.574	-0.037	0.0208
Ex	-1.524	0.8438	-1.806	0.074	-3.199	0.1508

Multiple linear regression model is given by :

$$\text{Health} = 16.318 + 1.1757 \cdot \text{SH} - 0.008 \cdot \text{TT} - 1.524 \cdot \text{Ex}$$

On the basis of p-value

$$P\text{-value} < \alpha (0.05)$$

Reject H_0 at 5% l.o.s.

Hence our regression model is adequate.

For $\alpha = 0.1$, all regressor are significant.

From R-square we can interpret it as 8% variation in response variable (health) is explained by the model.

β_1 can be interpreted as follows.

For increasing in sleeping hours, there is mean change of 1.1757 in health.

Similarly,

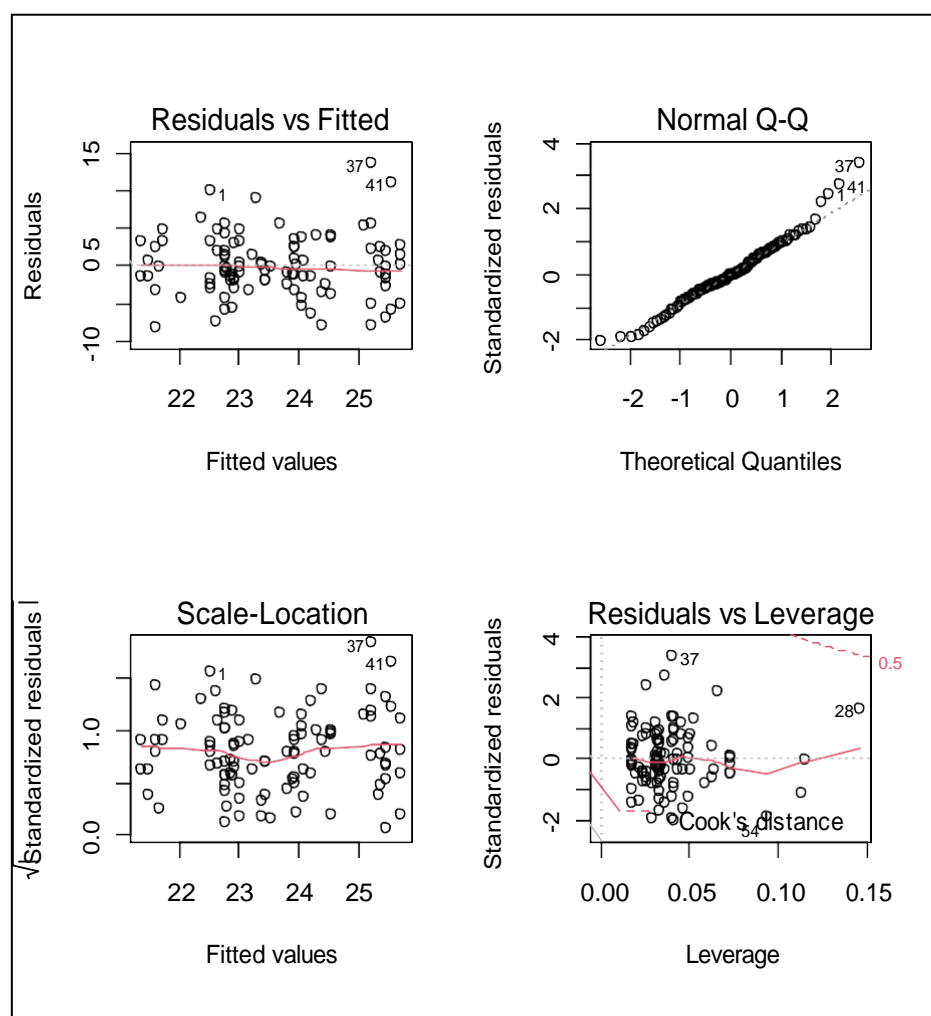
β_2 can be interpreted as follows.

For increasing in travelling time, there is mean change of -0.008 in health.

Similarly,

β_3 can be interpreted as follows.

For increasing in Exercise, there is mean change of -1.524 in health.



CONCLUSION

- Average BMI of youngster is greater than average BMI of older.
- Acidity –
 - a. For increasing in Sleeping hour, acidity decreases by 77%.
 - b. For increasing in exercise hour, acidity decreases by 62%.
 - c. For increasing in cup of tea, acidity increases by 7.9%.
- Contribution of salary satisfaction, boss satisfaction & working type are highly contributed to job satisfaction.
 - a. For increasing in salary satisfaction, job satisfaction increases by 90%.
 - b. For increasing in family satisfaction, job satisfaction increases by 4.9%.
 - c. For increasing in boss satisfaction, job satisfaction increases by 99.4%.
 - d. For increasing in working hours, job satisfaction increases by 6.1%.
- Health –
 - a. For increasing in sleeping hours, there is mean change of 1.1757 in health.
 - b. For increasing in travelling time, there is mean change of -0.008 in health.
 - c. For increasing in exercise, there is mean change of -1.524 in health.
- There is association between family satisfaction & salary satisfaction .
- There is no association between pain and age.
- There is no association between pain and working hours.
- There is no association between pain and travelling time.
- Majority that is more than 50% employees prefer Online work.

DISCUSSION

The main purpose of this analysis was to find out which factor have an impact on health of employees. In earlier 3-4 years we observe that many people face health problems because of suddenly changes in their working scheduled (Sometime Online/Sometimes Offline).

Our analysis indicates that their sleeping hr., exercise, daily taking cup of tea etc. have an impact of their acidity problems. Also, the analysis indicates that the working hr., travelling time, etc. have an impact on their health like body pain, obesity and so on. That's why we conclude that in a company most of people have a health problem.

SCOPE

After the completion of this project work we will be able to handle the different type of data sets to determine the future event. In this project we find which factors are strongly affecting on the job satisfaction and we can improve that factors and ultimately we improve level of job satisfaction.

LIMITATIONS

Due to lack of time availability, we collect only 100 sample. All analysis is done on the basis of 100 sample observation.

APPENDIX

R-Software code :

Two sample t-test for BMI of Youngster vs BMI of older.

```
y=scan("clipboard") # set of youngster BMI.
o=scan("clipboard") # set of older BMI.
alpha=0.05
z=c(y,o)
s1=shapiro.test(z) # to check normality.
pv=s1$p.value #to extract p value.
if(pv > alpha){cat("The given data is from normal distribution","\n")}
t1=t.test(x,y,var.equal =T , alternative ="greater")
pv1=t1$p.value
if(pv1>alpha){cat("Accept Ho","\n");}else{cat("Reject Ho","\n")}}else
{cat("The given data is not from normal distribution ", "\n")}
```

Assosication test for family satisfaction & salary satisfaction.

```
> x=c(0,3,2,3,6,13,9,13,40,11)
> mx=matrix(x,nrow=2)
> test=chisq.test(mx,correct=T)
Warning message:
In chisq.test(mx, correct = T) :
> test
```


Assosication test for pain and age.

```
> m=c(37,27,20,16)
> mx=matrix(m,nrow=2)
> mx
      [,1] [,2]
[1,]  37  20
[2,]  27  16
> test=chisq.test(mx,correct=F)
> test
```

Association test pain and working hours.

```
> m=c(12,13,32,27,13,3)
> mx=matrix(m,nrow=2)
> test=chisq.test(mx,correct=T)
> test
```

Association test for pain and travlling time.

```
x=c(16,14,20,16,21,13)
> mx=matrix(x,nrow=2)
> mx
      [,1] [,2] [,3]
[1,]  16  20  21
[2,]  14  16  13
> test=chisq.test(mx,correct=F)
> test
```

SUGGESTION

From our report we could suggest that, employees should have do more exercise on daily bases. They have to took proper sleep for relaxing there body, due to this they would have less pain issue's about neck pain, shoulder pain, headache etc. They should have to give there time to their family as possible as they can. They should have to take less tea to reduce acidity problem. From this analysis we suggested that company should arrange a medical checkup for their employees, they should give their any medical policies, counselling to their employees.

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