SURVEY ON FAST FOOD CONSUMPTION AND ITS EFFECT ON HEALTH AMONG COLLEGE STUDENTS

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SURVEY ON FAST FOOD CONSUMPTION AND ITS EFFECT ON HEALTH AMONG COLLEGE STUDENTS

A PROJECT REPORT SUBMITTED FOR THE PARTIAL FULFILLMENT OF B.Sc. IN STATISTICS

SESSION:- 2021-2024

UNDER THE SUPERVISION OF:

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CERTIFICATE

THE PROJECT REPORT TITLED

SURVEY ON FAST FOOD CONSUMPTION AND ITS EFFECT ON HEALTH AMONG COLLEGE STUDENTS

*This is to certify that the data given in this report entitled as- "**SURVEY ON FAST FOOD CONSUMPTION AND ITS EFFECT ON HEALTH AMONG COLLEGE STUDENTS**" has been collected, tabulated, analyzed and presented by "**RAJ CHANDRAVANSHI**" student of B.Sc.(6th semester) B.H.U. STATISTICS 2021- 2024 under thesupervision of*
Dr. ABHAY KUMAR TIWARI.

DATE :-_____

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At last but not the least I thank the Department of Statistics, B.H.U. whichgave me the opportunity for this project work and for which I shall ever remaingrateful.

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CONTENTS

INTRODUCTION

➢ *Energy Balance*

The inter-relationship between physical activity and food intake is important since both are major behavioral contributors to energy balance In addition to exercise being associated with health benefits such as feelingof well-being, reduced risk of coronary disease and reduction of hypertension it has an important role to play in energy balance. Although energy expenditure and energy intake are two independent measures which separately contribute to energy balance, it has been frequently proposed that exercise can influence energy balance indirectly by modulating energy intake.

➢ *Body Weight*

Body weight is an important measurement parameter towards management of overall health. Activities of daily living including food intakeand physical activities have a direct and measurable impact on body weight. Therefore, understanding the effect of these activities can provide insight towards development of a wearable system capable of detectingand quantifying daily intake and physical activities.

➢ *Fast Food*

Fast food refers to food that can be prepared and served quickly. It can come from many places: sit-down restaurants, counter service, take-out, drive-thru, and delivery. Fast food is popular because the food is inexpensive, convenient, and tastes good. Fast food may include refined grains instead of whole grains, contain saturated fat, cholesterol, and added sugar, and it can be high in sodium (aka salt) which is used as a preservative and makes food more flavorful and satisfying.

➢ *Skipping Meals*

Skipping meals causes the body to lower its metabolism which causesus to burn less energy (fewer calories) that can lead us to gain weight whenwe eat our usual amount of food. Skipping meals leaves us with little energy

because the body has run out of the fuel we get from food Leaves us sluggish and tired which causes headaches or makes us feel weak and shaky.

When we don't eat we and after some time when we get over-hungry we make unhealthy choices because we become so hungry that we can onlythink about getting food. The food we crave is usually quick and easy likesoft drinks, fast food, and chips.

- ***BMI (Body Mass Index)***

Body mass index (BMI) is a value derived from the mass (weight) and height of a person. The BMI is defined as the body mass divided by thesquare of the body height, and is expressed in units of kg/m2, resulting from mass in kilograms and height in metres.

The BMI is a convenient rule of thumb used to broadly categorize a person as underweight, normal weight, overweight, or obese based on tissue mass (muscle, fat, and bone) and height. Major adult BMI classifications are underweight (under 18.5 kg/m2), normal weight (18.5 to 24.9), overweight (25 to 29.9), and obese (30 or more).[1] When used to predict an individual's health, rather than as a statistical measurement for groups, the BMI has limitations that can make it less useful than some of the alternatives, especially when applied to individuals with abdominal obesity, short stature, or unusually high muscle mass.

- ***Calories Count***

The amount of energy in an item of food or drink is measured incalories When we eat and drink more calories than we use up, our bodiesstore the excess as body fat. If this continues, over time we may put on weigh .

When we eat and drink, we put energy into our bodies. Our bodies use up that energy through everyday movement, which includes everything from breathing to running.

To maintain a stable weight, the energy we put into our bodies must be the same as the energy we use through normal bodily functions and physical activity.

Some Example of fast food

Figure 1 fast food

- *Pizza*
- *Pasta*
- *Sandwich*
- *Hot dog*
- *Burger*
- *Noodles*
- *Momos …. So on*

Health problems caused by fast food

Fast food is often nutritionally poor and high in calories. Evidence demonstrates that overeating commercial fast food products can negatively impact health in both the short- and long-term.

Short-term effects of fast foods

As well as causing you to gain weight, the other short-term effects of eating fast food include:

- *increased stress levels*
- *fatigue and decreased energy levels*
- *difficulty sleeping*
- *concentration difficulties*
- *feeling down*
- *tooth decay*

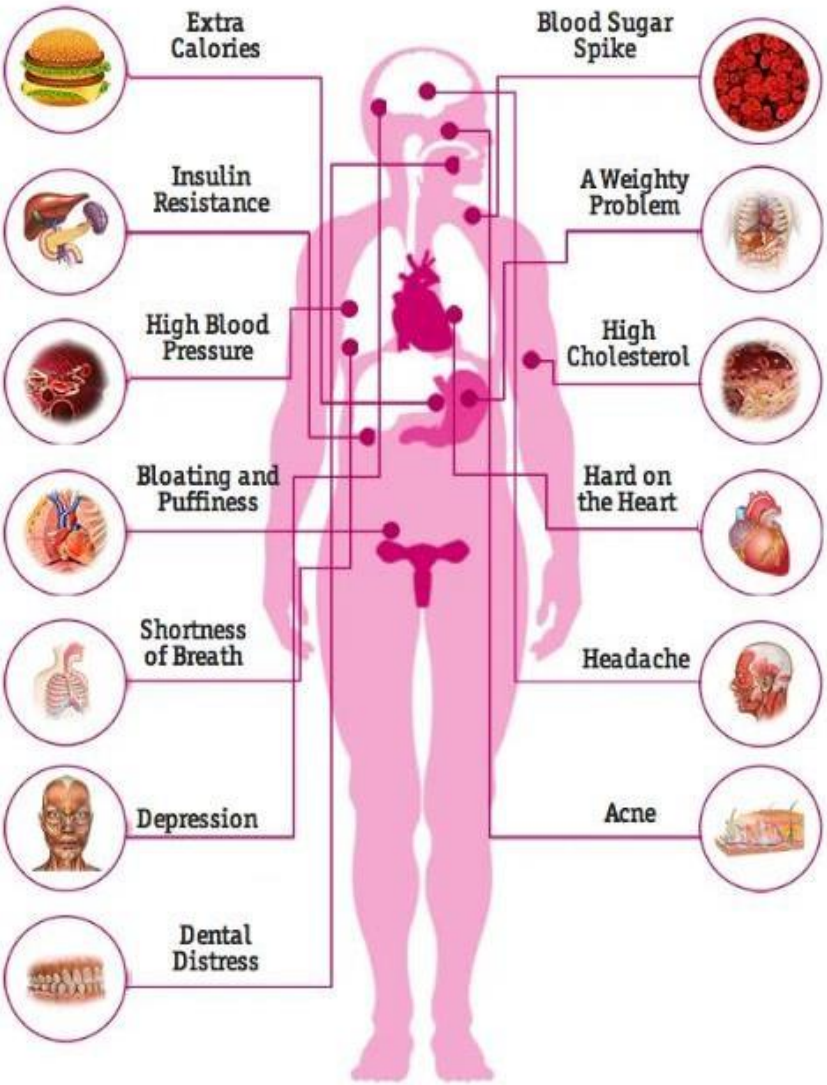
Long-term effects of fast foods

In the long-term, eating fast food can lead to:

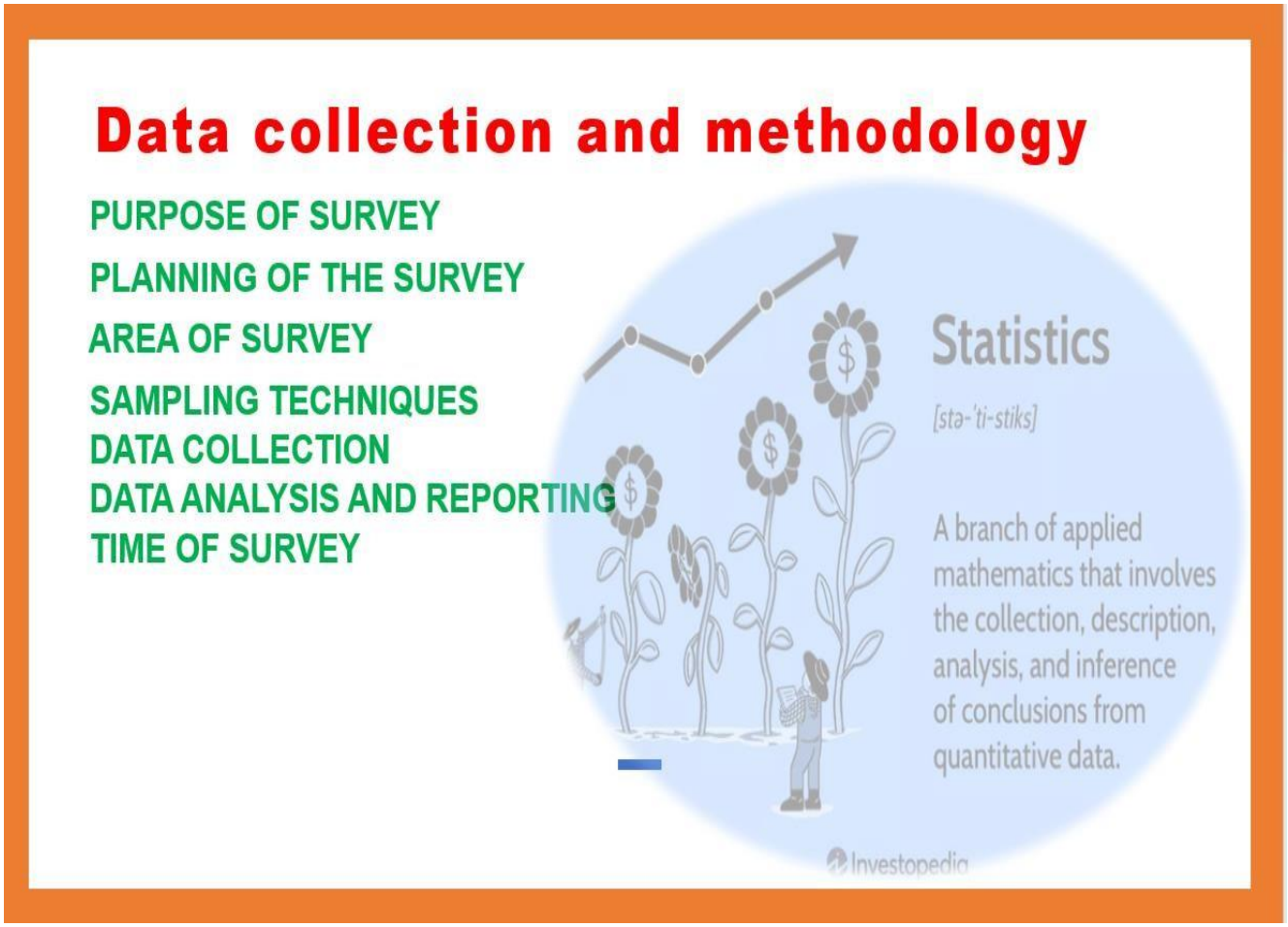
- *type 2 diabetes*
- *heart-related problems (such as cardiovascular disease, high blood pressure and cholesterol)*
- *overweight and obesity*
- *osteoporosis*
- *certain cancers*
- *depression*
- *eating disorder*

THE EFFECTS OF FAST FOOD ON THE BODY

Fast foods often contain too many calories and too little nutrition. If fast food is a regular component of your diet, you might find yourself struggling with weight problems and ill health.



DATA COLLECTION AND METHODOLOGY



- ***Purpose of Survey:*** *This study aims to find fast food consumption habits, body mass index, and check to fast food affect the health of students or not and to spread awareness among the students the potential health problems caused by fast food.*

- ***Planning of the Survey:*** *A full proof planning is an essential part of any statistical survey to complete it in a successful manner at minimum cost and time. Planning of survey includes selection of topic and preparation of a short questionnaire covering almost all the area. From this questionnaire, I select those questions which seem to be relevant in context of the mentioned topic.*

- ***Area of Survey:*** *According to aim of survey I had to take sample from students of Banaras Hindu University. Since B.H.U is very large so I had to fix my area of survey to under graduate (UG) 1^{st} ,2^{nd} and 3^{rd} year Science students.*

- ***Sampling Techniques:*** *A group of units or elements which have well defined characteristics under study, called Population. The population may be finite orinfinite a finite population is one in which unit of population is finite and an infinite population is one in which member of population is infinite. A sample is a finite subset of statistical individuals in a population and a number of individuals/units in a sample are called a sample size. On the basis of sample, we can estimate about the population parameter in which we are interested. The sample was selected by using random sampling as sampling technique & Sample size collected for survey is 139.*

- ***Data Collection:*** *Data for this project was collected through Online Questionnaire Method (Google form is Used). I have collected the data mainly through mailed questionnaire or by social media by providing a link ofthis questionnaire from Google. The size of the samples drawn from BHU was "139".*

- ***Data Analysis and Reporting:*** *Data analysis involves summarizing the raw data and interpreting their meaning which provides clear answer to questions in which we are interested. For this purpose, I have used software named as MS- EXCEL. Then I analysis and interpret the data using statistical tools (bar chart and pie chart) available in MS EXCEL.*

- ***Time Of Survey:*** *The questionnaire has been prepared by me and distributed to students through WhatsApp & E-mail to get response in lastweek of March and first week of April and finished it on last week of April 2024*

Objective of survey

- *To determine the consumption habit of fast food in a week by the undergraduate science students at BHU.*
- *To find out the amount of money spend by the students on fast food in a week.*
- *To determine the BMI (Body mass index) of the students and find out whether consumption of fast food affects the BMI or not.*
- *To identify that consumption of fast food affects the health of students..*

STATISTICAL TOOLS

- ✓ *Project contains both Tabular Representation of Statistical Data and Graphical Representation of Statistical Data. But latter is better way because: Graphical Representation give the first hand comparisons from the data whereas the tabular representation based comparison isquite numeric and needs time. Graphical Representation can be understood by layman also. The types of diagrams used for the statistical representation are:*

- ✓ ***COLUMN**: Most of the tabular representations are diagrammatically represented by column diagram. These are used for marking clear data which has discrete values in the diagram. Here equi-sized and equi- spaced columns are used to represents variables under comparison and the heights of the columns represent the values of the variable.*

- ✓ ***PIE CHART**: A pie chart (or a circle graph) is a circular chart divided into sectors, illustration proportion. In a pie chart, the arc length of each sector is proportional to the quantity it represents or the quantities are distributed so that the sect oral angles are proportional to the quantity they represent, summing up in total to 360°. Together the sectors createa full disk.*

- ✓ ***BAR GRAPH:** The pictorial representations of a grouped data, in the form of vertical or horizontal rectangular bars, where the lengths of the bars are equivalent to the measure of data, are known as bar graph. The bars drawn have uniform width, and the variable quantity is representedon one of the axes.*

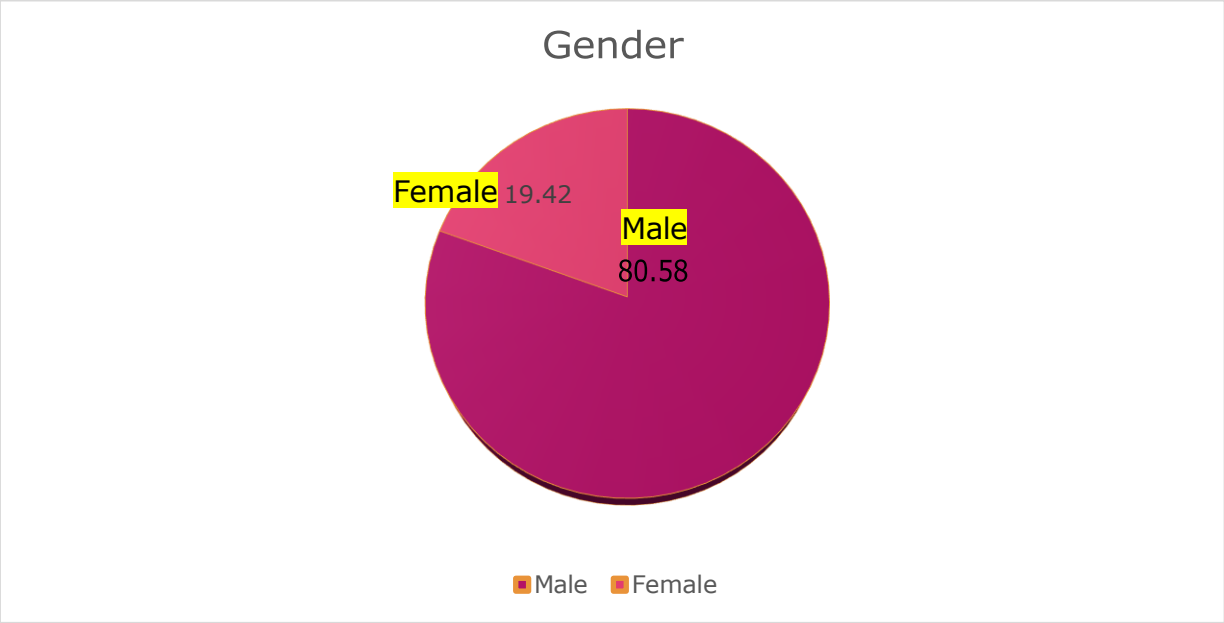
Also the measure of the variable depicted on the other axes. The heights or the lengths of the bars denote the value of the variable. These graphs can be used to compare various quantities.

TABULATION , ANALYSIS AND INTERPRETATION

Table – 1
Gender wise Respondent

Gender	***Frequence***
Male	*112(80.58%)*
Female	*27(19.42%)*
Grand total	*139*

Figure – 1



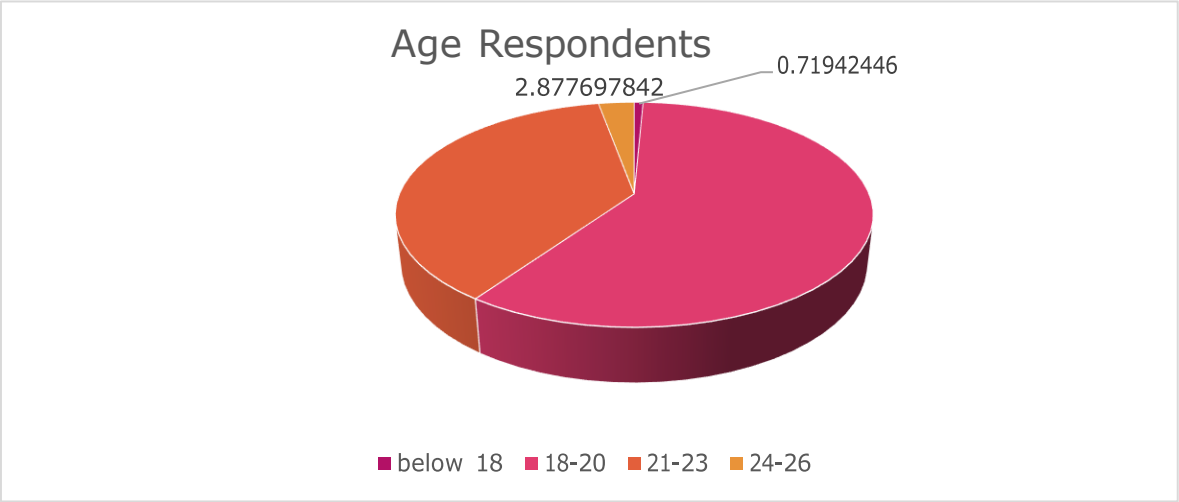
Interpretations :-

- *The data has been collected from **139** respondents of which **112** i.e **80.58%** are males and remaining **27** i.e **19.42%** are females which can be seen from the above Pie-Chart.*

Table – 2
Age wise Respondent

Age	Frequency
below 18	1(0.71%)
18-20	82(58.99%)
21-23	52(37.41%)
24-26	4(2.88%)
Grand Total	139

Figure – 2



Descriptive Measures

Mean	20.27338129
Median	20.00609756
Mode	19.68918919
Standard Deviation	1.687046525
Kurtosis	2.671245872
Skewness	0.655048569

Interpretations:

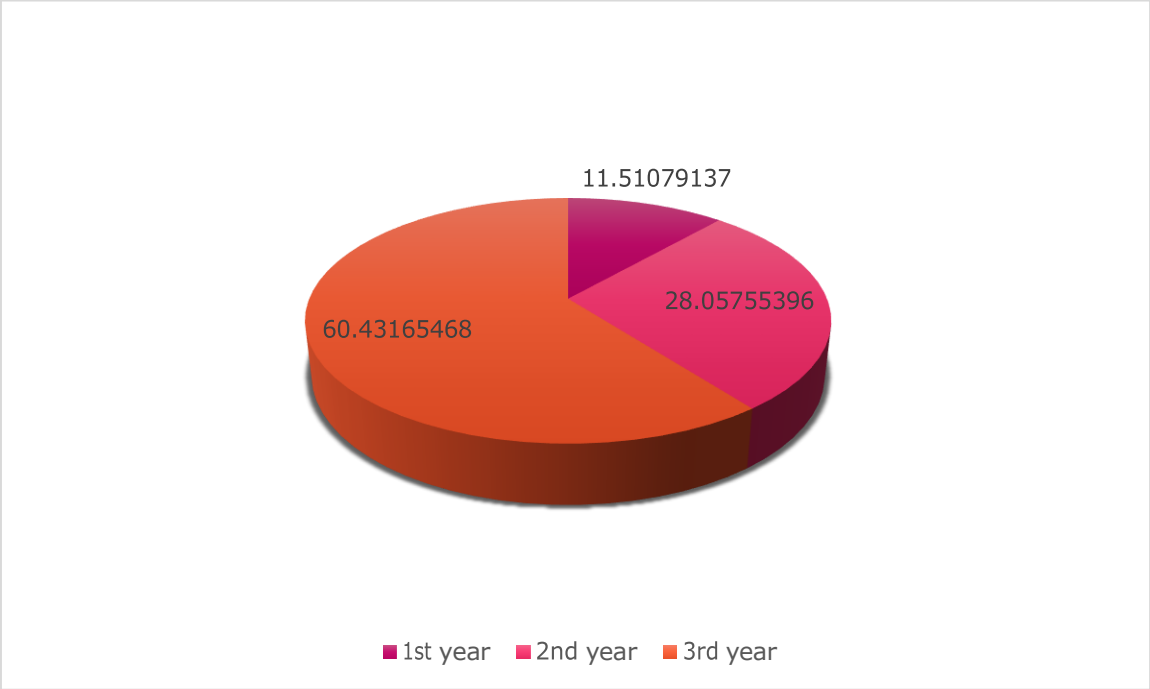
- *The age distribution of respondents is as given in Table-2.The age varies from group which is seem in table 1 in years. It can be seen from table that maximumrespondents are of the age group 18 - 20 years which consists of **58.99%** and **37.41%** is of age group 21 - 23 years.*
- *The mean age of respondents is **20.37** years.*
- *The Variability (Standard deviation) in age of respondents from mean age is 1.68 years.*
- *Since the skewness is **0.655**, which is **positive**, it means that when the curve is drawn from the given data, there will be a lack of symmetry and it will be stretched more to the **positive** side*
- *Here the kurtosis is **2.67**, which is less than 3, which means that the curve will be flatter than the normal curve, and it is known as the **Platykurtic Curve.***

Table – 3

Student's Year of study (1st ,2nd and 3rd) wise respondent

Year	***No of students (frequency)***
1st year	*16 (11.51%)*
2nd year	*39 (28.05%)*
3rd year	*84 (60.43%)*

Figure – 3



Interpretations:

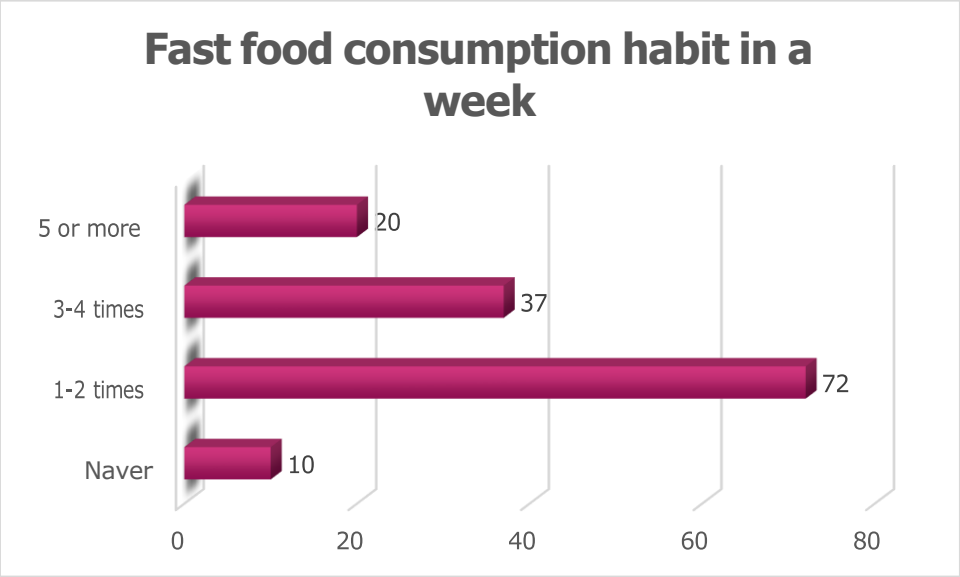
- *The data has been collected from **139** respondents of which **16 (11.51%)** data come from 1st Year students,*

39 (28.05%) *data come from 2nd Year students and* ***84 (60.43%)*** *data come from 3rd Year students which can be seen from the above Pie-Chart.*

Table - 4
Fast food consumption habit in a week

Fast food consumption habit in a week	**Frequency (%)**
Never	10 (7.19%)
1-2 times	72 (51.79%)
3-4 times	37 (26.61%)
5 or more times	20 (14.38%)
Total	139

Figure – 4



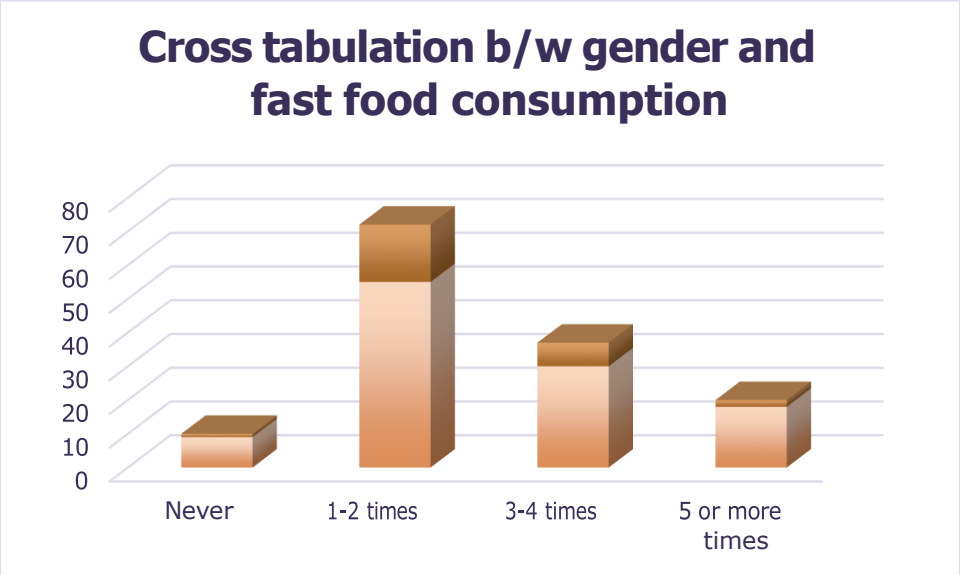
Interpretations:-

- *For undergraduate science students at BHU, **10 (7.19%)** students do not eat fast food, **72 (51.79%)** students eat fast food 1-2 times in a week, **37 (26.61%)** students eat fast food 3-4 times in a week, and the remaining **20 (14.38%)** students eat fast food more than 5 times in a week.*

Table - 5
Cross Tabulation between Gender and Fast food consumed in a week days

No of Day in week	Frequency(%)		Total Frequency
	Male	Female	
Never	9(8.03%)	1(3.70%)	10(7.19%)
1-2 times	55(49.11%)	17(62.96%)	72(51.79%)
3-4 times	30(26.78%)	7(25.92%)	37(26.61%)
5 or more times	18(10.07%)	2(7.40%)	20(14.38%)
Total	112(80.58)	27(19.42)	139

Figer - 5



Interpretations:-

- *For male respondents, out of **112** male respondents, **9(8.03%)** students do not eat fast, **55(49.11%)** students eat fast food 1-2 times in a week, **30(26.78%)** students eat fast food 3-4 times in a week, and the remaining **18(10.07)** students eat fast food 5 or more than 5 times in a week.*
- *For female respondents, out of **27** female respondents, **1(3.70%)** student do not eat fast, **17(62.96%)** students eat fast food 1-2 times in a week, **7(25.92%)** students eat fast food 3-4 times in a week, and the remaining **2(7.40%)** students eat fast food 5 or more than 5 times in a week.*

DESCRIPTIVE STATISTICS OF CONSUMPTION OF FAST FOOD

Mean	2.5
Median	2.152777778
Mode	1.778350515
Standard Deviation	1.590212872
Kurtosis	-23.48858934
Skewness	0.655048569

Interpretations:-

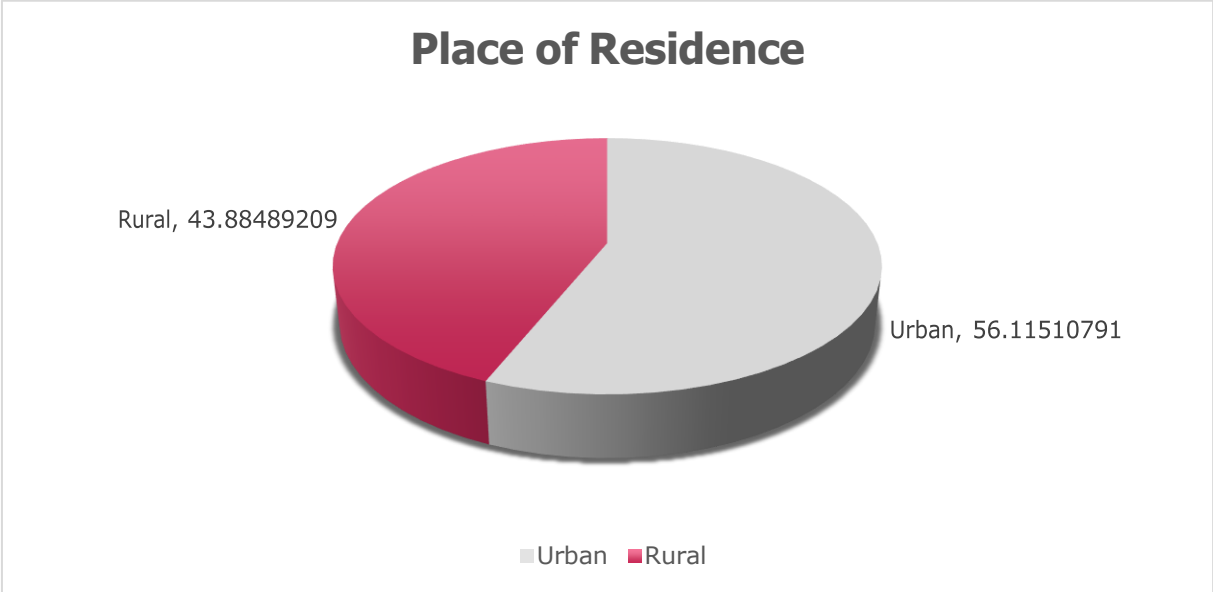
- *In a week, respondents consume fast food on average **2.5** days.*
- *The Standard deviation of the data is 1.590 in a week.*
- *Here the **kurtosis** is **"-23.488",** which is less than 3, which means that the curve will be flatter than the normal curve, andit is known as the **Platykurtic Curve.***
- *Since, the **skewness is "0.655"** which is **positive** it means that when the curve will be drawn from given data there will be lack of symmetry and it will be stretched more tothe positive side.*

Table - 6

Place of Residence wise respondents

Place of Residence	Frequency (%)
Urban	78(56.12%)
Rural	61(43.88%)
Total	139*(100%)

Figure – 6



Interpretations :-

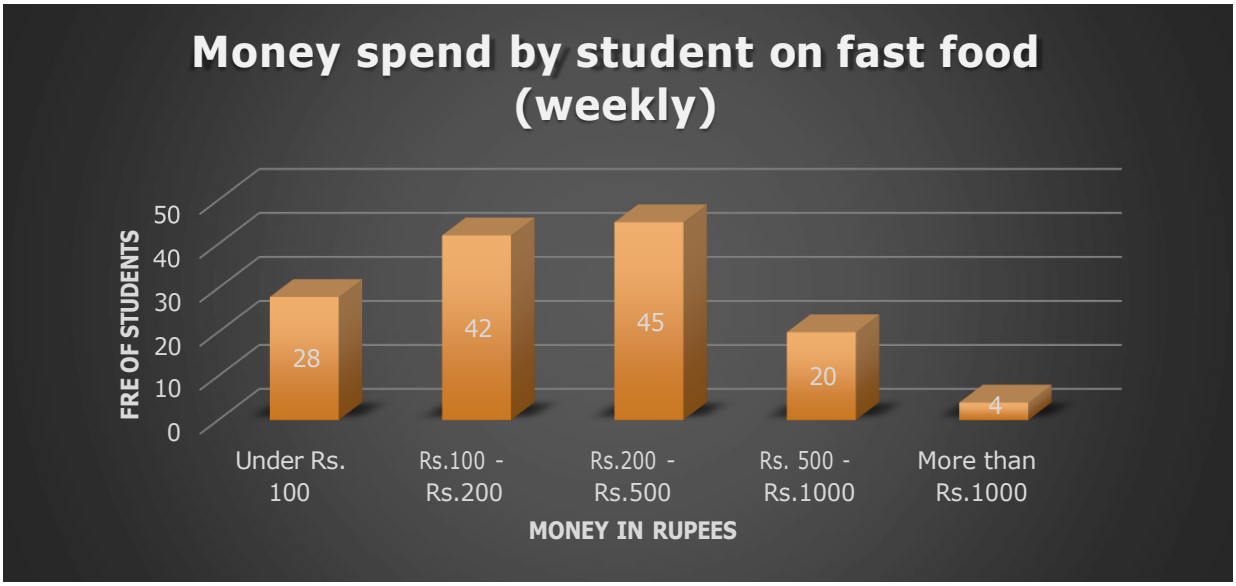
- *The data has been collected from **139** Students of which **78** i.e **56.12%** are belongs to Urban area and remaining **61** i.e **43.88%** are belongs to rural area which can be seen from the above Pie-Chart.*

Table – 7

Money spend by students on fast food in week

Money spend in Rupees	Frequency	Percentage
Under Rs. 100	28	20.144
Rs.100 - Rs.200	42	30.216
Rs.200 - Rs.500	45	32.374
Rs. 500 - Rs.1000	20	14.388
More than Rs.1000	4	2.878
Total	139	100

Figure – 7



Descriptive Statistics of money spend on fast food

Mean	*297.4820144*
Standard deviation	*16.8484426*
Kurtosis	*1.082219484*
Skewness	*3.556327375*

Interpretations :-

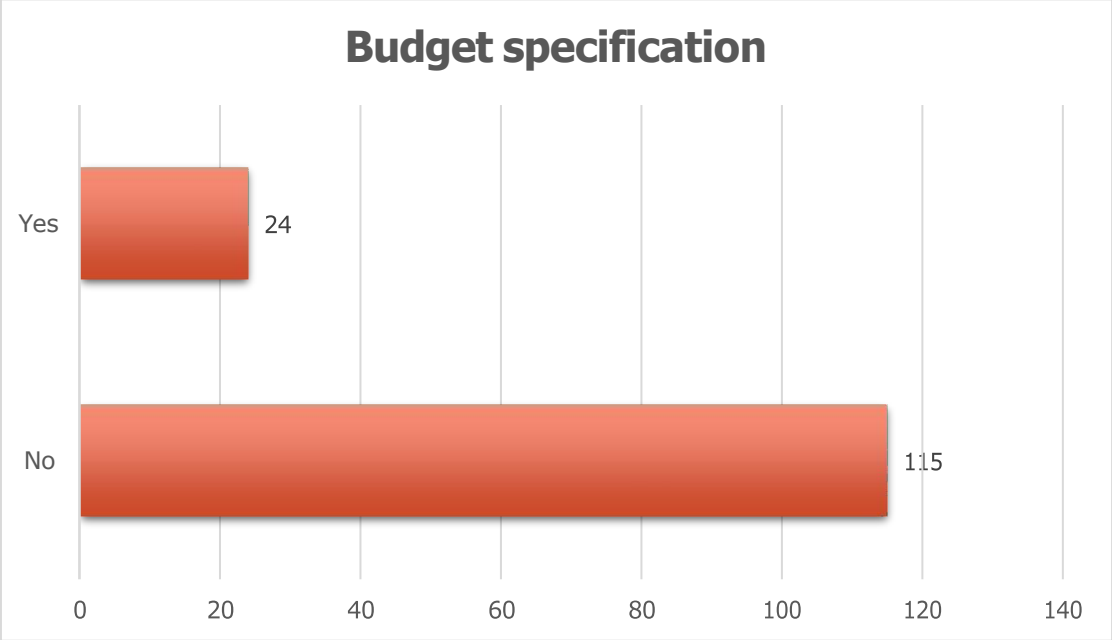
- For undergraduate science students at BHU, On average students spend approximate **300** rupees on consumption of fast food in a week .
- *The Variability (Standard deviation) of respondents is **283.87** rupees.*
- *Since the skewness is **3.55**, which is **positive**, it means that when the curve is drawn from the given data, there will be a lack of symmetry and it will be stretched more to the positive side*
- *Here the kurtosis is 1.08, which is less than 3, which means that the curve will be flatter than the normal curve, and it is known as the **Platykurtic Curve.***

Table – 8

Do you order budget specific fast food ?

Budget specific	Frequency
No	115
Yes	24
Total	139

Figure – 8



Interpretations :-

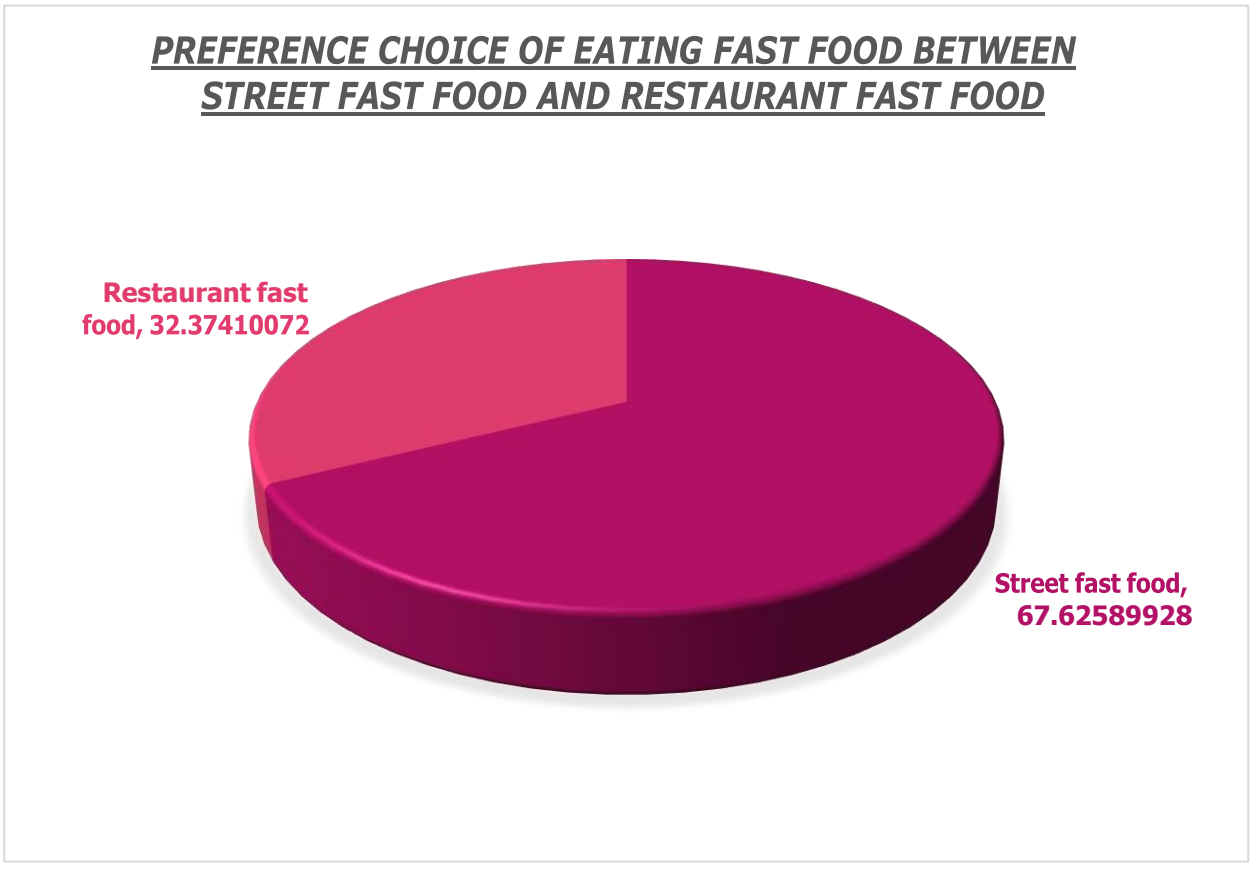
- *In 139 respondents, 24 students ordered the budget specific fast food and remaining 115 students do not prefer to order the budget specific fast food.*

Table – 9

Preference choice of eating fast food between Street fast food and Restaurant fast food

Choice	Frequency
Street fast food	94 (67.62%)
Restaurant fast food	45 (32.38%)
Total	**100**

Figure – 9



Interpretations :-

- In the **139** student respondents, **45 (32.38%)** students prefer to eat fast food in a restaurant, and the remaining **94 (67.62%)** students prefer to eat fast food on the street side.

Table - 10
Comparison between average height of male and female

Statistical measure

Gender	*Average height in cm*	Median height
Male	*171.93*	172
Female	*160.77*	162

Interpretations :-

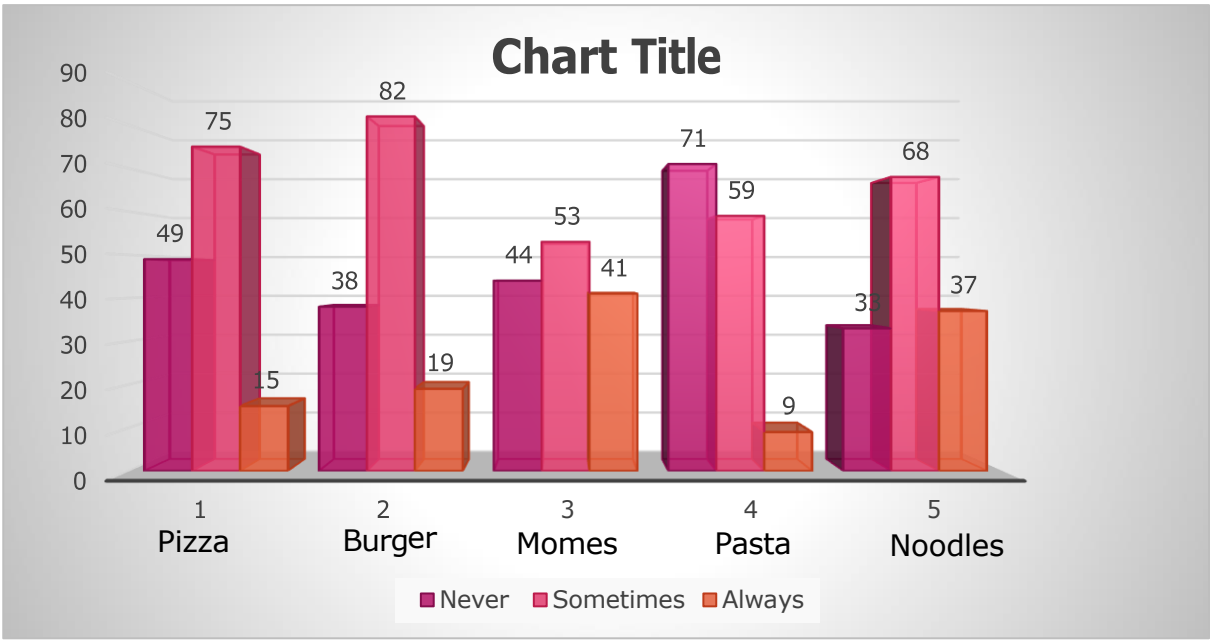
- *Average height of male is **171.93 cm** and female **160.77 cm**.*
- *The we can say that the height of female is less than the height of male (According to my data).*
- *The median height of females is **162 cm**, and that of males is **172 cm.***

Table - 11

Eating habit of students favourite fast food

Favourite fast food	*Pizza*	*Burger*	*Momes*	*Pasta*	*Noodles*
Never	*49*	*38*	*44*	*71*	*33*
Sometimes	*75*	*82*	*53*	*59*	*68*
Always	*15*	*19*	*41*	*9*	*37*

Figure – 10 (11.1)



Interpretations :-

- *On the basis of the above data, we see that **49** students do not prefer to eat pizza, **75** students eat pizza sometimes in a week, and **5** students prefer to eat pizza in a week.*

- *On the_basis of the above data, we see that **38** students do not prefer to eat burger, **82** students eat pizza sometimes in a week, and **19** students prefer to eat pizza in a week.*
- *On the_basis of the above data, we see that **44** students do not prefer to eat momes, **53** students eat momes sometimes in a week, and 41 students prefer to eat momes in a week.*
- *On the_basis of the above data, we see that **71** students do not prefer to eat pasta, **59** students sometimes eat pasta in a week, and **7** students prefer to eat pasta in a week.*
- *On the_basis of the above data, we see that **33** students do not prefer to eat noodles, **68** students sometimes eat noodles in a week, and **37** students prefer to eat noodles in a week.*

Table – 12

How many students consider that fast food is a regular part of our diet?

Opinion	Frequency	Percentage
No	114	82.01
Yes	25	17.99
Total	139	100

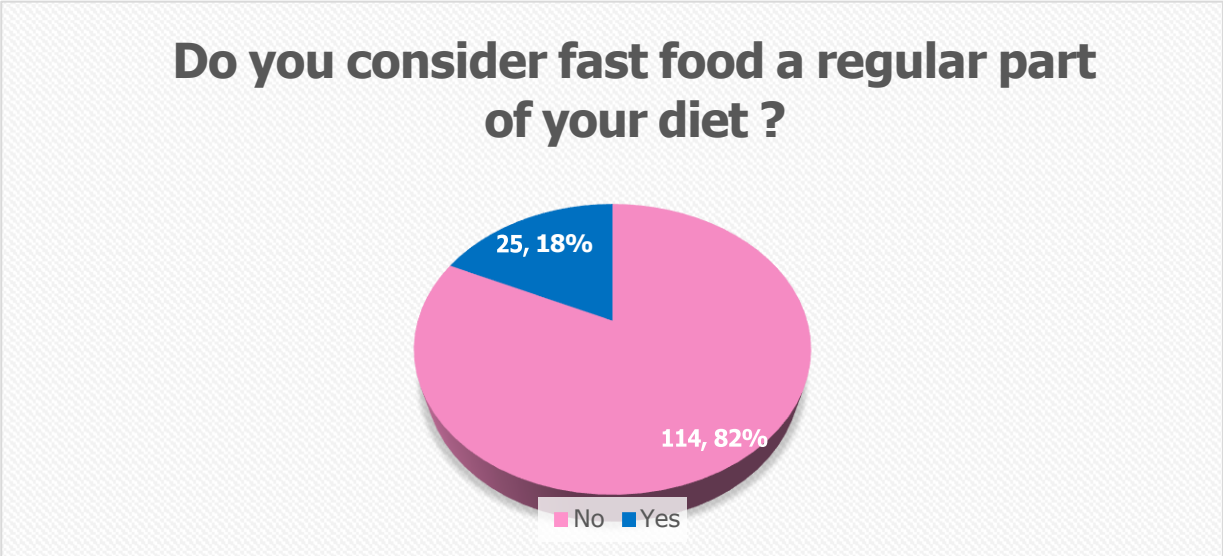


Figure-11(12.1)

Interpretations:-

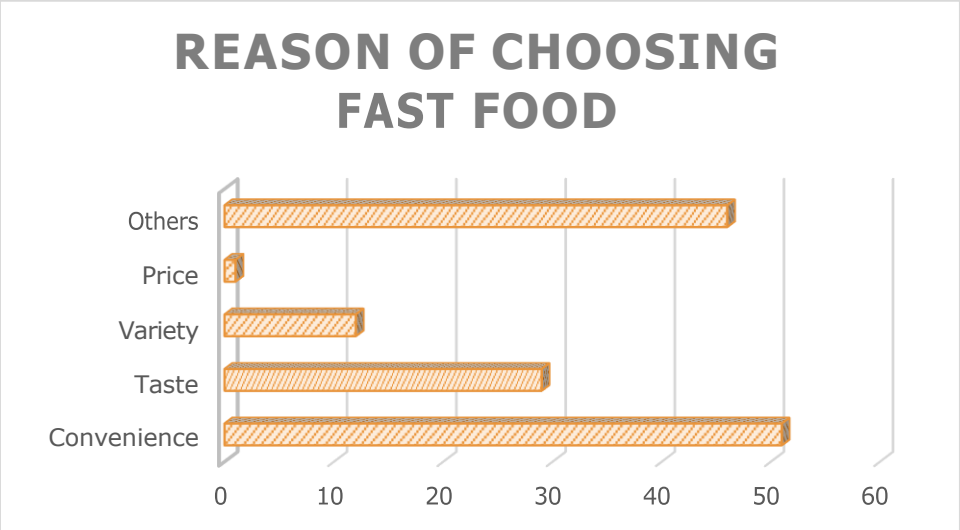
- *In the **139** respondents, **25 (17.99%)** students think that fast food is a regular part of our diet, and the remaining **114 (82.01%)** think that fast food is not a regular part of our diet.*

Table – 13

Reason of choosing fast food

Reason	Frequency
Convenience	51
Taste	29
Variety	12
Price	1
Others	46
Total	139

Figure – 12(13.1)



Interpretations:-

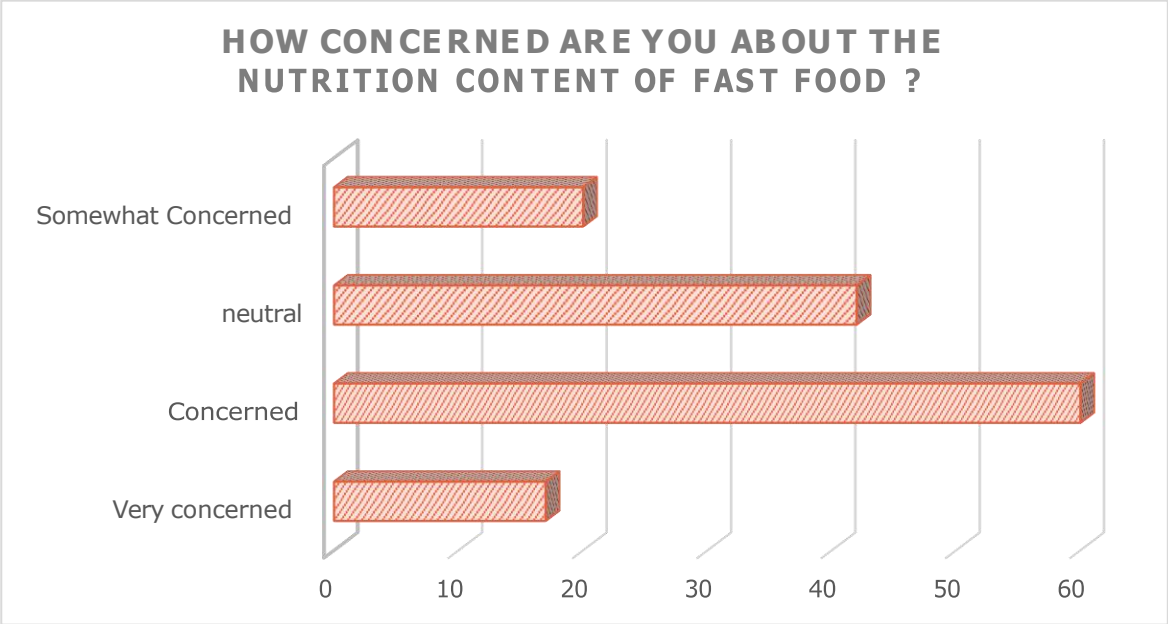
- *From the above **139** data, **46** students eat fast food for convenience, **29** students eat fast food for good taste, **12** students eat fast food for variety in food, and **46** students eat fast food for another reason.*

Table – 14

How concerned are you about the nutrition content of fast food?

Concern level	***Frequency***	***Percentage***
Very concerned	*17*	*12.23021583*
Concerned	*60*	*43.16546763*
neutral	*42*	*30.21582734*
Somewhat Concerned	*20*	*14.38848921*
Total	*139*	*100*

Figure – 13(14.1)



Interpretations:-

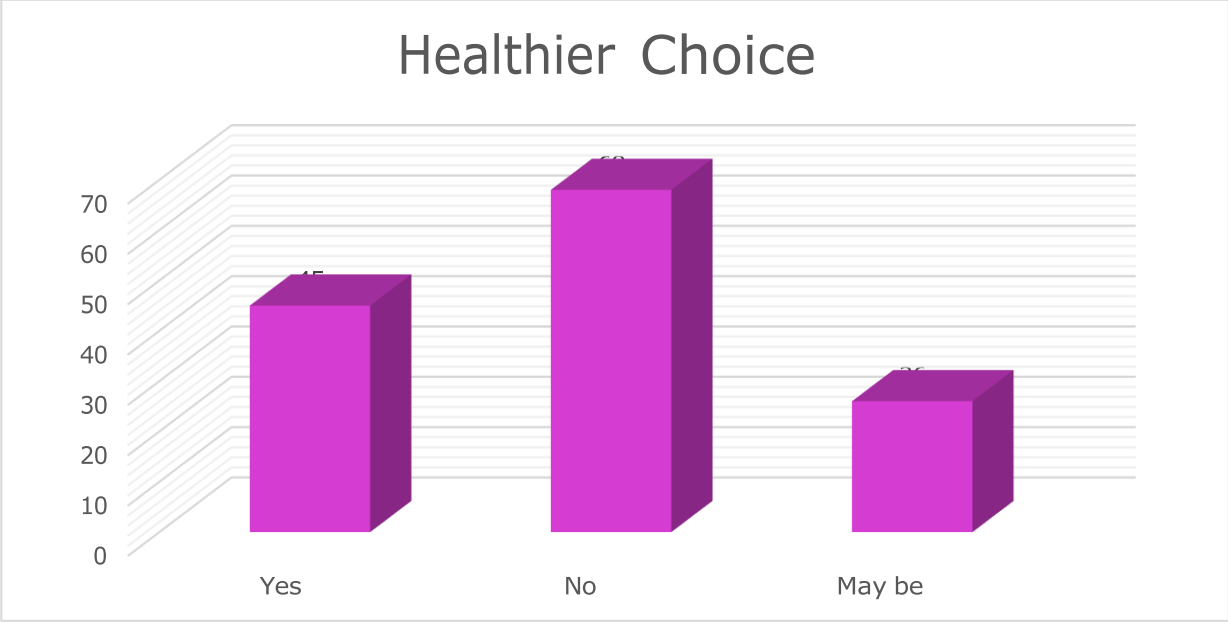
- *From the above data,*
  - ***12.23%** students very concern about the nutrition level of fast food.*
  - ***43.16%** students concern about the nutrition level of fast food.*
  - ***30.21%** students neutral about the nutrition level of fast food.*
  - ***14.38%** students somewhat concern about the nutrition level of fast food.*

Table – 15

Ordering healthier fast food

Choice	Frequency	Percentage
Yes	45	32.37
No	68	48.92
May be	26	18.71
Total	139	100

Figure – 14(15.1)



Interpretations:-

- *From the above data,*
- ***45 i.e 32.37%** students do not prefer to order healthier fast food, **68***

i.e 48.92% *students prefer to order healthier fast food, and remaining* ***26 i.e 18.71%*** *students may be order healthier fast food.*

Table – 16

Do you faced any health problem due to eating of fast food

Faced any health problem	*Frequency*	*Percentage*
No	*70*	*50.35971223*
Yes	*69*	*49.64028777*
Total	*139*	*100*

Figure – 15(16.1)

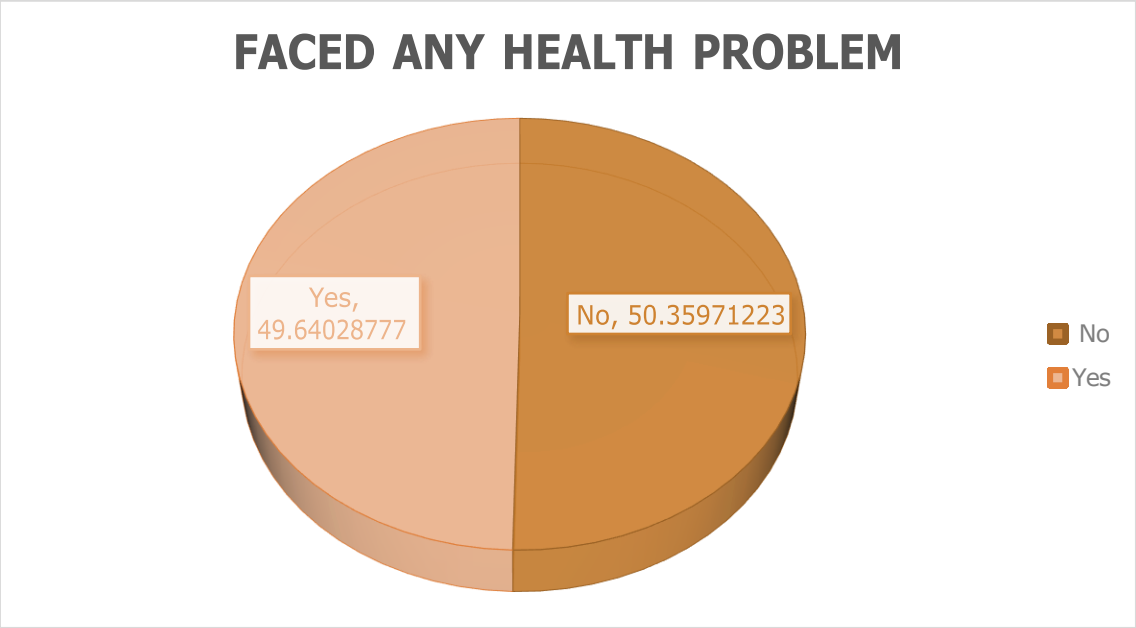
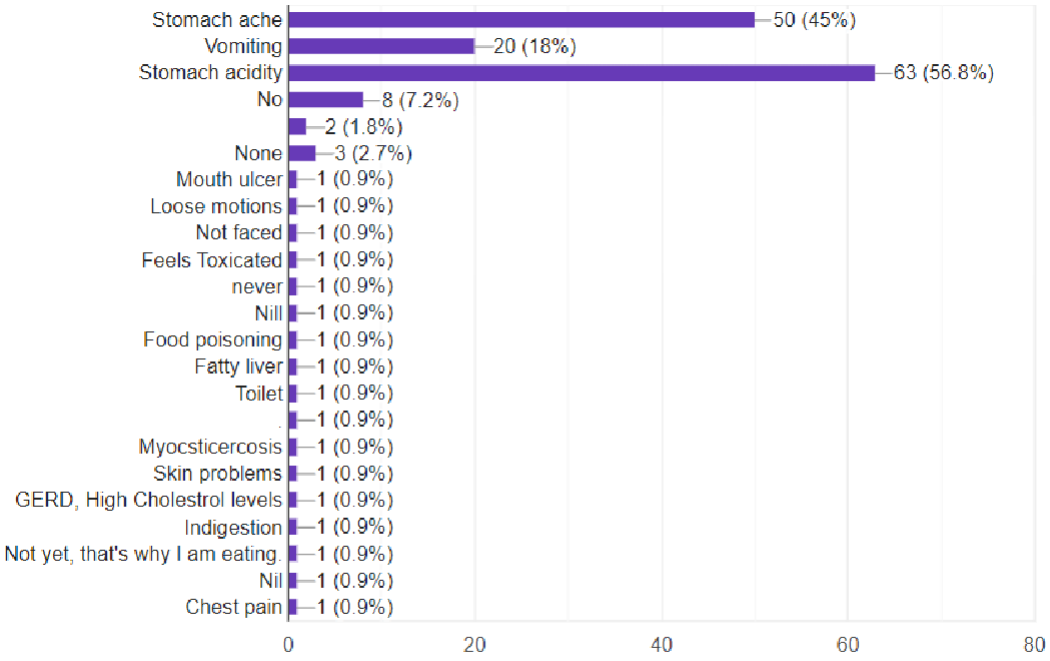


Figure – 16(16.2)



Interpretations:-

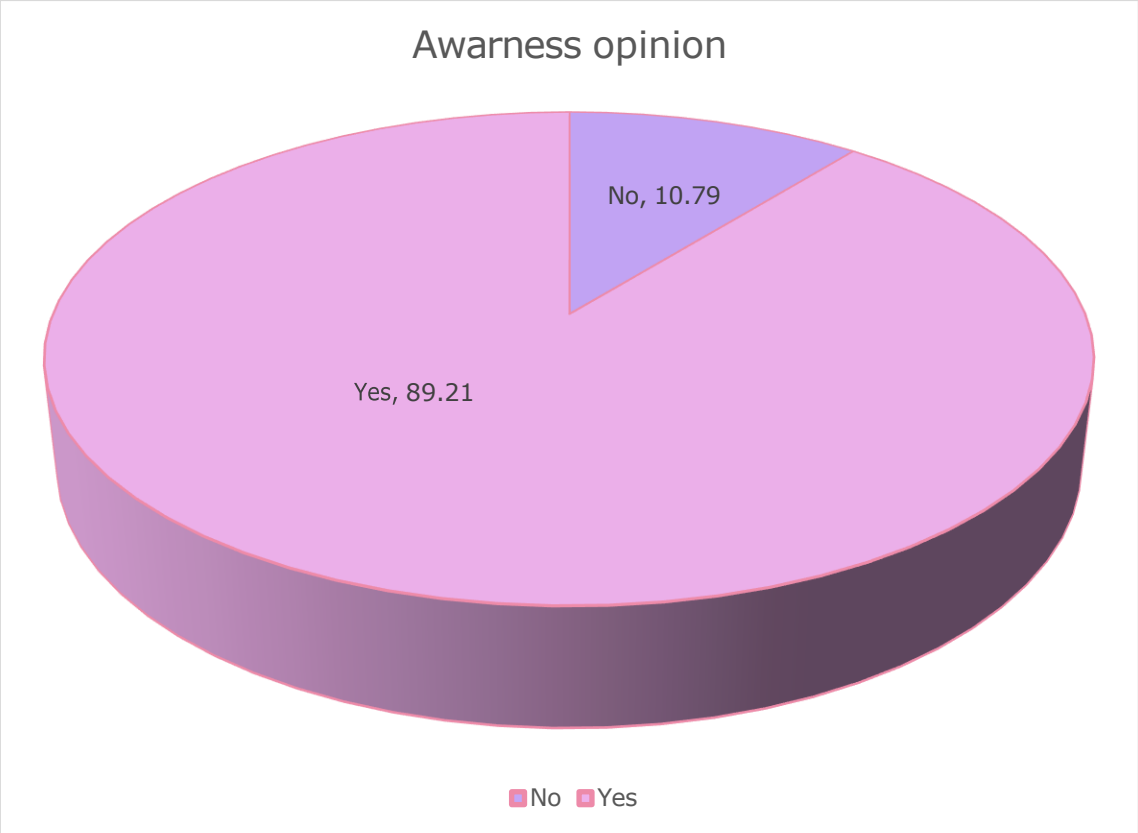
- *In **139** respondents, **70 i.e 50.36%** students do not face any health problems due to eating fast food, and remaining **69 i.e 49.64%** students faced some health problems due to eating fast food.*
- *The problems faced by students are stomach ache **(45%)**, vomiting **(18%),** and stomach acidity **(56.8%)** and so on which is shown in above chart.*

Table – 17

Opinion on Awareness of potential health risk associated with daily consumption of the fast food

Awareness opinion	frequency	Percentage
No	15	10.79
Yes	124	89.21
Total	139	100

Figure – 17



Interpretations:-

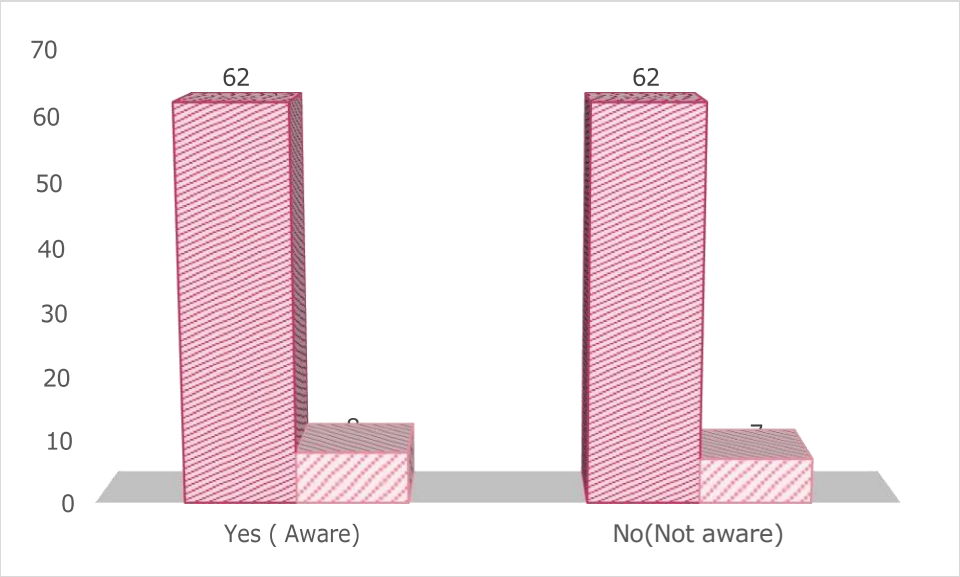
- *From the **139** respondents, **124 (89.21%)** students are aware of the potential health risk associated with regular consumption of fast food and **15 (10.79%)** are not aware.*

Table – 18

Cross tabulation between awareness of health risk of consumption of fast food and faced health problem

Yes/No	Yes(faced health problem)	No(Not faced any health problem)
Yes (Aware)	62(44.60%)	8(5.75%)
No(Not aware)	62(44.60%)	7(5.03%)

Figure – 18



Interpretations:-

From the above table,We see that

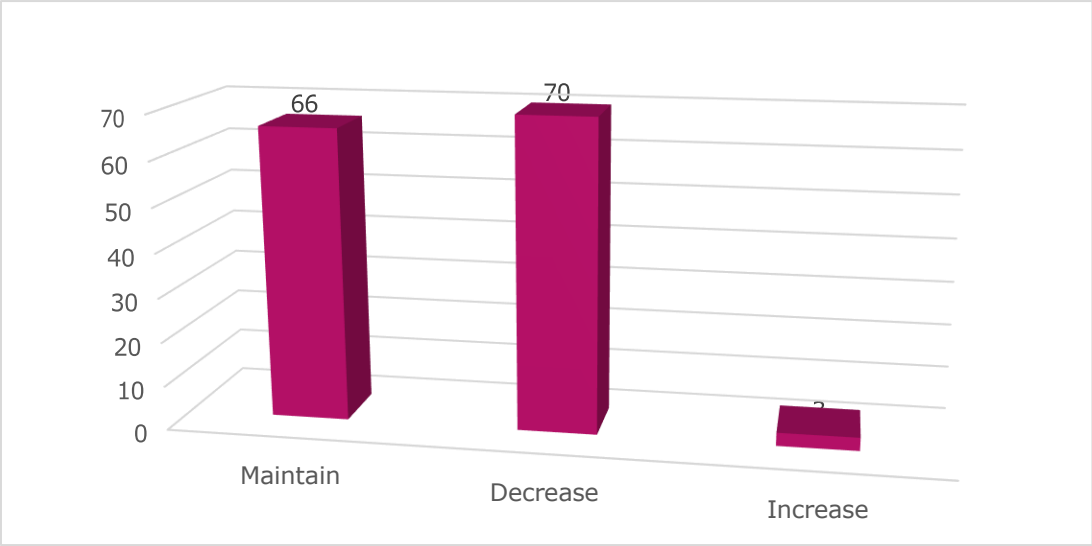
- *44.60% students aware the health risk associated with eating of fast food and they also faced a health problem due to eating of fast food.*
- *44.60% students do not aware the health risk associated with eating of fast food and they faced health problem due to eating of fast food.*
- *5.75% students aware the health risk associated with eating of fast food and they have not faced health any problem due to eating of fast food.*
- *5.03% students do not aware the health risk associated with eating of fast food and they have not faced health any problem due to eating of fast food.*

Table – 19

Do you plan to Decrease, maintain or increase your consumption of fast food?

Opinion	Frequency	Percentage
Maintain	66	47.48201439
Decrease	70	50.35971223
Increase	3	2.158273381
Total	139	100

Figure – 19



Interpretations:-

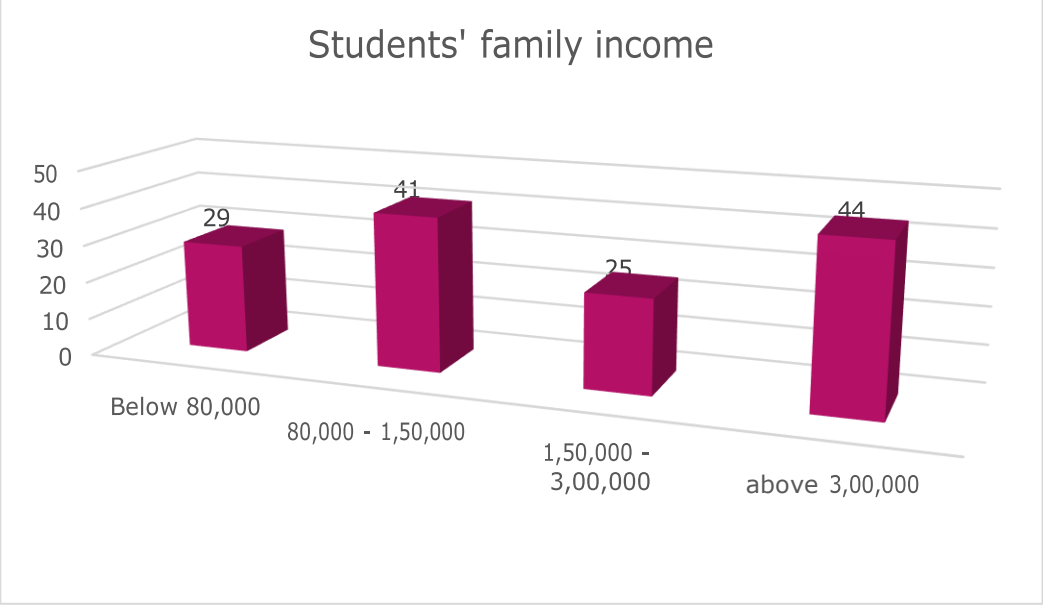
From the above table, we see that

- *66 i.e 47.48% students want to maintain their fast food consumption habits.*
- *70 i.e 50.36% students want to decrease their fast food consumption habits.*
- *3 i.e 2.15% students want to increase their fast food consumption habits.*

Table – 20
Students' family annual income

Annual income	Frequency
Below 80,000	29
80,000 - 1,50,000	41
1,50,000 -3,00,000	25
above 3,00,000	44
Total	139

Figure – 20



Interpretations:-

From the above data table, we see that

- *Annual income of 29 students is less than Rs. 80,000.*
- *Annual income of 41 students is between Rs. 80,000 to Rs. 1,50,000.*
- *The annual income of 25 students is between Rs. 1,50,000 and Rs. 3,00,000.*
- *And 44 students' annual income is more than Rs. 3,00,000.*

Table- 21

Body Mass Index of Respondents

BMI	Weight Status	Frequency	Percentage
Below 18.5	Under Weight	24	17.27
18.5 - 24.99	Healthy Weight	98	70.50
25.0 -29.9	Over Weight	16	11.51
30.0 and above	Obesity	1	0.72
Total		139	100

Table – 21.1

Body Mass Index of Male Respondents

BMI	Weight Status	Frequency	Percentage
Below 18.5	Under weight	14	10.07
18.5 - 24.99	Healthy Weight	84	60.43
25.0 -29.9	Over Weight	13	9.35
30.0 and above	Obesity	1	0.72
Total		112	80.57553957

Table – 21.2

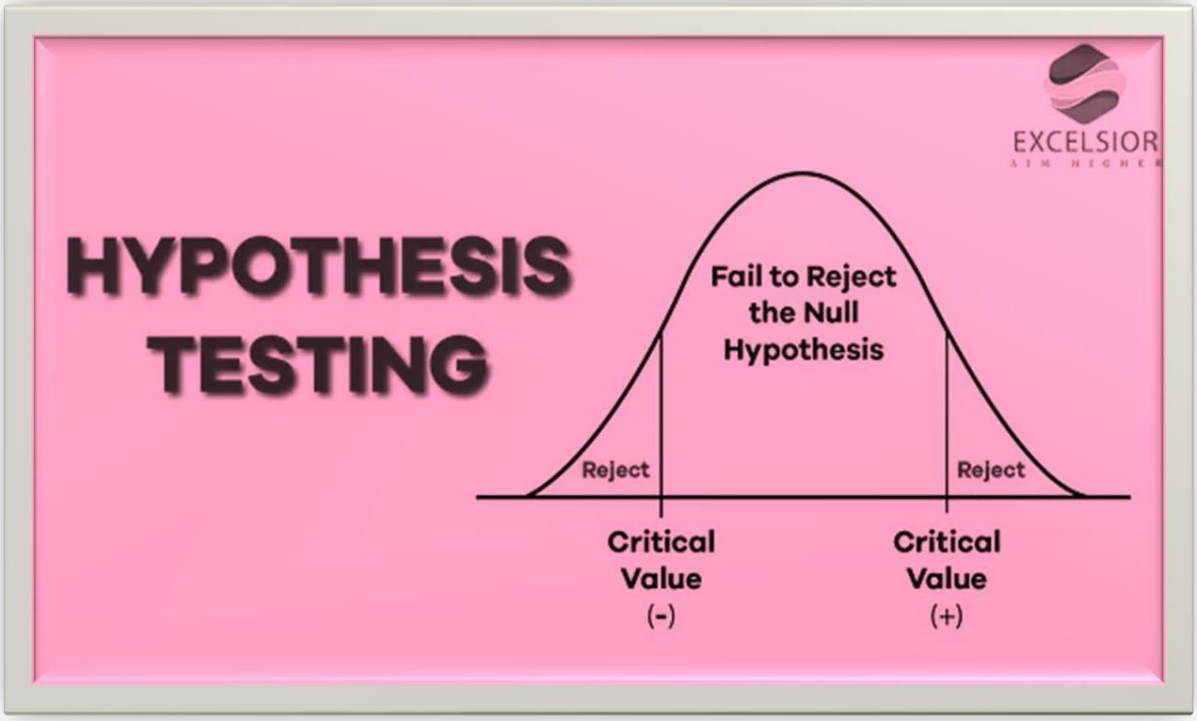
Body Mass Index of Female Respondents

BMI	Weight Status	Frequency	Percentage
Below 18.5	Under weight	10	7.19
18.5 - 24.99	Healthy Weight	14	10.07
25.0 -29.9	Over Weight	3	2.16
30.0 and above	Obesity	0	0.00
Total		27	19.42446043

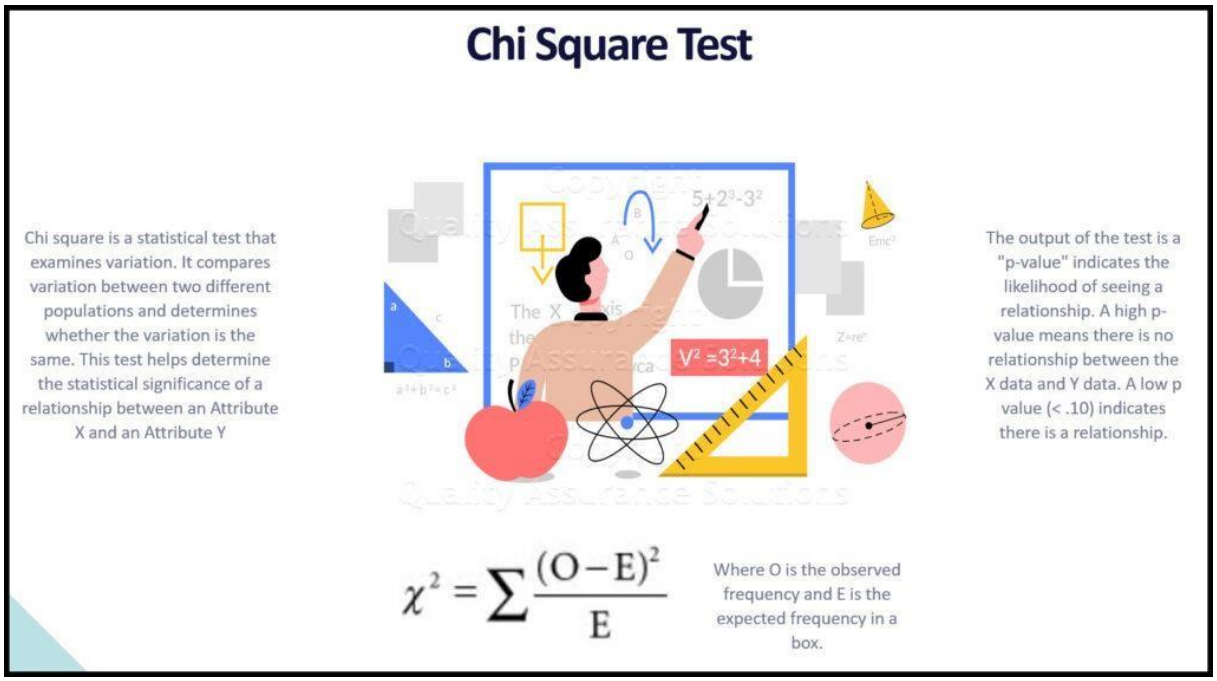
Interpretations:

- ***17.27%** of respondents are **Underweight,** around **9.35%** of the respondents are **Overweight.***
- *Around **60.43%** of respondents comes under **Healthy Weight** category.*
- *Almost **1%** respondents are **Obese.***
- *Of all Male respondents, **10.07%** are **Underweight**, whereas **7.19%** of Female respondents are **Underweight.***
- *Of all Male respondents, **9.35%** are **Overweight,** whereas only **2.16%** Female respondents are **Overweight.***
- *Generally more Females are **Underweight** and number ofMales with **Overweight** are greater.*
- *Average BMI of Students respondents is 21.331.*
- *Median BMI of Students respondents is 20.761.*

STATISTICAL TESTING
(HYPOTHESIS TESTING)



Concept of Chi-Square Test For Independence of Attributes:



Chi-square test is applied to find out whether the two variables in a bivariate contingency table under the study are dependent or independent. Our two hypotheses; null hypothesis H0 and alternate hypothesis H1.

H0: The two attributes are independent

H1: The two attributes are dependent

Computation is done using the formula:

χ 2 (cal.) = $\sum\sum$(Oij-Eij)2 / Eij ~ χ 2 (r-1)(s-1) ;

Where r and s are the no. of rows and number of columns of the contingency table and i=1, 2.....r and j=1, 2..... s

Oij = observed frequency of (i,j)th cell

Eij = expected frequency of (i,j)th cell

Where Nio and Noj are marginal totals and N is the total number of observations. The test statistic follows, under H0 a chi-square distribution with (r-1) (s- 1) degrees of freedom. The null hypothesis can be tested either at 5% or 1% level of

significance.

If **χ 2 (cal.) < χ 2 (tab.)** then H0 may be accepted which shows that the two variables are independent of each other otherwise we may be reject the H0 whichshows that the two variables are not independent i.e., dependent of each other.
Also, when the observed frequency is less than five, pooling is done to apply thetest.

Test 1
Chi Square test for testing effect of fast food on BMI

Ho: There is no significant relation between consumption of fast food and Body Mass Index
H1: There is significant relation between of fast food and Body Mass Index.

OBSERVED FREQUENCY TABLE

Observed Frequency Table			
	NO	YES	Total
Below 18.5	10	14	24
18.5—24.9	28	70	98
25.0—29.9	6	10	16
30.0 and above	0	1	1
Total	44	95	139

EXPECTED FREQUENCY TABLE

Expected Frequency Table			
	No	yes	Total
Below 18.5	7.60	16.40	24.00
18.5—24.9	31.02	66.98	98.00
25.0—29.9	5.06	10.94	16.00
30.0 and above	0.32	0.68	1.00
Total	44	95	139

AFTER POOLING

Oi (Observed)	*Ei (Expected)*	*(Oi-Ei)^2/Ei*
10	*7.597122302*	*0.76000109*
28	*31.02158273*	*0.294310007*
6	*5.381294964*	*0.071134536*
14	*16.05755396*	*0.263647147*
70	*65.56834532*	*0.299528119*
11	*10.70503597*	*0.008127369*

χ^2 *VALUE*

CALCULATED	*1.696748268*
LEVEL OF SIGNIFICANCE	*5%(0.05)*
D.O.F	*1*
TABULATED	*3.841458821*

INTERPRETATIONS:-

The degree of freedom is (4-1)*(2-1)=3, also 2 d.o.f is lost in the method of pooling, so Degree of freedom becomes 1.

Since χ 2 Calculated < χ2 tabulated so data don't provide sufficient evidence against the null hypothesis which may be accepted at 5% level of significance.

Hence we don't have conclusive evidence to reject the null hypothesis that thereis no significant relation between consumption of fast food and Body Mass Index. (According to my sample data)

Test-2

***Chi Square test for testing effect of Fast food consumption habits and* Place of Residence**

Ho: There is no significant relation between consumption of fast food and Place of Residence

H1: There is significant relation between of fast food and Place of Residence.

OBSERVED FREQUENCY TABLE

	Naver	1-2 times	3-4 times	5 or more times	Total
Rural	7	34	15	5	61
Urban	13	28	22	15	78
Total	20	62	37	20	139

EXPECTED FREQUENCY TABLE

	Naver	1-2 times	3-4 times	5 or more times	Total
Rural	8.78	27.21	16.24	8.78	61
Urban	11.22	34.79	20.76	11.22	78
Total	20	62	37	20	139

Table for calculation:-

Oi(Observed)	Ei(Expected)	(Oi-Ei)^2/Ei
7	8.777	0.360
34	27.209	1.695
15	16.237	0.094
5	8.777	1.625
13	11.223	0.281
28	34.791	1.326
22	20.763	0.074
15	11.223	1.271

χ^2 VALUE

CALCULATED	6.726
LEVEL OF SIGNIFICANCE	5%(0.05)
D.O.F	3
TABULATED	7.815

INTERPRETATIONS:-

The degree of freedom is (4-1)*(2-1)=3.

Since χ 2 Calculated < χ2 tabulated so data don't provide sufficient evidence against the null hypothesis which may be accepted at 5% level of significance.

Hence we don't have conclusive evidence to reject the null hypothesis that thereis no significant relation between consumption of fast food and Place of Residence.(According to my sample data)

Test-3

Chi-Square test for testing the relationship between expenditure on fast food and family annual income

Ho: There is no significant relationship between expenditure on fast food and family annual income.

H1: There is significant relationship between expenditure on fast food and family annual income.

OBSERVED FREQUENCY TABLE

	Under Rs. 100	Rs.100 - Rs.200	Rs.200 - Rs.500	Rs. 500 - Rs.1000	More than Rs.1000	Total
Below 80,000	9	10	6	3	1	29
80,000 - 1,50,000	10	12	10	8	1	41
1,50,000 - 3,00,000	5	7	11	1	1	25
above 3,00,000	4	13	18	8	1	44
Total	28	42	45	20	4	139

EXPECTED FREQUENCY TABLE

	Under Rs. 100	Rs.100 - Rs.200	Rs.200 - Rs.500	Rs. 500 - Rs.1000	More than Rs.1000	Total
Below 80,000	5.842	5.842	9.388	4.173	0.006	25.250
80,000 - 1,50,000	8.259	8.259	13.273	5.899	0.007	35.698
1,50,000 - 3,00,000	5.036	5.036	8.094	3.597	0.010	21.772
above 3,00,000	8.863	8.863	14.245	6.331	0.005	38.307
Total	28.000	28.000	45.000	20.000	0.028	139

AFTER POOLING

Oi(Observed)	Ei(Expected)	(Oi-Ei)^2/Ei
9	5.842	1.707
10	8.259	0.367
5	5.036	0.000
4	8.863	2.669
10	8.763	0.175
12	12.388	0.012
7	7.554	0.041
13	13.295	0.007
6	9.388	1.223
10	13.273	0.807
11	8.094	1.044
21	18.417	0.362
9	9.496	0.026
13	10.331	0.690

χ^2 VALUE

CALCULATED	9.129
LEVEL OF SIGNIFICANCE	5%(0.05)
D.O.F	6
TABULATED	12.592

INTERPRETATIONS:-

The degree of freedom is (5-1)*(4-1)=12, also 6 d.o.f is lost in the method of pooling, so Degree of freedom becomes 6.

Since χ 2 Calculated < χ2 tabulated so data don't provide sufficient evidence against the null hypothesis which may be accepted at 5% level of significance.

Hence we don't have conclusive evidence to reject the null hypothesis that there is no significant relationship between expenditure on fast food and family annual

income.(According to my sample data)

Test-4

Chi-Square test for testing the relationship between consumption of fast food and Gender

Ho: There is no significant relation between consumption of fast food and gender.

H1: There is significant relation between consumption of fast food and gender.

OBSERVED FREQUENCY TABLE

	Naver	1-2 times	3-4 times	5 or more times	Total
Male	9	55	30	18	112
Female	1	17	7	2	27
Total	10	72	37	20	139

EXPECTED FREQUENCY TABLE

	Naver	1-2 times	3-4 times	5 or more times	Total
Male	8.058	58.014	29.813	16.115	112
Female	1.942	13.986	7.187	3.885	27
Total	10	72	37	20	139

AFTER POOLING

Oi(Observed)	Ei(Expected)	(Oi-Ei)^2/Ei
9	8.058	0.110
55	58.014	0.157
30	29.813	0.001
19	18.058	0.049
17	13.986	0.650
9	11.072	0.388

χ^2 VALUE

CALCULATED	1.355
LEVEL OF SIGNIFICANCE	5%(0.05)
D.O.F	1
TABULATED	7.815

INTERPRETATIONS:-

The degree of freedom is (4-1)*(2-1)=3, also 2 d.o.f is lost in the method of pooling, so Degree of freedom becomes 1.

Since χ 2 Calculated < χ2 tabulated so data don't provide sufficient evidence against the null hypothesis which may be accepted at 5% level of significance.

Hence we don't have conclusive evidence to reject the null hypothesis that There is no significant relation between consumption of fast food and gender.(According to my sample data)

Due to the limitations in area of survey and biasedness of the data, there is a possibility that calculated result may differ from the actual one.

The Results are as follows:

- ✓ *Out of 139 respondents 80.58% of them are males and remaining 19.42% percentare females.*
- ✓ *The maximum number of respondents are 3rd-year students.*
- ✓ *The maximum number of respondents are in the 18-20 age group.*
- ✓ *More than 50% of the respondents eat fast 1-2 times a week.*
- ✓ *On average, students spend approximately Rs. 300 in a week.*
- ✓ *3/4th of respondents do not order budget-specific fast food.*
- ✓ *Approximately 2/3th of the respondents like to eat street fast food.*
- ✓ *According to my data, average height of male students is 171.93cm and average height of female students is 172 cm.*
- ✓ *According to my data, median height of male students is 171.93cm and median height of female students is 162 cm.*
- ✓ *Approximately 82.01% respondents consider that fast food is not a regular part of our diet.*
- ✓ ***The majority of students eat fast food for convenience purposes.***
- ✓ *Approx 43% students concerned about the nutrition level of fast food.*
- ✓ *In every three days respondents take lunch on average two days.*
- ✓ *Approximately 32.37% students ordering healthier fast food.*
- ✓ ***About 50% of students faced health problems due to eating fast food.***
- ✓ *Approximately 89.21% students know aware of the potential health risk associated with daily consumption of fast food.*
- ✓ *Approximately 50% students want to decrease their consumption habits of fast food.*
- ✓ *44 (32.35%) students family income is more than 3 lakh, and 41 (29.49%) students family income lie between 80,000 and 1,50,000.*
- ✓ *The BMI of 70.50% of students is 18.5 to 24.99, which means they belong to the healthy weight category.*
- ✓ *The BMI of 60.43% of male students is 18.5 to 24.99, which means they belong to the healthy weight category.*
- ✓ *The BMI of 60.43% of female students is 18.5 to 24.99, which means they belong to the healthy weight category.*
- ✓ *Using testing of hypothesis, we see that,*
    - *There is no significant relation between consumption of fast food and Body Mass Index.*
    - *There is no significant relation between consumption of fast food and Place of Residence.*

- *There is no significant relationship between expenditure on fast food and students' family annual income.*
- *There is no significant relation between consumption of fast food and gender of students.*

Conclusion

Most of the respondents uses hostel mess and they regularly miss their meals which result in calories deficit. They also regularly consume fast food. Greater numberof females are underweight (10 out of 27) where as few number of males are overweight (13 out of 112). But this is no gender dependence of fast food. Only few people feel energetic after taking the meals. A lot of respondents are in dilemma whether totake meals or not. Very few respondents feel satisfactory after taking meals.

Meals effect the mood of respondents too, and a healthy number of respondents feels that the meals are not worth it for money. We don't find any conclusive evidence to reject the null hypothesis that there is no significant relation betweenconsumption of fast food and Body Mass Index.

Field experience and difficulties

Execution stage of any sample survey requires a lot of patience and dedication to identify the sample individual in the field. I have opted for online questionnaire method for data collection. I got to know about Google Forms and learned to write in such a way that people found it interesting to participate in my survey.

I have faced multiple difficulties on my way to complete the project work and deal with it in efficient way. During the survey, sometime I had to remind the respondents two or three times to get the questionnaire filled. The main challenge was data cleaning; I got many responses that were incomplete or wrong, and so it took a lot of time to find out the proper responses. I learned many new things, like it was my first time with MS Word, which was very useful for creating documents, and I learned many new things in MS Excel, like pivot tables, which helped me a lot in making tables.

My project became more interesting and challenging for me due to all these difficulties. I got a great experience with it. I think it was a great opportunity for

me to learn something new from real life work by seeing conversion of theoretical knowledge into practical work.

References

- S. C. Gupta and V. K. Kapoor : Fundamentals of Mathematical Statistics.
- https://en.wikipedia.org/wiki/Body_mass_index
- https://www.forbes.com/health/body/bmi-chart-for-men-and-women/
- https://ieeexplore.ieee.org/document/7897231
- https://www.healthline.com/health/fast-food-effects-on-body

QUESTIONNAIRE

Personal Information

1. Please Write your name

   _____

2. Your Age *

   Maík only one oval.

   - ◯ Below 18
   - ◯ 18 to 20
   - ◯ 21 to 23
   - ◯ 23 and above

«. Your Gender *

Maík only one oval.

- Malc
- Icmalc

4. Field of Study *

Maík only one oval.

- Scic→ıcc
- Aít
- Social Scic→ıcc
- commcícc
- Otkcí: _____

5. Year of Study *

Maík only one oval.

- 1st Ycaí
- 2→ıd Ycaí
- «íd Ycaí
- 4tk Ycaí

6. Place of Residence *

Maík only one oval.

- R"íal
- Uíba→ı

7. What is your family annual income ? *

Maík only one oval.

- ◯ Bclow 80,000
- ◯ 80,000 - 1,50,000
- ◯ 1,50,000 -«,00,000
- ◯ abovc «,00,000

Frequency of fast food consumption

8. How often do you eat fast food in week ? *

Maík only one oval.

- ◯ Ncvcí
- ◯ 1-2 timcs
- ◯ «-4 timcs
- ◯ 5 oí moíc timcs

9. Do you consider fast food a regular part of your diet ? *

Maík only one oval.

- ◯ Ycs
- ◯ No

Reason for choosing fast food

10. What are the main factor influencing your decision to eat fat food ? *

(Multiple select options)

Check all that apply.

- [ ] Co→ı:c→ıic→ıcc
- [ ] Píicc
- [ ] ľastc
- [ ] VaíictQ
- [ ] Otkcí: _____

Favorite fast food chains

11. *

What is your favorite fast food chains ?

(Multiple select options)

Check all that apply.

- [ ] McDonald’s
- [ ] B"ígcí ki→ıg
- [ ] KIC
- [ ] Pizza H"t
- [ ] Komi→ıo's
- [ ] Local rood skop
- [ ] Otkcí: _____

12. Would you like to prefer to eat Street fast food or Restaurant fast food ? *

Maík only one oval.

- ◯ Stícct rast rood
- ◯ Rcsta"ía→ıt rast rood

1«. What are the specific menu items do you typically order from these chains ? *

(N - Never , S - Sometimes , A - Always)

Maík only one oval peí íow.

	N	S	A
Pizza			
B"ígcís			
Momos			
Pasta			
Noodlcs			

Health and Nutrition

14. How concerned are you about the nutrition content of fast food ? *

Maík only one oval.

- VcíQ co→ıccí→ıcd
- Co→ıccí→ıcd
- →ıc"tíal
- Somcwkat Co→ıccí→ıcd
- Otkcí: _____

15. Do you typically make healthier choices when ordering fast food ? *

(example- Salads , Vegetable soup)

Maík only one oval.

- Ycs
- No
- MaQbc

About your fitness (BMI calculation)

16. What' your Weight ?(in kg) *
(Approximately)

_____

17. What's your height ? (in cm) *
(Approximately)

_____

18. Does you think eating of fast food effect your body weight ? *

Maík only one oval.

- Ycs
- No

Spending habits

19. Approximately, How much do you spend money on fast food consumption per week ? *

Maík only one oval.

- U→ıdcí Rs. 100
- Rs.100 - Rs.200
- Rs.200 - Rs.500
- Rs. 500 - Rs.1000
- Moíc tka→ı Rs.1000

20. Do you budget specifically for fast food expenses ? *

Maík only one oval.

- Ycs
- No

Health problem

21. Have you faced any health problem by eating of fast food ? *

Maík only one oval.

- Ycs
- No

22. If yes then answer the question Have you faced any of these health problem by eating of fast food ?

(Multiple select options)

Check all that apply.

- Stomack ackc
- Vomiti→ıg
- Stomack aciditQ
- Otkcí: _____

Awareness of Health risk due to fast food & Future Intentions

2«. Are you aware of the potential health risk associated with regular consumption *

of fast food ?

Maík only one oval.

- [ ] Ycs
- [ ] No

24. Do you plan to Decrease, maintain or increase your consumption of fast food ? *

Maík only one oval.

- [ ] I→ıcícasc
- [ ] Mai→ıtai→ı
- [ ] Kccícasc

25. What factor would influence your decision to change your fast food consumption habits ?

_____

Thanks for your responses ....