

Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE, KOLHAPUR.



DEPARTMENT OF STATISTICS
A
PROJECT ON
**“ANALYSIS OF THE TRENDS IN FAST
FOOD CONSUMPTION”**

B.Sc.-III

2019-2020

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Under the guidance of

Mr. M. S. Barale

CERTIFICATE

This is to certify that the project entitled "*Analysis of the Trends in Fast Food Consumption*" being submitted by,

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as a partial fulfilment for the award of the degree of Shivaji University, Kolhapur. This is record of bonafide work carried out by him/her under my supervision and guidance.

To the best my knowledge the matter presented in the project has not been submitted earlier.

Teacher in charge

Examiner

INDEX

Sr. No.	Contents	Page No.
1	Acknowledgement	4
2	Objectives	5
3	Introduction	6
4	Source of data, statistical tools and statistical software	8
5	Notations	9
6	Graphs	10
7	Analysis of data	19
8	Overall conclusion	30
9	Bibliography	31

ACKNOWLEDGEMENT

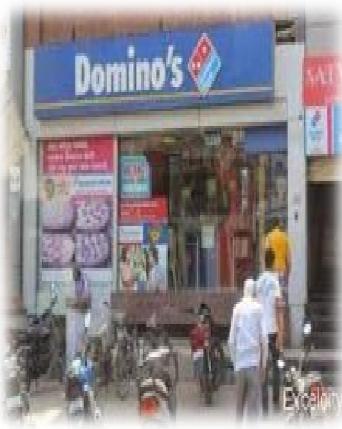
We wish to thanks to Department of Statistics, Vivekanand College, Kolhapur (VCK) for giving us opportunity to do the project. We would like to thanks Department of Statistics (VCK) for considering us for this project.

This project has been prepared under the guidance of Mrs. V. V. Pawar (Head of Department of Statistics in VCK), Hon. Dr. S.Y. Hongekar (Principal of VCK), Mr. M. S. Barale, Mr. A. B. Bhosale, Miss. M. B. Lohar, Mr. A. A. Pawar, Miss. P. C. Patil. We would like express our profound gratitude towards them for their guidance constructive suggestions throughout our project.

OBJECTIVES

1. To find out which is the most preferred Fast Food amongst students.
2. To find out which is the most preferred time for the consumption of Fast Food amongst students.
3. To find out which is the most preferred place for the consumption of Fast Food amongst students.
4. To find out the reasons for the consumption of Fast Food among different categories of the students.
5. To study the independence between area and gender, gender and money spend on eating the fast food.
6. To study population proportion of students according to BMI and Health problems faced by students.
7. To study the single population proportion test for male students according to their courses.

INTRODUCTION



Fast food is the term given to the food that can be prepared and served very quickly. Any meal with low preparation time can be considered to be fast food. The concept of fast food popped up during the 1920s. The 1950s first witnessed their rapid spread.

For a Nation that is particular about its food and significantly fond of home-cooked and fresh food, the trend is radically changing the way people eat and is definitely showing the globalization and increase of new markets not witnessed in India before. Due to rising disposable income, changing consumer behavior and favorable

demographics, India is observing a tremendous growth in the Fast Food and restaurant industries.

Additional reasons include exposure to western cuisine, the rising of number of nuclear families and growth in the number of employed women, which are also having a significant impact on the eating out trends and growth of the Fast Food industry in the country. As a result, to this trend all the international food players like Pizza Hut, Dominos, McDonalds and KFC are investing huge amount of money to grab a share of this highly lucrative market.

So after noticing this increasing trend of consumption of Fast Food, we the students of **Vivekanand College Kolhapur, B.Sc.III (Statistics)**, decided to take a survey to analyze the eating habits of the students of our college.



SOURCE OF DATA:

We have collected primary data from Vivekanand College, Kolhapur.

STATISTICAL TOOLS:

1. Pie chart
2. Simple Bar Diagram
3. Multiple Bar Diagram
4. Chi-Square Test
5. Proportion Test

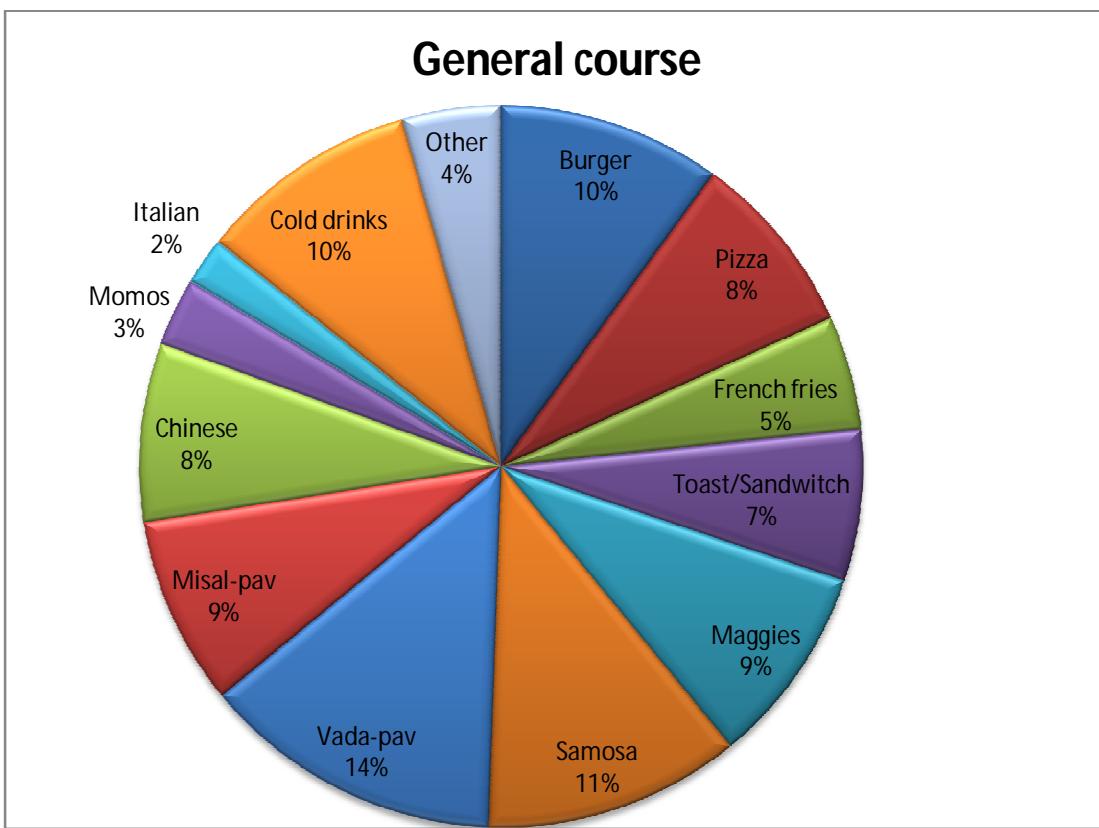
STATISTICAL SOFTWARE:

1. Ms-Excel

NOTATIONS

Description	Notation used
Professional	P
General	G
Health problems	HP
Body mass index	BMI
Calculated	cal
Tabulated	tab

PIE CHARTS



CONCLUSION:

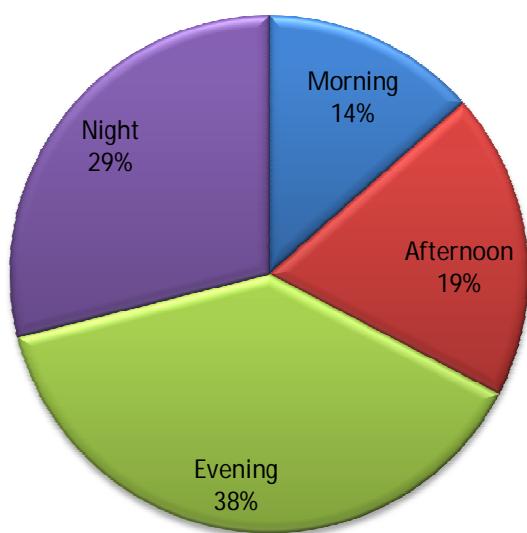
Most of the students eat Vada-pav and Samosa. And only few students eat Italian and Momos.



CONCLUSION:

Most of the students eat Vada-pav, Misal-pav, Cold drinks and Samosa. And only few students eat Italian, Momos and Other food items.

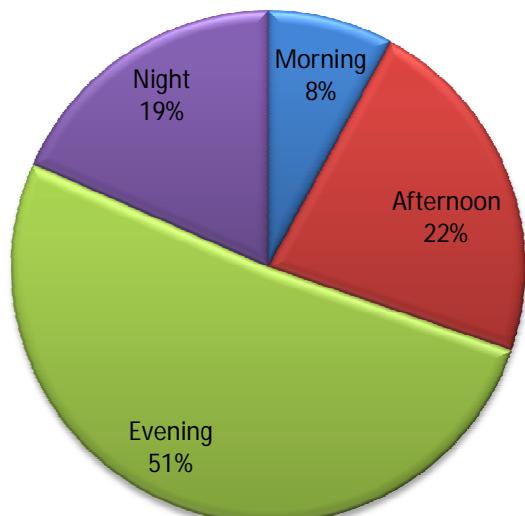
General Course



CONCLUSION:

Students eat fast food mostly at the Evening

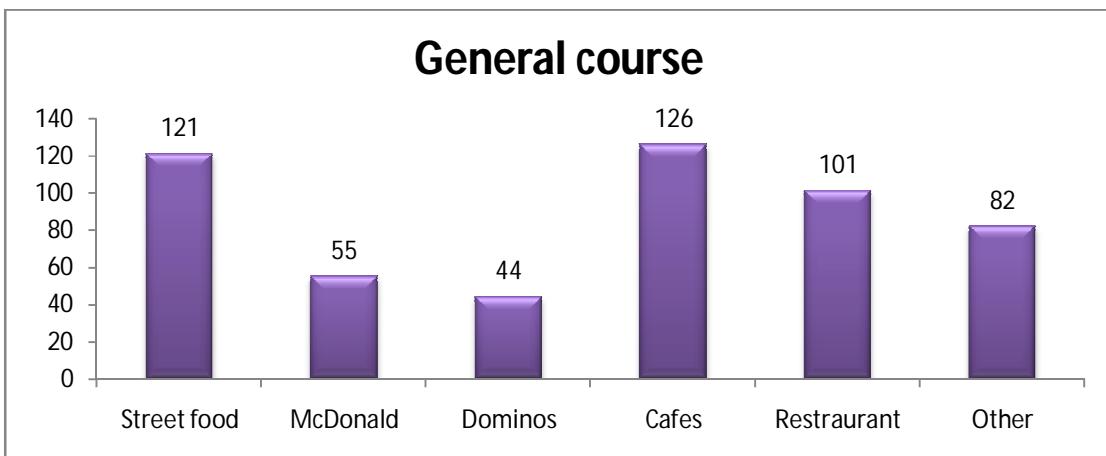
Professional course



CONCLUSION:

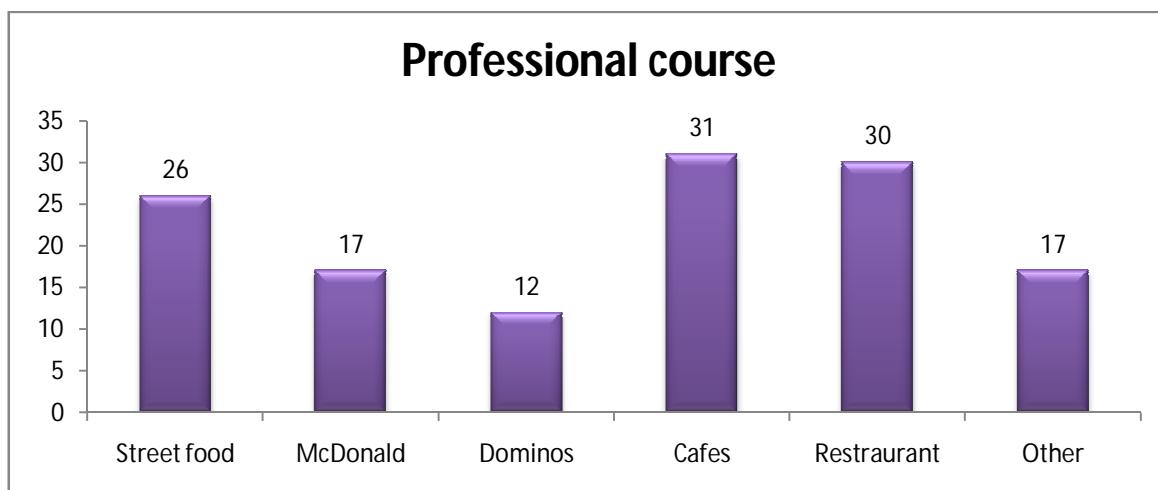
Students eat fast food mostly at the Evening

SIMPLE BAR DIAGRAM



CONCLUSION:

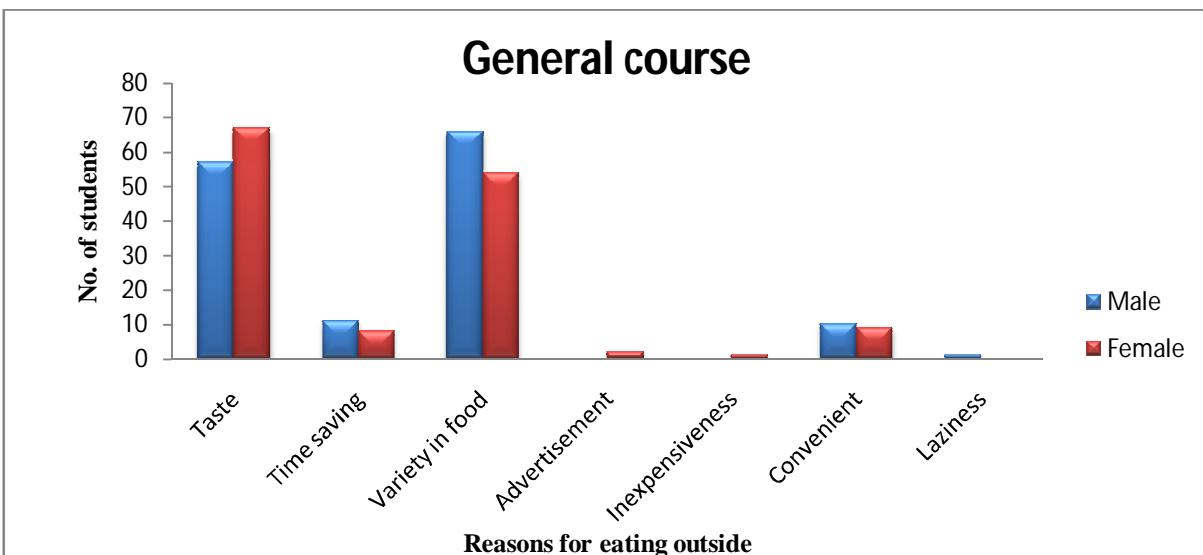
Most of students are preferred to eat fast food at Street and Cafes.



CONCLUSION:

Most of students are preferred to eat fast food at Cafes and Restaurants.

MULTIPLE BAR DIAGRAMME



CONCLUSION: There are more numbers of female students eat fast food for the taste and male students for variety in food.



CONCLUSION: There are more numbers of male students eat fast food for the taste and female students for variety in food.

TEST FOR INDEPENDENCE OF ATTRIBUTES

- **Aim:** To test the independence between area and gender.
- **Hypothesis:**

H_0 : AREA and GENDER are independent.

V/S

H_1 : AREA and GENDER are dependent.

Test statistic is,

$$\chi^2 = \frac{N(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)}$$

- **Decision criteria:**

Reject H_0 if $\chi_{\text{cal}}^2 > \chi_{\text{tab}}^2$, otherwise accept H_0

- **Observation table:**
- **For Professional course:**

		Area		Total
		Rural	Urban	
Gender	Male	18	15	33
	Female	7	24	31
Total		25	39	64

$$\chi_{\text{cal}}^2 = 6.8611 \quad \chi_{\text{tab}}^2 = 3.8414$$

Here, $\chi_{\text{cal}}^2 > \chi_{\text{tab}}^2$

- **Conclusion:** Hence reject H_0 at 5% level of significance. Hence we can conclude that gender and area are dependent. So here gender and area affects on the fast food consumption.
- **For General course:**

		Area		Total
		Rural	Urban	
Gender	Male	84	61	145
	Female	71	70	141
Total		132	154	286

$$\chi^2_{\text{cal}} = 1.9747 \quad \chi^2_{\text{tab}} = 3.8414$$

Here, $\chi^2_{\text{cal}} < \chi^2_{\text{tab}}$

- **Conclusion:** Hence accepts H_0 at 5% level of significance. Hence we can conclude that gender and area independent. So here gender and area dose not affects on the fast food consumption.

CHI-SQUARE TEST-WITH CONTINGENCY TABLE

- **Aim:** To test the independence between gender and money spend.
- **Hypothesis:**

H_0 : GENDER and MONEY SPEND are independent.
V/S

H_1 : GENDER and MONEY SPEND are dependent.
Test statistic is,

$$\chi^2 = \sum_{i=1}^n \left(\frac{(O_i - E_i)^2}{E_i} \right) \sim \chi^2_{(a-1)(b-1)} \quad ; i = 1, 2, \dots, n$$

Where,

a = number of rows

b = number of columns.

- **Decision criteria:**

Reject H_0 if $\chi^2_{\text{cal}} > \chi^2_{\text{tab}}$, otherwise accept H_0

- **Observation table:** (For Professional courses)

		Observed				Total	
		Money Spend					
Gender		<100	100-200	200-300	300>		
	Male	8	11	6	8	33	
	Female	4	13	9	5	31	
	Total	12	24	15	13	64	

		Expected			
		Money Spend			
		<100	100-200	200-300	300>
Gender	Male	6.1875	12.3750	7.7344	6.7031
	Female	5.8125	11.6250	7.2656	6.2969

$$\chi^2_{\text{cal}} = 2.7325 \quad \chi^2_{\text{tab}} = 7.8147$$

Here, $\chi^2_{\text{cal}} < \chi^2_{\text{tab}}$

- **Conclusion:** Hence accepts H_0 at 5% level of significance. Hence we can conclude that Gender and Money Spend to eat fast food are independent.

- **Observation table: (For General courses)**

		Observed				Total	
		Money Spend					
		<100	100-200	200-300	300>		
Gender	Male	38	49	26	32	145	
	Female	44	51	28	18	141	
Total		82	100	54	50	289	

		Expected			
		Money Spend			
		<100	100-200	200-300	300>
Gender	Male	41.5734	50.6993	27.3776	25.3497
	Female	40.4266	49.3007	26.6224	24.6503

$$\chi^2_{\text{cal}} = 4.4180 \quad \chi^2_{\text{tab}} = 7.8147$$

Here, $\chi^2_{\text{cal}} < \chi^2_{\text{tab}}$

- **Conclusion:** Hence accepts H_0 at 5% level of significance.
Hence we can conclude that Gender and Money Spend to eat fast food are independent.

TEST FOR PROPORTION OF MALE

- **Aim:** To test significant difference between two course population proportions.
- **Formulae:**

$$Z = \frac{p_1 - p_2}{\sqrt{P * Q * \left\{ \left(\frac{1}{n_1} \right) + \left(\frac{1}{n_2} \right) \right\}}}$$

Where,

$$P = \frac{(n_1 * p_1) + (n_2 * p_2)}{n_1 + n_2} \quad \text{And} \quad Q = 1 - P$$

- **Hypothesis:**

$$H_0: p_1 = p_2$$

i.e. there is no significant difference between two population proportions.

V/S

$$H_1: p_1 \neq p_2$$

i.e. there is significant difference between two population proportions.

- **Decision criteria:**

If $|Z| > 1.64$ then reject H_0 at 5% level of significance.

- **Calculation:**

1.
 - **Aim:** To test significant difference between two courses population proportions on the basis of BMI.

- **Hypothesis:**

$$H_0 : p_{(P)} = p_{(G)} \quad V/S \quad H_1 : p_{(P)} \neq p_{(G)}$$

- **Calculation:**

$$|Z| = 0.5684$$

$$Z_{\text{tab}} = 1.64$$

- **Conclusion:** As $|Z| < Z_{\text{tab}}$, so we accept H_0 at 5% level of significance. Hence proportion of two courses is equal.

2.
 - **Aim:** To test significant difference between two courses population proportions on the basis of Health problems faced by students.

- **Hypothesis:**

$$H_0 : p_{(P)} = p_{(G)} \quad V/S \quad H_1 : p_{(P)} \neq p_{(G)}$$

- **Calculation:**

$$|Z| = 0.7527$$

$$Z_{\text{tab}} = 1.64$$

- **Conclusion:** As $|Z| < Z_{\text{tab}}$, so we accept H_0 at 5% level of significance. Hence proportion of two courses is equal.

TEST FOR SINGLE POPULATION PROPORTION FOR MALE

- **Aim:** To test significant difference between two population proportions.
- **Formulae:**

$$Z_{cal} = \frac{p - P}{\sqrt{\frac{P * Q}{n}}}$$

- **Hypothesis:**

$$H_0: P = 0.5$$

V/S

$$H_1: P > 0.5$$

- **Decision criteria:**

If $Z_{cal} > Z_{tab}$ then reject H_0 at 5% level of significance, otherwise accept H_0 .

- **Solution:**

For General courses:

$$n = 286$$

$$\text{Numbers of males} = 145$$

$$Z_{cal} = 0.2365$$

$$Z_{tab} = 1.64$$

- **Conclusion:** Here, $Z_{cal} < Z_{tab}$. Thus we accept H_0 at 5% level of significances. Hence population proportion of male students who eats the fast food is equal to 0.5

For Professional courses:

$$n = 64$$

Numbers of males = 33

$$Z_{\text{cal}} = 0.25$$

$$Z_{\text{tab}} = 1.64$$

- **Conclusion:** Here, $Z_{\text{cal}} < Z_{\text{tab}}$. Thus we accept H_0 at 5% level of significances. Hence population proportion of male students who eats the fast food is equal to 0.5

CONCLUSION

- From Pie chart, most of the students in General courses eat Vada-pav and Samosa and in Professional courses Vada-pav, Misal-pav, Samosa and Cold-drinks.
- From Pie chart, students mostly prefer to eat fast food in the Evening for both the General and Professional courses.
- From Bar diagram, students from General courses prefer to eat fast food at Street and Cafes
- From Bar diagram, students from Professional courses prefer to eat fast food at Cafes and Restaurants.
- From Multiple bar diagram, for General courses there are more number of female students eat fast food for the taste and male students for variety in food.
- From Multiple bar diagram, for Professional courses there are more number of male students eat fast food for the taste and female students for variety in food.
- Gender and area is dependent for Professional courses, while for General courses they are independent.
- Gender and money spend on the fast food is independent for both the General and Professional courses.
- Proportion of students eating fast food for both the General and Professional courses is equal on the basis of the BMI and the Health problems faced by students.
- Proportion of male and female students eating fast food for both the General and Professional courses is equal.
- So from above conclusions we conclude that the students of our college are not addicted for eating fast food.

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