

Probability  
and  
Applications

Department of Mathematics and Statistics

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# Introduction

What is the solution for these uncertainty elements ?



***PROBABILITY***

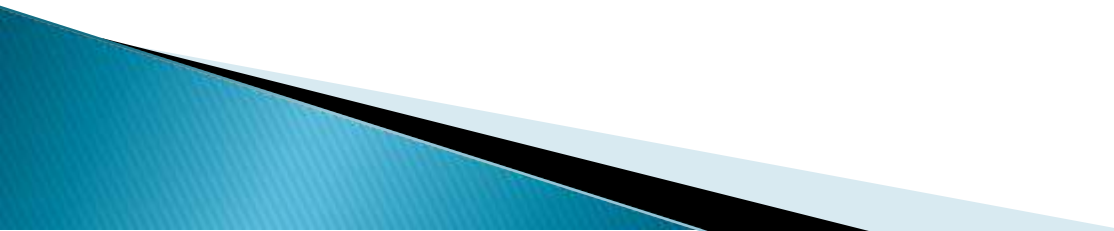
# Introduction

- ▶ Probability is a numerical evaluation of chance factor of an event.
- ▶ Probability of an event =  $\frac{\text{FAVOURABLE NO.OF OUTCOMES}}{\text{TOTAL NO.OF OUTCOMES}}$
- ▶ Probability started with gambling, it has been used extensively in the fields of Physical Sciences, Commerce, Biological Sciences, Medical Sciences, Weather forecasting, etc.,

# Applications

## SPORTS

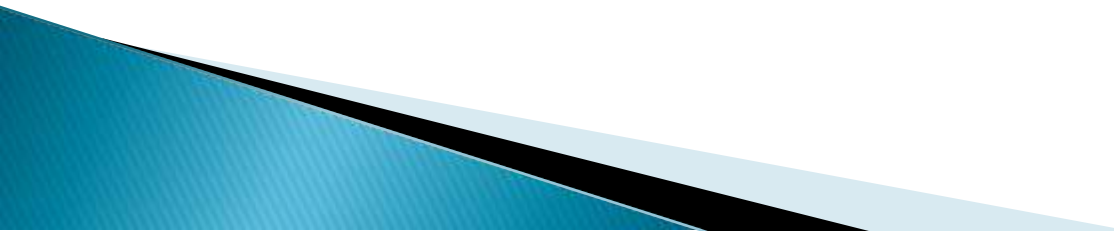
Basketball or football or cricket a coin is tossed and both teams have 50/50 chances of winning it.



# Applications

## MEDICAL DECISIONS

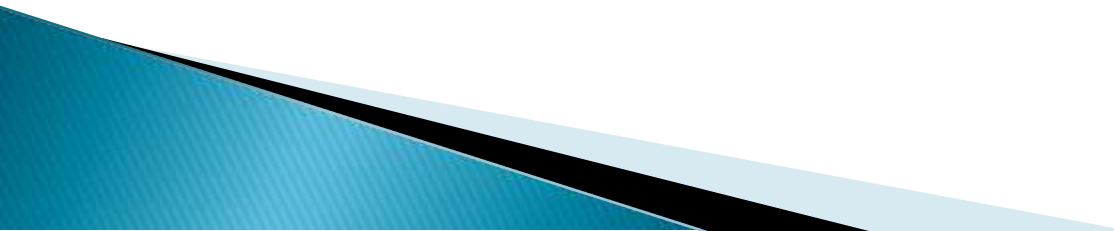
When a patient is advised to undergo surgery, they often want to know the success rate of the operation which is nothing but a probability rate. Based on the same the patient takes a decision whether or not to go ahead with the same.



# Applications

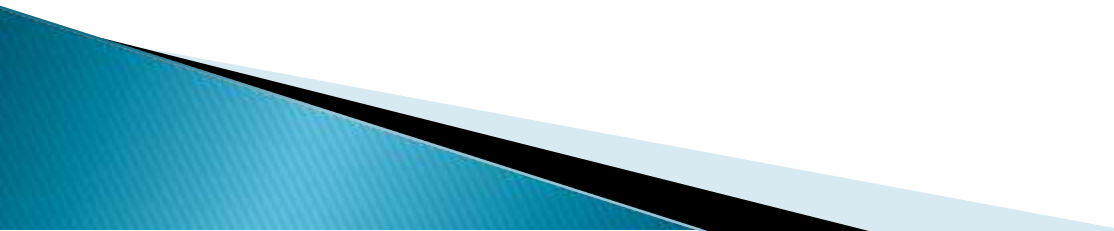
## WEATHER FORECASTING

when planning an outdoor activity, people generally check the probability of rain. Meteorologists also predict the weather based on the patterns of the previous year, temperatures and natural disasters are also predicted on probability and nothing is ever stated as a surety but a possibility and an approximation.



# WEATHER FORECASTING

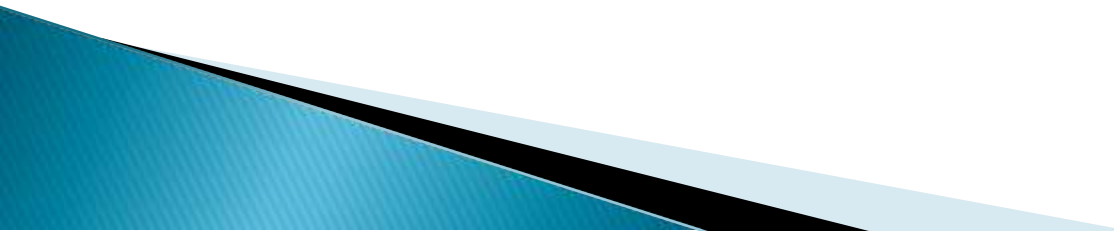
Nearly every day you use probability to plan around the weather. Meteorologists can't predict exactly what the weather will be, so they use tools and instruments to determine the likelihood that it will rain, snow or hail. For example, if there's a 60-percent chance of rain, then the weather conditions are such that 60 out of 100 days with similar conditions, it has rained



# INSURANCE

Insurance companies use probability approach to draft and price policies. When issuing health insurance, for instance, the policy given to a smoker is likely more expensive than the one issued to a non-smoker.

Statistical figures show a stronger association with a variety of health risks for habitual smokers or those with a history of smoking. Insuring a smoker, then, is a greater financial risk given their higher probability of serious illness and, hence, of filing a claim.





# INSURANCE

few people opt for fire insurance of their property because they perceive that odds are low, but of lately a lot of people have started getting their expensive smart phones insured because their chances of getting damaged or lost are high.

# BUSINESS

Sales Forecasting One practical use for probability distributions and scenario analysis in business is to predict future levels of sales. It is essentially impossible to predict the precise value of a future sales level.

## Activity 1:

A survey was taken on 30 classes at a school to find the total number of left-handed students in each class. The table below shows the results:

No. of left-handed students	0	1	2	3	4	5
Frequency	1	2	5	12	8	2

A class was selected at random.

- Find the probability that the class has 2 left-handed students.
- What is the probability that the class has at least 3 left-handed students?

## Activity 2 :

A bag contains 3 black balls and 5 white balls. Paul picks a ball at random from the bag and replaces it back in the bag. He mixes the balls in the bag and then picks another ball at random from the bag.

- a) Construct a probability tree of the problem.
- b) Calculate the probability that Paul picks:
  - i) two black balls
  - ii) a black ball in his second draw

### Activity 3 :

Take two bowels which consists

Bowel I : 2 Red and 1 yellow candies

Bowel II: 1 Red, 1 Black and 2 Orange candies

Select randomly 1 candy from each bowel  
what is the probability of getting

(a) 1 Red and 1 Red

(b) 1 Red and 1 Black

(c) 1 yellow and 1 Black

	Red	Black	Orange	Orange
Red	RR	RB	RO	RO
Red	RR	RB	RO	RO
Yellow	YR	YB	YO	YO

## Activity 4:

Take any coin, toss it ten times and note down the number of times head and tail come up. Record your observations in the form of the following table:

No. of times the coin is tossed	No. of times head comes up	No. of times tail come up
10	---	---

## Activity 5:

Toss two coins simultaneously ten times and record your observations in the form of table

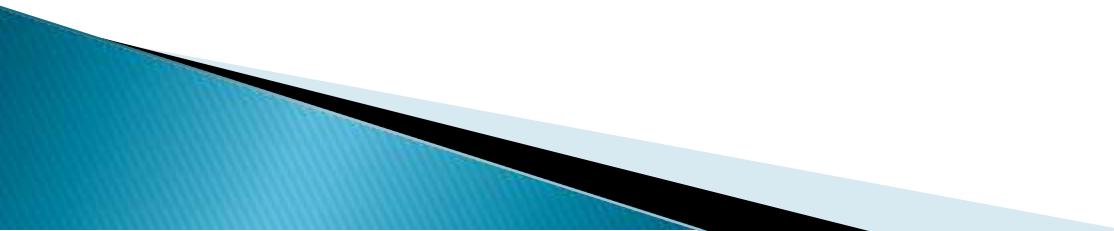
No. of times two coins are tossed	No. of times no head comes up	No. of times one head comes up	No. of times two heads come up
10	---	---	---

Similarly we can record no. of tails also.

## Activity 6:

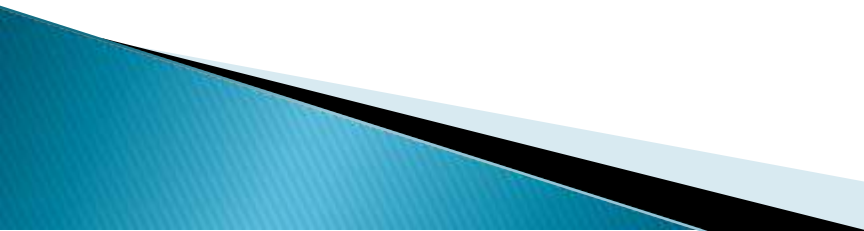
Divide the class into 2 or 3 groups. Let a student in each group toss a coin 15 times. Another student in each group should record the observations regarding heads and tails.

Similarly we can conduct the activities through die, pack of cards and calendar dates etc.



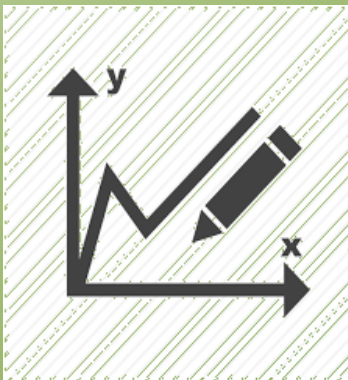


## CONCLUSION

- ▶ Students will begin to understand the concept of probability through hands on activities.
  - ▶ The process of helping students to learn the basic principles of probability.
  - ▶ This experiment is designed to help students see that the probability is not the same as reality. However, they should discover that as we do the experiment more times, the results resemble the probability more closely.
- 

Thank you









# What Is Statistics?

- 1. Collecting Data** e.g., Survey
- 2. Organising Data** e.g., Tables
- 3. Presenting Data** e.g., Diagrams & Bars

**4. Data  
Analysis**



**5. Interpretation**



# Collection of data

## SOURCES OF INFORMATION



```
graph TD; A([SOURCES OF INFORMATION]) --> B[Primary Source]; A --> C[Secondary Source];
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### **Primary Source**

- Data is collected by researcher himself
- Data is gathered through questionnaire, interviews, observations etc.

### **Secondary Source**

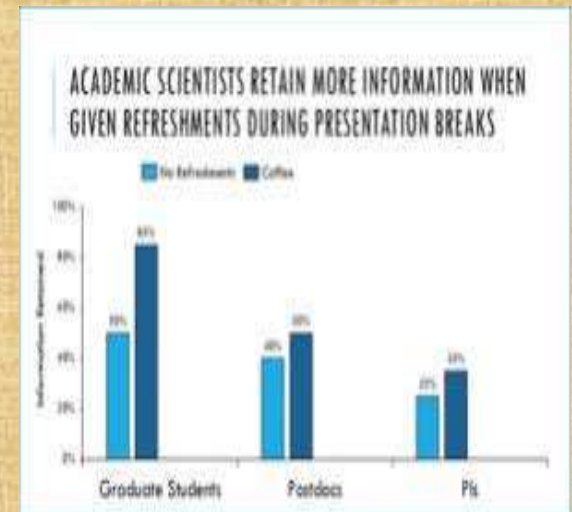
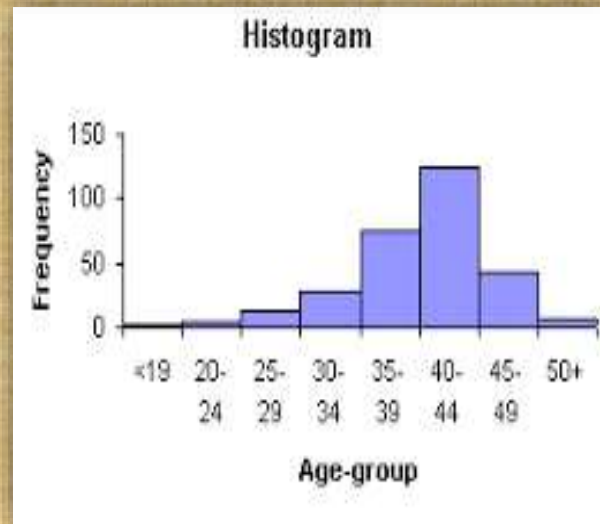
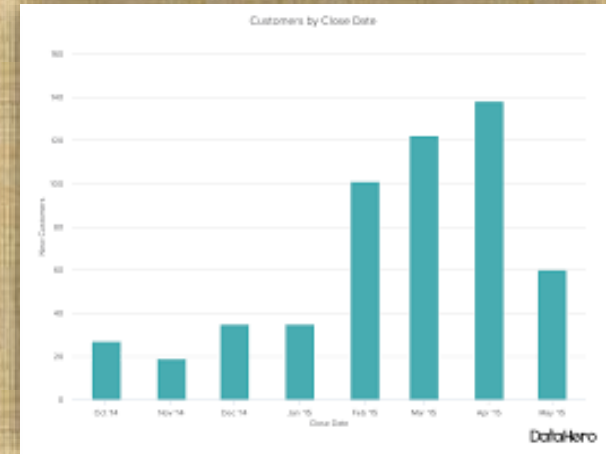
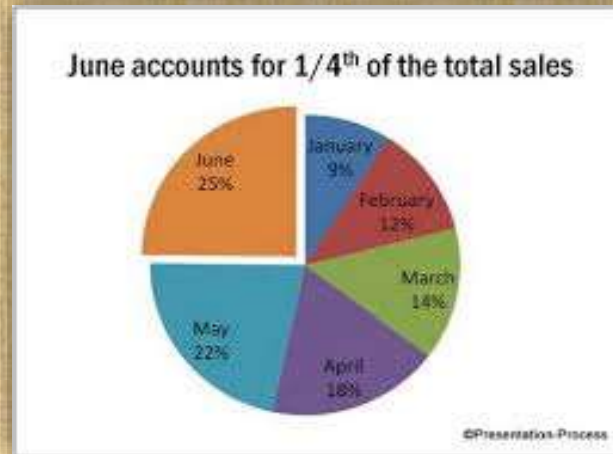
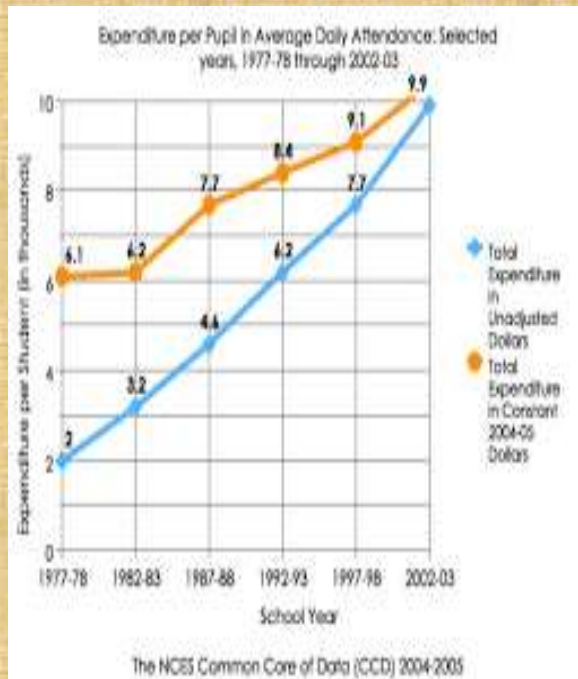
- Data collected, compiled or written by other researchers eg. books, journals, newspapers
- Any reference must be acknowledged

## Organising data

Subject	Tally Marks	Number of Students
Art		7
Mathematics		5
Science		6
English		4



# Presenting Data







# Interpretation of Data

The Art of Data Interpretation



# Applications of Statistics in Real life

- Industries and Business
- Agriculture
- Forecasting
- Education
- Medical Studies
- Sports
- Research etc.....

# **STATISTICS**

- **A BUNCH OF NUMBERS FOR A FIGHT,  
IS NOT THE PROBLEM BUT IT IS THE SOLUTION**



Thank  
you



# CONSUMER BEHAVIOR TOWARDS OFFLINE VS ONLINE SHOPPING IN HYDERABAD

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## **Abstract:**

In this paper, we study the consumer behavior towards offline vs. online shopping in Hyderabad. The study tells us which shopping is preferred more i.e., online (or) offline. We are comparing many characters like Gender, age, education qualification, occupation, income, family etc to get a better result. We analyzed demographic factors using diagrammatic representation. We also used chi square test and factor analysis to test the effect of factors through SPSS.

**Key words: GST, Offline, Online, demographic factors.**

## **INTRODUCTION:**

The concept of shopping in India has rapidly changed due to drastic increase in usage of technology and shopping online via apps is the latest trend now. People shop easily using their phones but as the recent introduction of GST has complicated matters and forced the people to look back towards the local kirana stores and offline shopping India

In Hyderabad, shopping is done at large extent. People prefer both online and offline shopping. Whereas, Most of the educated and salaried persons use online shopping. Unlike offline shopping, almost everyone does offline shopping in Hyderabad. Before demonetization, Hyderabad was not that much into online shopping. But as year's passes, People are more interested in online shopping. Offline shopping is becoming less due to work stress, laziness and many other reasons of the people.

Shopping is done by each and every person in the country irrespective of their gender, age, education qualification, occupation, income etc. It is one of the most important activities. As

the technology is increasing day-by-day, online shopping is emerging very fast in recent years. Whereas, shopping can be done in two ways.

They are: (1) Offline shopping (i.e., Traditional shopping) and (2) Online shopping.

Traditional shopping is a process where consumers buy their products directly from the stores by comparing Convenient. Traditional shopping requires the customer to have knowledge and information about the product. The customers can touch and feel the products before buying. Traditional retail can be categorized into many categories like Departmental stores, Convenience retailer, Super market, Specialty retailers, Vendors, Street Hawkers, and Entrepreneurs etc. Offline detail can also be categorized into Organised and Unorganised retail. Organised retailing refers to the trading activities undertaken by licensed retailers which include Haymarket's and large business. Unorganised retail means the small retailers who include local kirana shop, footwear shops etc.

Online shopping is a process where customers buy their goods, without any intermediate services through the internet by visiting various websites as per their convenience and comfort. The customers can't touch the products, but they don't have to be present physically at the market to buy the product. Online stores help the shoppers to find new models, brand or items. Online customers need to access to the internet and a valid method of payment in order to complete a transaction such as credit or debit card. Some of the online retailing corporations are Amazon, e-bay etc.

## **OBJECTIVES:**

The Present study compares the online and offline shopping:

- (a) To analyze the significant difference between the online and offline consumers in terms of demographic factors and attitude of the consumers.
- (b) To analyze the significant effect of demographic factors and Type of Shopping.
- (c) To analyze the significant effect of demographic factors and purchasing accessories and groceries
- (d) To test the factors affecting on online shopping

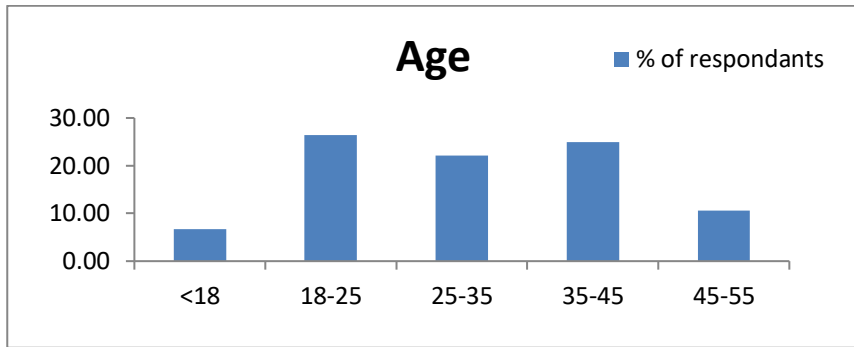
(e) To find the effect demographic factors on Online Vs Offline shopping.

**RESEARCH METHODOLOGY:**

Sources of data:

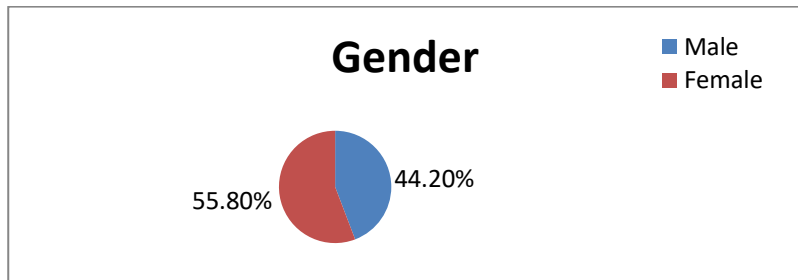
The Primary data for the above study has been collected through structured questionnaire

Age	% of respondents
<18	6.73
18-25	26.44
25-35	22.12
35-45	25.00
45-55	10.58
>55	9.13



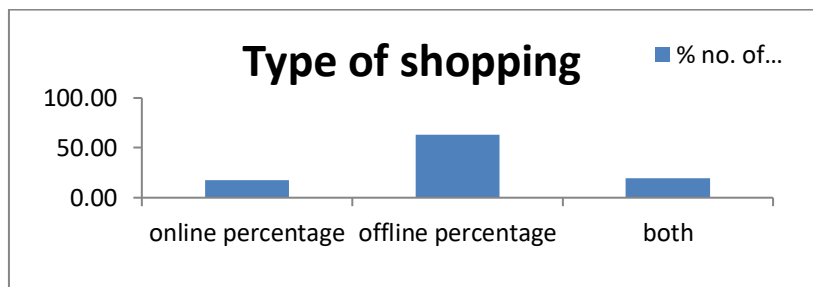
From the above Bar graph we conclude that the age group less than 18 years are 6.73% of shopping, greater than 55 years are 9.13% of shopping, 18-25 years are 26.44% of shopping, 25 - 35 years are 22.11% of shopping, 35 -45 years are 25% of shopping and 45 -55 years are 10.57% of shopping. Hence, we can conclude than 18-25 years age group of people are shopping in more number and less than 18 years age group of people are shopping in less number.

Gender	% no. of respondents
Male	44.2%
Female	55.8%



From the above Pie-chart we can see that male are 44.2% of shopping and female are 55.8% of Shopping. Hence, we can conclude that females are doing more shopping than male.

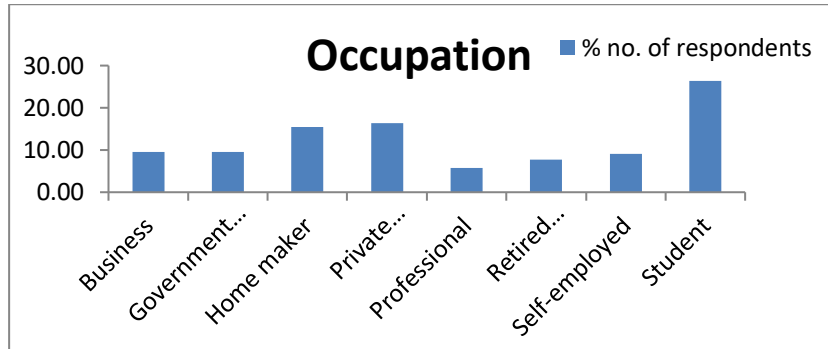
Type of shopping	% no. of respondents
online	17.31
offline	62.98
both	19.71





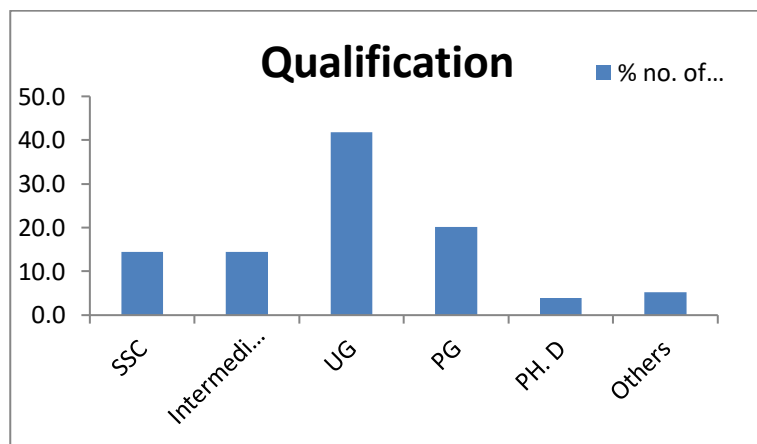
From the above figure we can see that 17.31% are online shopping, 62.98% are the offline shopping and 19.71% are both online and offline shopping. Hence, we can conclude that most of the people are preferring offline shopping than the online shopping.

Occupation	% no. of respondents
Business	9.62
Government employee	9.62
Home maker	15.38
Private employee	16.35
Professional	5.77
Retired employee	7.69
Self-employed	9.13
Student	26.44



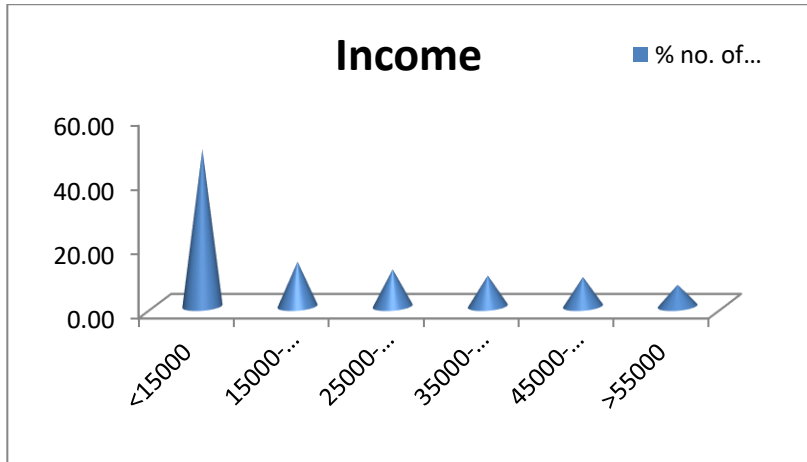
From the above bar graph we can say that government employees are 9.61%, homemakers 15.38%, business people are 9.61%, private employees are 16.34%, professionals are 5.76%, retired employees are 7.69%, self-employees are 9.13% and students are 26.44%. Hence, we can conclude that students are taking part in shopping in more number.

Qualification	% no. of respondents
SSC	14.4
Intermediate	14.4
UG	41.8
PG	20.2
PH. D	3.8
Others	5.3



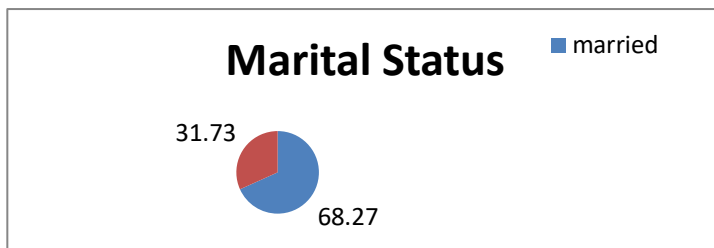
From the above Bar diagramme we can say that SSC 14.4%, Intermediate 14.4%, UG 41.8%, PG 20.2% , Ph.D 3.8% and Others are 5.3% are shopping. Hence, we can conclude that UG students are doing shopping more number.

Income	% no. of respondents
<15000	49.04
15000-25000	13.94
25000-35000	11.54
35000-45000	9.62
45000-55000	9.13
>55000	6.73



From the above figure we can say that the people earing income less than 15000 fall under 49.03% of shopping, greater than 6.73% of shopping, 15000-25000 fall under 13.94% of shopping, 25000-35000 fall under 11.53% of shopping, 35000-45000 fall under 9.61% of shopping and people earning income 45000-55000 fall under 9.13% of shopping. Hence, we can conclude that the people earning 15000-2500 are shopping more in number.

Marital Status	% no. of respondents
married	68.27
unmarried	31.73



From the above Pie-chart we can say that married people fall under 68.26% of shopping and unmarried people fall under 31.73% of shopping. Hence, we can conclude that married people are doing shopping more in number.

Type of family	% no. of respondents
Nuclear	83.65
Joint	16.35

From the figures we can say that nuclear families fall under 83.65% of shopping and joint families fall under 16.34% of shopping. Hence, we can conclude that nuclear families are doing shopping more in number.

We tested demographic factors Vs Type of Shopping using Chi-square test for Independence of attributes through Ms-Excel.

	calculated value	conclusion
Gender vs. type of shopping	0.962	There is no association between gender and type of shopping
Age vs type of shopping	0.052	There is no association between age and type of shopping
Education qualification vs type of shopping	<b>0.002</b>	There is an association between education qualification and type of shopping
Occupation vs type of shopping	<b>0.048</b>	There is an association between occupation and of shopping
Income vs type of shopping	0.057	There is no association between income and type of shopping
Marital status vs type of shopping	0.391	There is no association between marital status and type of shopping
Family vs type of shopping	0.213	There is no association between family and of shopping
Family size vs type of shopping	0.3162	There is no association between family size and type of shopping

We tested demographic factors Vs purchasing accessories and groceries on Offline shopping using Chi-square test for Independence of attributes through Ms-Excel.

	calculated value	conclusion
Gender vs purchasing accessories and groceries	0.339	There is no association between Gender and purchasing accessories and groceries
Age vs purchasing accessories and groceries	<b>0.004</b>	There is an association Age and purchasing accessories and groceries
Income vs monthly expenditure on grocery	0.063	There is no association between Income and monthly expenditure on grocery
Income vs annual expenditure on accessories	<b>0.001</b>	There is an association between Income and annual expenditure on accessories

#### Online stores

	calculated value	conclusion
Income vs monthly expenditure on groceries	0.881	There is no association between Income and monthly expenditure on groceries
Income vs annual expenditure on accessories	<b>0.013</b>	There is an association between Income and annual expenditure on accessories

We used factor analysis to test the factors affecting on online shopping through SPSS.

	convenience	easy to compare the product	Ease of product return and Money refund	quality	Price related	discount	Door delivery
convenience	1.000	.471	.454	.128	.372	.175	.310
Easy to compare the product	.471	1.000	.098	.138	-.107	-.195	.076
Ease of product return and Money refund	.454	.098	1.000	.235	.369	.483	.167
quality	.128	.138	.235	1.000	.474	.440	.190
pricerelated	.372	-.107	.369	.474	1.000	.590	.236
discount	.175	-.195	.483	.440	.590	1.000	.315
doordelivery	.310	.076	.167	.190	.236	.315	1.000

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.586
Bartlett's Test of Sphericity	Approx. Chi-Square	150.153
	df	21
	Sig.	.000

From the above KMO and Bartlett's test we can say that the adequacy value is more the 0.5, hence we conclude that it is acceptable to apply factor analysis for the data.

The significant value is less than 0.05 hence it is significant to apply.

**Communalities**

	Initial	Extraction
CONVENIENCE	1.000	.781
EASYTOCOMPARE	1.000	.846
MONEYREFUND	1.000	.492
QUALITY	1.000	.626
PRICERELATED	1.000	.694
DISCOUNT	1.000	.775
DOORDELIVERY	1.000	.819

Extraction Method: Principal Component Analysis.

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	2.707	38.667	38.667	2.707	38.667	38.667	2.314	33.055
2	1.467	20.952	59.619	1.467	20.952	59.619	1.541	22.008	55.063
3	.860	12.280	71.899	.860	12.280	71.899	1.179	16.836	71.899
4	.847	12.094	83.993						
5	.557	7.964	91.957						
6	.331	4.731	96.688						
7	.232	3.312	100.000						

Extraction Method: Principal Component Analysis.

From the above Extraction sums of squared loadings we conclude that the first factor accounts for 38.667% of the variance, the second 20.952% and the third 12.280%. All the remaining factors are not significant

**Component Matrix<sup>a</sup>**

	Component		
	1	2	3
CONVENIENCE	.610	.632	-.094
EASYTOCOMPARE	.145	.873	.250
MONEYREFUND	.691	.101	.065
QUALITY	.623	-.154	.463
PRICERELATED	.780	-.267	.118
DISCOUNT	.765	-.434	-.039
DOORDELIVERY	.504	.107	-.744

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

**Rotated Component Matrix<sup>a</sup>**

	Component		
	1	2	3
CONVENIENCE	.273	.745	.390
EASYTOCOMPARE	-.090	.910	-.094
MONEYREFUND	.586	.307	.234
QUALITY	.759	.135	-.176
PRICERELATED	.811	.001	.193

DISCOUNT	.799	-.193	.315
DOORDELIVERY	.129	.083	.892

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

From the above Rotated component matrix we conclude that The factors Quality, price related and Discount are affecting more compare to the other factors

### **Conclusion:**

1. From the analysis we conclude that there is an association between educational qualification and type of shopping
2. There is an association between occupation and type of shopping
3. There is an association between Age and purchasing accessories and groceries in offline shopping
4. There is an association between Income and annual expenditure on accessories in Offline shopping
5. There is an association between Income and annual expenditure on accessories in Online shopping.
6. From the factor analysis we conclude that The factors Quality, price related and Discount are affecting more compare to the other factors

The generation today is living in a techy savvy world where in everything is available to them online. So the present study focused on demographic factors which influence the buying behaviour of a customer online. It was evident from the study that age, educational qualifications, income levels & occupation have shown significance association in the buying behaviour of the customers. Customers of the present generation would like to prefer online as they are more expose to online . The educated customer knows how to get the benefit of online shopping. In the same way the higher the income the more people prefer shopping online. The customer's occupation also shows the difference of shopping. So the study concludes by saying that these factors show a change in the buying behaviour of the customer.

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# A Critique Survey on Perspective of Women en route Ready to eat food products, Hyderabad, India

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## Abstract

In India, most of the people take their food still at home. But with time, convenience food usage is expanding due to growth in urbanization, breaking up of the conventional joint family system, probing for quality, lack of time, increasing number of working women, increase in per capita income, Changing lifestyles and increasing level of luxury in the middle income group had brought about the changes in food habits. The prevailing studies on this subject are limited needing further exploration into the matter. The study aimed to check the preference of women towards the ready to eat food, to identifying the factors influencing the acquisition of ready to eat food, to check the extent of awareness of women towards ready to eat food products and also to spot most preferred time for ready to eat food in Hyderabad. This study is empirical in nature supported on a sample of respondents, selected by adopting probability sampling method. The data are analysed using Chi square, ANOVA, Explanatory Factor Analysis (EFA) and Garret Ranking technique using Ms Excel and SPSS. The result shows that there is no association between age, qualification and preference towards the ready to eat food but, there is an association between occupation, marital status, and nature of family, income and preference of ready to eat food. This study identified the seven factors which influence the preference of the ready to eat food by women. It also reveals that most of the women prefer ready to eat food at morning and evening times. It is hoped that the findings of this empirical study, supported a reliable sample and valid statistical analysis would have facilitated adding to the existing contributions on the subject.

**Keywords:** Ready to eat food, Women, Influencing factors, Preference, EFA.

## I. Introduction:

### A. Research Background

In modern days, where the life is at quick, pace with the time very vital to every person, ready to eat foods play a valuable role in everyone's day to day life. In olden days people used to have their food generously and slowly but this trend changed the habits to foods due to their busy schedule. Hence, the existence of these ready to eat foods fulfilled all the wants of contemporary person. Conception food with instant mixes has become

the simplest way of life and no doubt they are going to be an integral part of food habit in future. The food habits in India have reciprocated due to the western influence and the usage of these foods is additionally on the increase.

### Research Objectives

Research on existence of perception of women en route ready to eat food in India remains mostly uncharted. Researchers on ready to eat food among women and the factors influencing the acquisition of ready to eat food are very limited. Hence the study aims to explore the factors that influence in

purchase of ready to eat food. The present study evaluates preference of women towards ready to eat food, study the extent of awareness of women in ready to eat food products and also to identify most favored time for ready to eat food in Hyderabad.

### **Hypothesis of the study:**

The research hypotheses are developed, keeping in perceive the objectives of the study, i.e., testing the relation between various demographic factors and desire of ready to eat food; buying preferences of women towards ready to eat food products; effect of income level towards the ready to eat food; analyzing the attributes, having a sway on the purchasing of ready to eat food.

### **B. Prior Research**

There are three types of variables that influence buying aim of customer. The primary one is intrinsic elements, second one is extrinsic variables and third one is demographic information [1]. Within the past studies regarding awareness, purchase behavior, brand preference, factors influencing brand preference and alternative purchase plans has been analysed[2]. Examination between the link among perception about food, its preference and choices of food; recognize and spot out the explanations that have an impression on perception of food, its preference, and various factors that influence the preferences and food choice was done[3]. Evaluated the consumer's level of contentment on using instant food items and period of using instant food products [4]. Described about the three forms of ready to cool foods i.e., Satisfaction of consumer, convenient usage and usefulness. The result showed that easiness in cooking and time saving was the main characteristics of ready to cook foods that affect the buying decision of consumers [5]. Worked on the acquisition behavior of consumer regarding food industry in Northern India and analysed the consumption pattern of food products, aware about the ready to eat food industry [6]. Analysed the eating behavior and fondness of single living male and female towards convenience food products [7]. A study inspected about the factors which influenced the negative aspects, usefulness, ease of

use, advertisement, familiarity, fondness, price influence and time taken on readymade food products[8].

## **II. Research Methodology, Data Collection, Analysis And Results**

### **A. Research Methodology**

The present study is initiated to test the preference of women towards the ready to eat food, to identifying the factors influencing the acquisition of ready to eat food, to look at the extent of awareness of women about ready to eat food products and also to spot most favored time for ready to eat food in Hyderabad. This research focus the varied important factors that individual perceive for ready to eat food and perception of women towards ready to eat food.

### **Research Hypotheses:**

The research hypotheses are formulated, keeping in view of following objectives of the study, thus:

- a) H11: There is an association between various demographic factors and preference of ready to eat food.
- b) H12: There is an association between occupation buying preferences of women towards ready to eat food products.
- c) H13: The attributes, having a manner on the acquiring of ready to eat food by women, have latent and interdependent factors related to them.

### **Sample Size:**

A sample of 256 respondents has been selected, confining to Hyderabad, on the basis of random sampling method.

### **B. Data Collection**

Data have been collected from the sample of women through structured questionnaire. For this, recourse has been made to Google forms and also collected by interview method.

### **C. Data Analysis**

The data are analysed and hypotheses are tested by using valid statistical tools viz., descriptive

statistics, Chi-square test, ANOVA, Exploratory Factor Analysis and Garret Ranking technique.

**Demographic Factors:**

A glance at the information on the demographic factors (Table 1) reveals that out of total sample of 256 women respondents, about age the distribution of the women is comparatively skewed towards the younger age group with 53% (52.7) in the age group of 20-39 years and 24% (24.2) in the age group of 30-39 years. The model age group is 40-49 years with 18% (18.4) members belonging therein. A small number of 5% (4.7%) are in the age group of 50 and above.

An investigation of the occupation of respondents shows that 10% (9.5) are Government, 51% (50.8) are Private employees and 9% (8.6) are Business women. Home makers are 17% (16.8) and others are 14% (14.1).

It is observed that 59% (59.4) are married and 41% (40.6) are unmarried women respondents and also we see 67% (66.8) belongs to Nuclear and remaining from Joint families

The data on the educational qualification of women indicates that, majority of the respondents 45% (44.9) are graduates, 35% (34.8) are post graduates and 10% are intermediate , high school in each.

Regarding the income, the respondent belongs to Rs. Below 10,000 are 39% (39.1), Rs. 10000 – 25000 are 36% (36.3), Rs. 25000-50000 are in 18% and 7% (6.6) are belongs to 50000 and above.

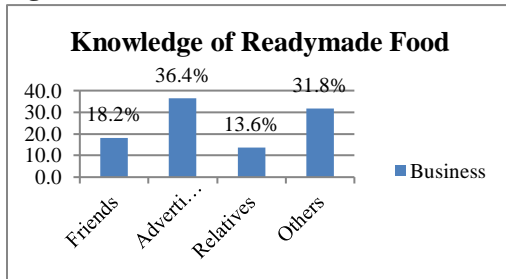
**Table 1: Frequency distribution of Demographic Factors**

S.No.	Variables	Category	Frequency	Percentage
1	Age	20-30	135	52.7
		30-40	62	24.2
		40-50	47	18.4
		50-60	9	3.5
		60-70	2	0.8
		70-80	1	0.4
2	Occupatio	Governme	25	9.8

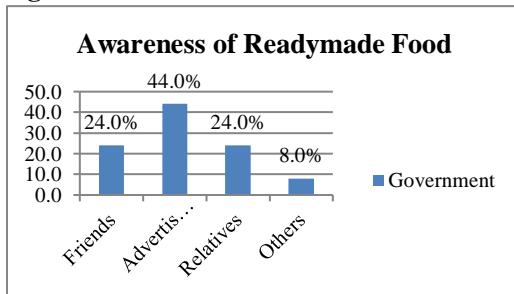
	n	nt		
		Private	130	50.8
		Business	22	8.6
		Home maker	43	16.8
		Others	36	14.1
3	Marrital Status	Married	152	59.4
		Unmarried	104	40.6
4	Type of family	Nuclear	171	66.8
		Joint	85	33.2
5	No. of people in a family	1_3	71	27.7
		4_6	155	60.5
		7_9	17	6.6
		>9	13	5.1
6	Education al Qualificat ion	High School	26	10.2
		Intermedia te	26	10.2
		Under Graduate	115	44.9
		Post Graduate & above	89	34.8
7	Income per month (in '000s)	<10	100	39.1
		10_25	93	36.3
		25-50	46	18.0
		50 and above	17	6.6

From Figures 1, 2, 3, 4 we observe that nearly all of Business, Government employees and Home makers getting information about ready to eat food through Advertisements where as Private people are coming to know from the friends. Therefore we can say advertisement of a product giving more awareness about ready to eat food to women in Hyderabad.

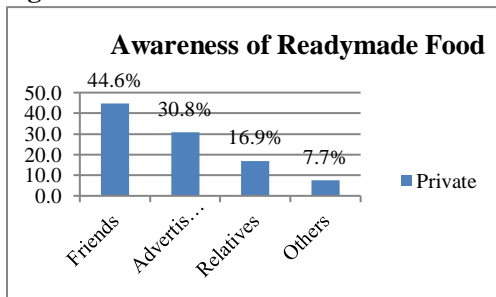
**Figure 1**



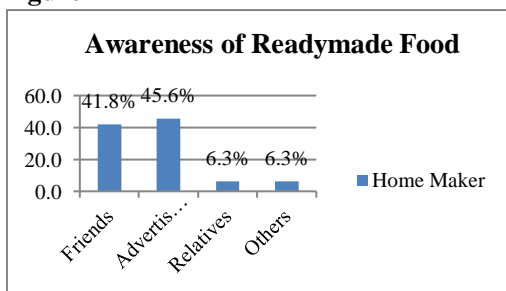
**Figure 2**



**Figure 3**



**Figure 4**



**Testing Of Hypotheses:**

The Hypothesis H<sub>11</sub> taken for the study has been tested using Chi-Square test. From the Table 2 it is observed that the p – value is greater than 0.05 for attributes age, qualification and income and less than 0.05 for attributes occupation, marital status and type of family. Hence we conclude that there is no association between age, qualification and

preference towards the ready to eat food but, there is an association between occupation, marital status, type of family, income and preference of ready to eat food.

**Table 2: Chi-Square Test for Demographic Factor Vs Preference of ready to eat food**

Attribute	p - value
Age	0.2217
Occupation	0.0385
Marital Status	0.0457
Type of Family	0.0455
Qualification	0.1957
Income	0.0319

The hypothesis H<sub>12</sub> taken for the study has been tested using ANOVA. From Table 3 it shows that the buying preference of women towards the ready to eat food among different occupation of women in Hyderabad district, since p - value is greater than 0.05, the alternative hypothesis is rejected. Therefore occupation wise there is no significant difference in buying preference of women towards the ready to eat food among different occupation of women. It is further clear that occupation is not a significant variable in buying preference of ready to eat food for women in Hyderabad.

**Table 3: ANOVA Results for Occupation and Buying preference of women**

Source of Variation	SS	df	MS	F	P- val ue	F crit
Between Groups	195 4.3	4	488. 575	2.6 586	0.0 738	3.05 5568
Within Groups	275 6.5	15	183. 766			
Total	471 0.8	19				

**Ready to eat food and their Attributes:**

The responses (on the likert scale of 1 to 5) given by the women numbering 256, to each of the 15

attributes of the preference of ready to eat food considered for the study (Table 4), on the average, lie between 2.28 and 4.00, indicating that the women possess all these attributes within them to different degrees on the lower side. The variation in their responses is in the range of 1.010 to 1.449, reflecting consistency in the responses.

**Table 4: Attributes - Mean and Standard Deviation**

	Mean	Std. Deviation
Quality	3.29	1.312
Taste	3.63	1.328
Availability	3.26	1.322
Cost saving	2.28	1.126
Easy to cook	4.00	1.010
Advertisement and Presentation	3.07	1.294
Convenient	3.23	1.264
Time saving	3.63	1.295
party time	3.95	1.036
variety	2.86	1.216
Laziness	3.14	1.158
fun and entertainment	3.45	1.309
Hectic Life style	3.39	1.449
Influence of children	3.05	1.379
Attractive Offers	2.89	1.386

**Attributes Influencing the preference of ready to eat food:**

The number of attributes, having a bearing on the factors influencing the preferring ready to eat food by women is quite large and is reduced herein into a smaller and manageable number of latent and interdependent factors associated with them, by using Exploratory Factor Analysis (EFA) method. This facilitates determining the underlying structure of factors influencing the preference of ready to eat food. To validate the use of factor analysis, Kaiser-Meyer-Olkin (KMO) measure of

sampling adequacy is found. Table 5 shows the value as 0.603, and being more than 0.5 it indicates multivariate normality among the original variables.

**Table 5: KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.603
Bartlett's Test of Sphericity	Approx. Chi-Square	596.196
	df	105
	Sig.	0.000

The null hypothesis that the variables taken into account for the study are uncorrelated is tested by using the Bartlett's Test of Sphericity. The result, given by the Chi-Square statistic, shows the value of 596.196, with 105 degrees of freedom and significant value approximating to 0.000. Thus, the null hypothesis is rejected at 0.05 level of significance, and it is considered that the variables taken into account for the study are correlated, paving the way for the use of factor analysis. The amount of variance accounted by the factor solution for each variable, i.e., communality, should be 0.5 or higher for a valid factor structure. The relative data (Table 6) show that most of the values are above 0.5 confirming validation of the analysis done.

**Table 6: Communalities**

	Initial	Extraction
Quality	1.000	0.664
Taste	1.000	0.611
Availability	1.000	0.655
Cost saving	1.000	0.55
Easy to cook	1.000	0.716
Advertisement and Presentation	1.000	0.518
Convenient	1.000	0.671
Time saving	1.000	0.515
party time	1.000	0.507

variety	1.000	0.654
Laziness	1.000	0.508
fun and entertainment	1.000	0.566
Hectic Life style	1.000	0.652
Influence of children	1.000	0.568
Attractive Offers	1.000	0.704

Extraction Method: Principal Component Analysis.

On extracting the 15 attributes based on the Principal Component Analysis (PCA) extraction method, and then choosing the Varimax rotation method, the rotation based on the cumulative percentage of variance criterion envisages that, for social sciences, 50% - 60% of variance explained is sufficient. Therefore, for the study, the EFA, with the aid of extraction technique PCA and the rotation method Varimax, based on a fixed number of seven factors has been carried out. The output is given in Table 7, and seven factors cumulatively contributed to 59.73% of the total variance in the data.

**Table 7: Eigen Values for the seven extracted factors**

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	1.695	11.298	11.298
2	1.33	8.869	20.167
3	1.242	8.283	28.45
4	1.211	8.075	36.525
5	1.192	7.944	44.469
6	1.157	7.714	52.183
7	1.132	7.547	59.73

**Preference of ready to eat food and Related Factors:**

For analysing the information, its reliability has to be tested for internal consistency of the select factors obtained by factor analysis. This is done

using Cronbach's alpha which is found to be 0.682, 0.725, 0.876, 0.624 and 0.653. Thus, the responses are considered as internally consistent.

In order to work out the variable's role and contribution in determining the factor structure, the factor loadings for every variable were processed because the factor loading is that the correlation of the variable and also the factor, the squared loadings is that the amount of the variable's total variance accounted. Therefore, a 0.5 loading ( R ) denotes that 25% of the variance is accounted for the factor. On getting a satisfactory factor solution thus, the factors are labeled. This process is about assigning the aspiring to the factor structure. After examining all the numerous variables for a specific factor, the factors were named by following the caveat of accurate reflection of the variables on the factor. The information on the rotated components, for every of the seven factors, are given in Table 8. For every factor, the values of loadings indicate the correlations of the original variables with that factor. It is seen that select attributes are highly loaded to factor 0.501 and above. Similarly, the set of attributes highly loaded to the other six factors with values exceeding 0.5 can be identified.

**Table 8: Rotated Component Matrix**

	1	2	3	4	5	6	7
Convenient	0.713						
Hectic Life style	0.710						
Availability	0.572						
Cost saving	0.501						
Taste		0.601					
Attractive Offers		0.565					

Advertisement and Presentation			0.507				
Influence of children			0.531				
variety			0.515				
Quality				0.597			
Easy to cook					0.649		
Time saving					0.543		
party time						0.561	
fun and entertainment						0.506	
Laziness							0.511

Extraction Method: Principal Component Analysis.

a. 7 components extracted.

Based on the factor loadings, the underlying factor structure has been identified as shown within the Table 9. These factors are Accessible (was explained 11.298% of variance), Sales Promotions (was explained 8.869% of variance), Fondness (was explained 8.823% of variance), Quality (was explained 8.075% of variance), Effortless (was explained 7.944% of variance), Enjoyment (was explained 7.714% of variance), Laziness (was explained 7.547% of variance)

**Table 9: Rotated Component Matrix**

Factors	Attributes	Factor Loading
Accessible	Convenient	0.713
	Hectic Life style	0.710
	Availability	0.572
	Cost saving	0.501
Sales Promotions	Taste	0.601
	Attractive Offers	0.565
	Advertisement and Presentation	0.507
Fondness	Influence of children	0.531
	variety	0.515
Quality	Quality	0.597
Effortless	Easy to cook	0.649
	Time saving	0.543
Enjoyment	party time	0.561
	fun and entertainment	0.506
Laziness	Laziness	0.51

**Identification of Most preferred time for ready to eat food:**

Women have been using various kind of ready to eat food at different times such as morning (breakfast), afternoon(lunch), evening(snacks), night times(dinner). In order to find out the most preferred time for ready to eat food mostly used by women, Garrett ranking technique has been applied to the ranks given by women for ready to eat food at different time periods.

**Table 10: Preference of ready to eat food at different time periods**

S.No	Preferred time	Rank rendered by the Respondents				
		1	2	3	4	5
1	Morning	21	43	54	66	72
2	Afternoon	36	117	38	44	21

3	Evening	25	44	25	81	81
4	Night	37	76	27	61	55

The responses were converted to numerical scores using Garrett technique which is highly advantageous. The Percent position and the Garrett value are presented in Table 11. The Garrett's score conversion formula is [9].

$$\text{Percent position} = 100 (R_{ij} - 0.5) / N_{ij}$$

Where  $R_{ij}$  – Rank given for the  $i^{\text{th}}$  variable by the  $j^{\text{th}}$  respondents

$N_{ij}$  – Number of variable ranked by  $j^{\text{th}}$  respondents

**Table 11: Garrett Score**

S.No.	Calculated value	Garrett value
1	10	75
2	30	60
3	50	50
4	70	40
5	90	24

By using the above Garrett's conversion formula the Garrett values are computed and presented in Table 12.

**Table 12: Computation of Garrett's value**

S.N o.	Preferred Time	Rank rended by respondents				
		1	2	3	4	5
1	Morning	540	396	270	172	50
2	Afternoon	157	264	175	468	86
3	Evening	607	486	125	176	60
4	Night	412	366	135	304	88

Based on the values of above table Ranks have calculated and kept in the Table 13. From this Table we observe that majority of women gave top rank in preference of ready to eat food for

Evening time, it also reveals that women gave second rank to the morning time, we also notice that third rank for Night and fourth rank for afternoon time. Therefore we can say that most of the women not preferring ready to eat food in the afternoon time.

**Table 13: Ranking of Preferred time for ready to eat food**

S.No.	Preferred Time	Total	Avg	Rank
1	Morning	14284	55.80	II
2	Afternoon	11509	44.96	IV
3	Evening	14545	56.82	I
4	Night	13063	51.03	III

### III. Discussion and Conclusion:

The reason behind considering this paper over women than men is that in majority of Indian families' women take the decision of cooking and to keep the meals ready for the family. So "she" in the family plays an important role in the society. The paper discussed preference of women towards the ready to eat food, extent of awareness of women towards ready to eat food, the factors which influence the preference of ready to eat food and also most preferred time for ready to eat food in Hyderabad. The demographic factors related to the respondents have been evaluated. On testing the hypotheses that have been formulated for the study, the results revealed that there is no relation between age, qualification and preference towards the ready to eat food but, there is a relation between occupation, marital status, type of family, income and preference of ready to eat food. It proves that preference of ready to eat food among different occupation, marital status and type of family do not have same preference for the ready to eat food i.e., these are significant variables influencing the preference towards the ready to eat food. But, age and qualification are not significant variables influence towards ready to eat food. Next, the attributes, having a bearing on the factors influencing the preference of ready to eat food by women have been examined. These are found to have an important manner on the



usage of ready to eat food by women. As these attributes are large in number (15), they were diminished into a smaller and manageable number of latent and interdependent factors associated with them using factor analysis. Further, the study has classified seven factors i.e, Accessible, Sales Promotions, Fondness, Quality, Effortless, Enjoyment and laziness which affect the preference of ready to eat food. It finds that women would like to prefer ready to eat food due to their hectic schedule, taste, advertisement, cost saving, influence of children, variety and conveniently without disturbing their works. Laziness and quality are not more enabling as remaining factors in influencing the preference of ready to eat food. And also we can see women prefer ready to eat food mostly at evening and morning times rather in the night and afternoon due to their work at home and outside. Overall, these conclusions may be considered to expedite adding to the existing improvement on the influence of ready to eat food on women.

#### **IV. Limitation and Future Research:**

The statistics of the study is narrowed to Hyderabad. The study shows the different factors which influence the preference of ready to eat food by women and considered demographic factors into account. This can be studied in further research and replicated with different population on a large sample to validate and generalize its findings for large population. The study can also be done on discussion upon women choosing ready to eat food verses their stress level at work, home, business etc. The study can be considered the factors influencing to consume ready to eat food on working men staying away from home, bachelors, and students male and female.

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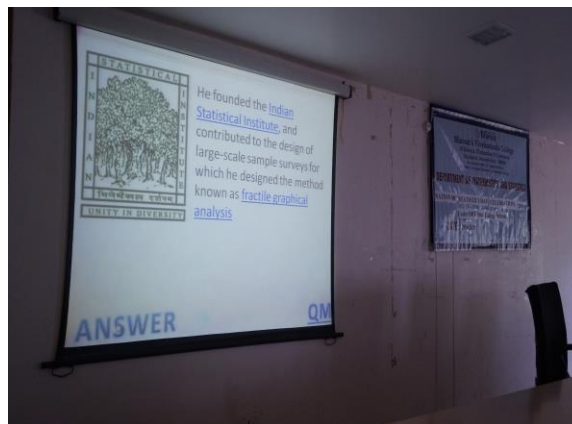
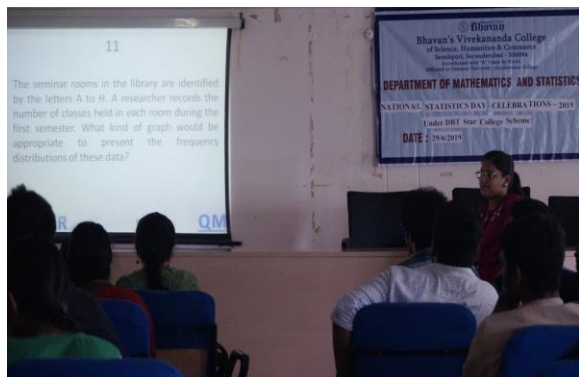
## National Statistics Day Celebrations – 29<sup>th</sup> June 2019

On the occasion of National Statistics day 29<sup>th</sup> June 2019 the Department of Mathematics and Statistics has organized a guest lecture on “Data Sciences- For a wonderful present and a brilliant future” by Prof. V. V. Haragopal, Department of Mathematics, BITS Pilani, Hyderabad. Prof. V. V. Haragopal briefed about the importance of Data- Sciences, all the trends and applications of data sciences its uses to the world and the predictions we can do using it. Data Sciences is one of the most growing fields of today’s generation, his speech about the same is really helpful for the students who aspire to build a career in this field. Also he advised the students to understand the benefits of entering this field and encouraged them to actually opt it.

On this occasion the Department of Mathematics and Statistics conducted a Statistics Quiz and 23 teams participated in this quiz. Baba and Pooja from B.Sc (MSCs-III A) stood 1<sup>st</sup> in the quiz and were awarded the certificates by the guest and Dr. K. Vasudeva Rao, Head Department of Mathematics and Statistics also appreciated the prize winners and participants.

Dr. K. Vasudeva Rao addressed the students about the importance of Statistics and various trends of new software’s related to the statistics.

Finally we concluded the program by vote of thanks.









## **Guest Lecture on Applications of statistics in various domains and Advanced Experimental Designs on 11/01/2020**

**Speaker:** Dasari Ravi Kumar, Statistical Specialist, Novartis, Hyderabad

A wonderful seminar was given by Dr. Ravi Kumar Dasari on Data Science and Pharma Industry who works in Novartis Hyderabad. Sir has given brief introduction about Statistics and application of statistics in various domains. He also explained about Advanced Experimental Designs. Students had a very interactive session with Ravi Kumar sir, sir has given a clear lecture on Pharma Industry with a case study, which was very helpful for the students.





## Industrial Visit to Coco –Cola Factory

**Date: 31.01.2020**

All the students reported in college by 8:15 AM and started our journey towards the factory, which is at Miyapur by 8:30 AM. We reached the location by 10:00 AM. At first, we were given instruction and safety rules to be followed. Then a seminar was given by Surya Narayana (An employee of Coco-Cola company). He gave a brief description about the company and also showed us few samples. Students were given soft drink (which was their product Sprite). Then students moved to visit the factory lines along with lecturers. Surya Narayana Sir was guiding the students about the manufacturing of their products students started their journey back to college at 1:30 PM.



### Outreach Program for school students:

As a part of department activities, Mathematics and Statistics department organized a 3 day Outreach program on "STATISTICS, STATISTICAL DATA AND ANALYSIS OF STATISTICAL DATA THROUGH MEASURES OF CENTRAL TENDENCY AND PROBABILITY" from 26,27,29 AUG 2016 at Z.P.H. School, Nagaram, Ranga Reddy District for 10th class students.

Following faculty members of our department took classes .

- Mrs. P. Rajini
- Mr. N Chandan Babu

The Following Student Volunteer took part in this Program

- G Rajashree (B.Sc (MSCs IIIA))
- R Gowtham Kumar (B.Sc (MSCs IIIA))
- V Swathi (B.Sc (MSCs IIIB))
- N Sandhya (B.Sc (MSCs IIIB))

The course covers the topics :

Introduction to Statistics and Computation of Mean, Median, Mode



Drawing Ogive Curve

Computation of Mean, Median, Mode through Ms Excel

The faculty was happy and got different experience from teaching to school students. The feedback from school students is appreciated. We are thankful to ZPH School Headmaster, Mr. Aravindan Kumar and faculty members for their co-operation and support for the successful completion of the Outreach program. We will try to provide more topics in the fore coming programs to improve more student understandability.



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- Mr. N Chandan Babu

The Following Student Volunteer took part in this Program

- G Rajashree (B.Sc (MSCs IIIA))
- R Gowtham Kumar (B.Sc (MSCs IIIA))
- V Swathi (B.Sc (MSCs IIIB))
- N Sandhya (B.Sc (MSCs IIIB))

The course covers the topics :

Introduction to Probability, basic definitions of probability, Addition theorem of probability and real life problems based on probability.

The faculty was happy and got different experience from teaching to school students. The feedback from school students is appreciated. We are thankful to ZPH School Headmaster, Mr. Aravindan Kumar and faculty members for their co-operation and support for the successful completion of the Outreach program. We will try to provide more topics in the fore coming programs to improve more student understandability.





## Outreach programme for college teachers

The Department of Mathematics and Statistics at Bhavan's Vivekananda College of Science, Humanities and Commerce conducted an Outreach programme on 'Data Analytics with R-Programming' sponsored by DBT- Star College Scheme.

This programme was attended by 30 Lecturers from 17 different colleges on 15 February. The programme was about the Data Analytics, Statistical analysis, Quantitative methods and Computer based models to gain insight about business operations, make better decisions and analyze future. There were three sessions, First session was about introduction to R and the other two sessions were carried out in lab with hands on experience.

The programme was concluded by Vote of thanks by the department of Mathematics and Statistics.





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## Outreach programme for high school teachers

Outreach programme for high school teachers was conducted by Department of MATHEMATICS & STATISTICS on 27 July 2019 on the concepts of Geometry and basic Statistics. There was an overwhelming response by the teachers from twin cities. There were 47 teachers from 30 schools including private and government schools who attended the programme and participated in all the activities very actively.









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