

**CONSUMPTION PATTERN OF FRUITS AND
VEGETABLES IN BENGALURU CITY**

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BENGALURU –560 065**

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*Project Report submitted to the
University of Agricultural Sciences, Bengaluru
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August, 2016




*Affectionately
dedicated
to my beloved
parents, sister and
my guide*

DEPARTMENT OF AGRICULTURAL MARKETING,
CO-OPERATION AND BUSINESS MANAGEMENT
UNIVERSITY OF AGRICULTURAL SCIENCES
GKVK, BENGALURU – 560 065

CERTIFICATE

This is to certify that the Project Report entitled “CONSUMPTION PATTERN OF FRUITS AND VEGETABLES IN BENGALURU CITY” submitted by Ms. APARNA, K.S., ID. No. MBAL 4002, in partial fulfillment of the requirements for the degree of MASTER OF BUSINESS ADMINISTRATION (AGRIBUSINESS MANAGEMENT) to the University of Agricultural Sciences, Bengaluru is a bonafied record of research work done by her during the period of her study in this University, under my guidance and supervision and the project work has not previously formed the basis of the award of any degree, diploma, associate ship, fellowship or other similar titles.

Bengaluru,
August 2016


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(APARNA, K.S.)

CONSUMPTION PATTERN OF FRUITS AND VEGETABLES IN BENGALURU CITY

APARNA, K. S

ABSTRACT

The present study was conducted to know the Consumption pattern of fruits and vegetables in Bengaluru city. The study revealed that the important factors influencing the consumers to consume fruits and vegetables are consumer's perception, health consciousness, convenience, affordability, nutrition, diet requirement and source of energy. About 66.67 per cent of consumers consume fruits once a day followed by 27.78 per cent two times a day and 5.56 per cent all three times a day. 50 Per cent of consumers consume vegetables twice a day, 38.89 per cent all three times a day and 11.11 per cent only once a day. 53.33 per cent of the consumers buy fruits and vegetables as and when needed, 26.67 per cent of consumers buy once in two days, 11.11 per cent of consumers buy daily and 8.89 per cent of the consumers buy weekly once. 54.44 per cent of households prefer modern retail stores with least preference to online shopping. The majority 77.78 per cent consumers prefer fresh fruits and vegetables, 22.22 per cent of consumers prefer cut fruits and vegetables. High price of fruits and vegetables and non-availability of required quality and type of fruits and vegetables are the major constraints faced by the consumers. From this it can be suggested that the modern retail outlets can display nutritional value and advantages of consuming fruits and vegetables to influence consumers to purchase fruits and vegetables.

August, 2016

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(G.N. Nagaraja)
Major advisor

ಬೆಂಗಳೂರು ನಗರದಲ್ಲಿ ಹಣ್ಣು ತರಕಾರಿಗಳ ಬಳಕೆ ಮಾದರಿ

ಅಪರ್ಣಾ, ಕೆ. ಎಸ್.

ಸಾರಾಂಶ

ಪ್ರಸ್ತುತ ಅಧ್ಯಯನ ಬೆಂಗಳೂರು ನಗರದಲ್ಲಿ ಹಣ್ಣುಗಳು ಮತ್ತು ತರಕಾರಿಗಳ ಬಳಕೆ ಮಾದರಿ ತಿಳಿಯಲು ನಡೆಸಲಾಯಿತು. ಅಧ್ಯಯನದ ಪ್ರಮುಖ ಅಂಶಗಳೇನೆಂದರೆ ಗ್ರಾಹಕರು ಹಣ್ಣು ತರಕಾರಿಗಳನ್ನು ಬಳಸಲು ಗ್ರಾಹಕರ ಗ್ರಹಿಕೆ, ಆರೋಗ್ಯ ಕಾಳಜಿ, ಅನುಕೂಲತೆ, ಶಕ್ತೆ, ಪೋಷಣೆ, ಆಹಾರ ಅವಶ್ಯಕತೆ ಮತ್ತು ಶಕ್ತಿಯ ಮೂಲ ಎಂದು ತಿಳಿದುಬಂದಿದೆ. ಶೇಕಡ 66.67 ರಷ್ಟು ಗ್ರಾಹಕರು ದಿನಕ್ಕೆ ಒಂದು ಬಾರಿ, ಶೇಕಡ 27.78 ರಷ್ಟು ಎರಡು ಬಾರಿ ಹಾಗೂ ಶೇಕಡ 5.56 ರಷ್ಟು ಗ್ರಾಹಕರು ಮೂರು ಬಾರಿ ಸೇವಿಸುತ್ತಾರೆ. ಅರ್ಧದಷ್ಟು ಗ್ರಾಹಕರು ಎರಡು ಬಾರಿ, ಶೇಕಡ 38.89 ರಷ್ಟು ಗ್ರಾಹಕರು ಮೂರು ಬಾರಿ ಹಾಗೂ ಶೇಕಡ 11.11 ರಷ್ಟು ಗ್ರಾಹಕರು ದಿನಕ್ಕೆ ಒಂದು ಬಾರಿ ತರಕಾರಿಗಳನ್ನು ಸೇವಿಸುತ್ತಾರೆ. ಶೇಕಡ 53.33 ರಷ್ಟು ಗ್ರಾಹಕರು ಹಣ್ಣು ತರಕಾರಿಗಳನ್ನು ಬೇಕಾದಾಗ ಖರೀದಿಸುತ್ತಾರೆ. ಶೇಕಡ 26.67 ರಷ್ಟು ಗ್ರಾಹಕರು ಎರಡು ದಿನಕ್ಕೊಮ್ಮೆ, ಶೇಕಡ 11.11 ರಷ್ಟು ದಿನಕ್ಕೊಮ್ಮೆ ಮತ್ತು ಶೇಕಡ 8.89 ರಷ್ಟು ವಾರಕ್ಕೊಮ್ಮೆ ಖರೀದಿಸುತ್ತಾರೆ. ಶೇಕಡ 54.44 ರಷ್ಟು ಕುಟುಂಬದವರು ಆಧುನಿಕ ಚಿಲ್ಲರೆ ಅಂಗಡಿಗಳಿಗೆ ಆಧ್ಯತೆ ನೀಡಿದ್ದೂ ಆನ್‌ಲೈನ್ ಖರೀದಿಗೆ ಕಡಿಮೆ ಆಧ್ಯತೆ ಕೊಟ್ಟಿದ್ದಾರೆ. ಶೇಕಡ 77.78 ರಷ್ಟು ಗ್ರಾಹಕರು ತಾಜಾ ಹಣ್ಣು ತರಕಾರಿಗಳಿಗೆ ಆಧ್ಯತೆ ಕೊಡುತ್ತಾರೆ. ಬೆಲೆ ಏರಿಕೆ ಹಾಗೂ ಗುಣಮಟ್ಟದ ಹಣ್ಣು ತರಕಾರಿಗಳು ದೊರಕದಿರುವುದು ಗ್ರಾಹಕರು ಎದುರಿಸುತ್ತಿರುವ ಮುಖ್ಯ ಸಮಸ್ಯೆಗಳಾಗಿವೆ. ಆಧುನಿಕ ಚಿಲ್ಲರೆ ಅಂಗಡಿಗಳಲ್ಲಿ ಪೌಷ್ಟಿಕಾಂಶ ಮೌಲ್ಯ ಹಾಗೂ ಹಣ್ಣು ತರಕಾರಿಗಳ ಸೇವನೆಯಿಂದಾಗುವ ಉಪಯೋಗಗಳನ್ನು ಪ್ರದರ್ಶಿಸುವುದರಿಂದ ಗ್ರಾಹಕರ ಗಮನ ಸೆಳೆದು ಹೆಚ್ಚಾಗಿ ಖರೀದಿಸುತ್ತಿದ್ದಾರೆ.

ಆಗಸ್ಟ್, ೨೦೧೬

ಕೃಷಿ ಮಾರುಕಟ್ಟೆ, ಸಹಕಾರ ಮತ್ತು ವ್ಯವಹಾರ ನಿರ್ವಹಣೆ ವಿಭಾಗ

ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಬೆಂಗಳೂರು - 65

(ಜಿ.ಎನ್. ನಾಗರಾಜ)

ಪ್ರಧಾನ ಸಲಹೆಗಾರರು

Consumption Pattern of Fruits and Vegetables in Bengaluru city



Aparna K.S and G. N. Nagaraja

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Introduction

India has been bestowed with wide range of climate and physio-geographical conditions which ensures availability of most kind of fruits and vegetables. The country is the second largest producer of the Fruits (81.285 million tonnes) and vegetables (162.19 million tonnes) in the world, contributing 12.6 per cent and 14.0 per cent of the total world production of fruits and vegetables respectively. (FAO, 2014 and Indian Horticulture Database, 2013).

The general recommendation for intake of F&V is atleast 400 grams per person per day (five serving of 80 g each day) or about 146 kg per person per year. Similarly, national nutrition guidelines recommends average daily consumption of 300 g of vegetables (portion size = 100 gm × no. of portions = 3) and 100 g of fruits (portion size = 100 gm × no. of portions = 1).

Diets high in fruits and vegetables are widely recommended for their health-promoting properties. Fruits and vegetables have historically held a place in dietary guidance because of their concentrations of vitamins, especially vitamins C and A; minerals, especially electrolytes; and more recently phytochemicals, especially antioxidants. Additionally, fruits and vegetables are recommended as a source of dietary fiber.

Objective

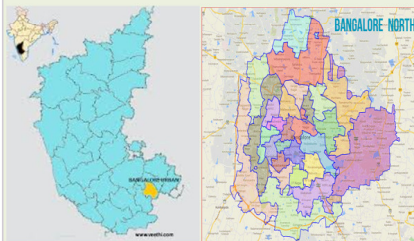
The main objective of the study is to analyze the factors influencing consumption of fruits and vegetables.

Methodology

The present study was conducted in Bengaluru city during the year 2016 and the collection of data was carried out during the period of February and March 2016.

The general information regarding socio economic characteristics and factors influencing consumption of fruits and vegetables were collected from respondents randomly through pre tested schedule by personal interview method.

The secondary information regarding the study area, demography and other required information were collected from APEDA, FAO and other publications.



Analytical tools and techniques

The data were analyzed through statistical tool like Factor analysis and Kaiser-Meyer-Olkin (KMO) test by using SPSS software.

Results

The details of the results is presented in the following Tables.

Table 1: KMO and Bartlett's test for variance among factors

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.363
Bartlett's Test of Sphericity	Approx. Chi-Square 1206.759
	Degrees of freedom 190
	Significance level 0.000

Table 2: Factors influencing consumption of fruits and vegetables

Sl.No.	Attributes	Component						
		1	2	3	4	5	6	7
1.	Consumption of F&V keeps us healthy	0.127	-0.027	0.025	-0.035	0.831	0.004	-0.013
2.	F&V provide nutrients to the body	0.122	0.391	-0.051	0.154	0.641	0.322	0.09
3.	F&V contain more fiber	-0.139	0.004	-0.126	-0.108	-0.048	0.721	-0.145
4.	The price of F&V are relatively lower than non veg	-0.205	0.222	0.401	0.411	-0.47	0.143	-0.172
5.	Doctors' advice to consume F&V.	0.255	0.603	0.284	-0.159	-0.346	0.498	-0.051
6.	It helps to maintain our diet requirement	0.142	0.053	0.013	0.023	0.099	0.178	0.022
7.	F&V contain less fat	0.903	0.272	0.109	0.225	-0.019	-0.071	0.094
8.	F&V are easily digestible	0.469	-0.047	-0.09	-0.099	0.06	-0.015	-0.13
9.	Easily available	0.277	-0.016	0.115	0.125	0.053	0.153	0.581
10.	F&V are freshly available	-0.064	-0.154	0.261	-0.222	0.39	-0.127	0.237
11.	Organically grown F&V are good for health	0.026	0.264	-0.293	-0.559	0.001	0.053	0.022
12.	Children likes to eat F&V	0.611	0.108	-0.084	-0.104	0.056	0.401	0.358
13.	It is our tradition to consume F&V	0.786	0.162	-0.103	0.223	0.138	-0.064	0.173
14.	Some F&V are available seasonally	0.303	0.264	-0.765	0.053	0.041	0.282	-0.042
15.	I grow F&V in the garden	0.112	0.322	0.79	0.12	0.054	0.104	0.123
16.	Taste will be good	0.166	0.971	-0.04	0.008	0.093	-0.036	-0.134
17.	Health conscious	0.086	0.679	0.091	-0.021	-0.027	0.103	0.483
18.	F & V are called 'Protective foods'	-0.088	0.017	0.473	-0.448	0.133	0.527	0.161
19.	F&V are source of sugars, vitamins, minerals	0.092	-0.029	-0.018	0.031	-0.081	0.22	-0.733
20.	F&V are good for Diabetic patients	0.2	0.129	-0.156	0.867	-0.022	-0.138	0.137

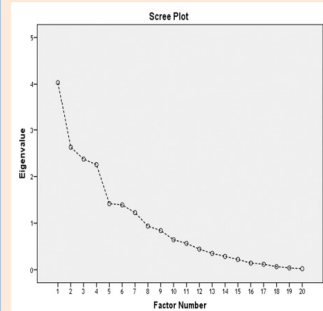
Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization

Discussion

- KMO measure was found to be 0.336. It shows that the factors that are extracted will account for fair amount of variance. The overall significance of correlation matrices is tested with Bartlett test of Sphericity (Table 1).
- Seven values greater than one are considered for determining the number of factors. With the help of Cattell's scree plot the factors are determined and noticed that eight factors has Eigen value greater than 1 and as such, only eight factors were retained (Graph 1).
- The factors retained such as Consumption of F&V keeps us healthy, provide nutrients to the body, contain more fiber, the price of F&V are relatively lower than non veg, Doctors advice to consume F&V to improve health condition, F&V helps to maintain our diet requirement, contain less fat, easily digestible.
- The correlation matrix of rotated factor loadings revealed that Factor 1 collects 4 variables and labelled as 'perception'. Factor 2 collects 4 variables and labelled as 'health conscious'. factor 3 collects 2 variables and labelled as 'convenience', Factor 4 collects 3 variables and labelled as 'affordability'. Factor 5 collects 2 variables and labelled as 'nutrition'. Factor 6 collects 3 variables and labelled as 'diet requirement'. Factor 7 collects 2 variables and labelled as 'source of energy' (Table 2).

Graphs



Graph 1: Cattell's scree plot for factors influencing consumption of F&V



Summary

- Fruits and vegetables have historically held a place in dietary guidance because of their concentrations of vitamins like C and A; minerals like electrolytes and more phytochemicals especially antioxidants. Additionally, fruits and vegetables are recommended as a source of dietary fiber. Hence, the study attempts to analyze the factors influencing consumption of fruits and vegetables in Bengaluru city.
- The study revealed that the consumers perception, health consciousness, convenience, affordability, nutrition and diet requirement influence them to consume fruits and vegetables.

Advisory Committee

Chairperson : Dr. G. N. Nagaraja

Members: Mr. T. N. Venkata Reddy
Dr. P. K. Mandanna
Dr. B. V. Chinnappa Reddy

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I INTRODUCTION

India has been bestowed with wide range of climate and physio-geographical conditions which ensures availability of most kind of fruits and vegetables. The country is the second largest producer of the fruits (81.285mt) and vegetables (162.19mt) in the world, contributing 12.6 per cent and 14.0 per cent of the total world production of fruits and vegetables respectively (FAO, 2014 and Indian Horticulture Database, 2013).

Banana, mango, citrus, papaya, guava and grape account for major share in total fruit production across India. The major fruit producing states are Andhra Pradesh, Maharashtra, Karnataka, Bihar, Uttar Pradesh, Tamil Nadu, Kerala and Gujarat. These eight states account for 70 per cent of the area under fruit cultivation. Potato, tomato, onion, brinjal, cabbage, cauliflower and tapioca account for maximum share in vegetable production in the country. India is a front runner in many fruits and vegetables with share of world production (Indian Horticulture Database 2013) as follows: 44.1 per cent of mango, 42.6 per cent Papaya, 25.6 per cent of banana, 20.2 per cent of onion, 35.6 per cent of cauliflower, 37 per cent of Okra.

Out of the total production of fruits and vegetables, nearly 76 per cent is consumed in fresh form, while wastage, and losses account for 20 to 22 per cent. Only 2 per cent of vegetable production and 4 per cent of fruit production are being processed. This is in sharp contrast to the extent of processing of fruits in several other developing countries such as Brazil (70%), Malaysia (83%), Philippines (78%) and Thailand (30%).

Export of Fruits and Vegetables from India

Hundreds of fruits and vegetables types are grown in all parts of India. Fresh fruit and vegetable reach small scale fruits vegetables suppliers, they are then sent to local markets as well as fruits and vegetables exporters. Last decades have seen the number of Indian fruit vegetables suppliers and fruits vegetables exporters rising to an all-time high. Especially there has been a steep rise in the number of vegetable exporters.

The vast production base offers India tremendous opportunities for export. During 2013-14, India exported fruits and vegetables worth Rs. 8760.96 crores which comprised of fruits worth Rs. 3298.03 crores and vegetables worth Rs. 5462.93 crores. Mangoes, Walnuts, Grapes, Bananas, Pomegranates account for larger portion of fruits exported from the country while Onions, Okra, Bitter Gourd, Green Chillies, Mushrooms and Potatoes contribute largely to the vegetable export basket.

The major destinations for Indian fruits and vegetables are UAE, Bangladesh, Malaysia, UK, Netherland, Pakistan, Saudi Arabia, Sri Lanka and Nepal. The country has exported 2, 87,384.63 MT of processed fruits and vegetables to the world for the worth of Rs. 2,266.66 crores during the year 2013-14. India is also a major exporter of Mango Pulp in the world. The country has exported 1,74,860.34 MT of Mango Pulp to Saudi

Arabia, Yemen Republic, Netherland, United Arab Emirates and Sudan for the worth of Rs. 772.97 crores during the year 2013-14. India is also a prominent exporter of dried and preserved vegetables to the world. The country has exported 56,158.40 MT of dried and preserved vegetables to Germany, Russia, United Kingdom, United States, France and Brazil for the worth of Rs. 742.74 crores during the year 2013-14.(Source: APEDA)

Fruits and Vegetables processing

The fruit and vegetable processing industry in India is highly decentralized. A large number of units are in the small scale sector, having small capacities upto 250 tonnes/annum though big Indian and multinational companies have capacities in the range of 30 tonnes per hour or so. The prominent processed items are fruit pulps and juices, fruit based ready-to-serve beverages, canned fruits and vegetables, jams, squashes, pickles, chutneys and dehydrated vegetables. More recently, products like frozen pulps and vegetables, frozen dried fruits and vegetables, fruit juice concentrates and vegetable curries in restorable pouches, canned mushroom and mushroom products have been taken up for manufacture by the industry.

Processing of fruits and vegetables in India holds tremendous potential to grow, considering the still nascent levels of processing at present. Though India's horticultural production base is reasonably strong, wastage of horticultural produce is sizeable. Processing and value addition is the most effective solution to reduce the wastage. Considering the wide-ranging and large raw material base that the country offers, along with a consumer base of over one billion people, the industry holds tremendous opportunities for large investments.

Health benefits of Fruits and Vegetables

Diets high in fruits and vegetables are widely recommended for their health-promoting properties. Fruits and vegetables have historically held a place in dietary guidance because of their concentrations of vitamins, especially vitamins C and A; minerals, especially electrolytes; and more recently phytochemicals, especially antioxidants. Additionally, fruits and vegetables are recommended as a source of dietary fiber.

Most countries have dietary recommendations that include fruits and vegetables. Although dietary recommendations have many similarities, different countries choose different strategies to separate fruits and vegetables into groups. Orange fruits and vegetables are often high in carotenoids and are placed in a separate category. Yet many dark green vegetables (i.e., spinach) are also high in carotenoids. Dividing fruit and vegetables into color categories makes sense for menu planning but does not correspond with nutrient content.

Certain fruits and vegetables are rich sources of vitamin C, but these rich sources (citrus fruits, strawberries, green peppers, white potatoes) are spread over many fruit and vegetable categories. Other fruits and vegetables, including avocado, corn, potatoes, and dried beans, are rich in starch, whereas sweet potatoes are mostly sucrose, not starch.

Recommended Intake of Fruits and Vegetables

The general recommendation for intake of fruits and vegetables is at least 400 grams per person per day (five serving of 80 g each day) or about 146 kg per person per year. Similarly, national nutrition guidelines recommend avg. daily consumption of 300 g for vegetables (portion size = 100 g × no. of portions = 3) and 100 g of fruits (portion size = 100 g × no. of portions = 1). The vegetables include (green leafy vegetables = 50 g, other vegetables = 200 g, roots and tubers = 50 g). A glass of fruit juice (excluding sweetened beverages) counts towards a portion of fruit each day although whole fruit is encouraged for its fiber content in-conjunction with active life-style.

Fruits and vegetables (F& V) provide a diversified, flavored, colorful, tasty, low caloric, and protective, micro-nutrient rich diet. Overall it is estimated that low F& V intake is attributable to approximately 2.7 million (4.9%) annual deaths and 26.7 million (1.8%) DALYs (disability adjusted life year) and causes about 31 per cent of ischaemic heart diseases (IHD), 11 per cent of stroke and 19 per cent of gastro-intestinal cancers and still significantly associated (protective) with lung/pharyngeal/laryngeal/oral cancer, type-2 diabetes mellitus, bone-health, vision/cataract and micronutrient deficiency state. Low F&V intake is considered as the sixth main risk factor for mortality in the world. With this back ground the following specific objectives are formulated.

1. To examine the consumption pattern of fruits and vegetables (F&V) in Bengaluru city,
2. To analyse the factors influencing the consumption of fruits and vegetables and
3. To analyse the purchase behaviour of consumers for fruits and vegetables.

Hypotheses of the study are

1. There is an increasing trend in consumption of fruits and vegetables
2. Dual income of the family influences the consumption of fruits and vegetables
3. Purchase behaviour depends on number of varieties of fruits and vegetables

II REVIEW OF LITERATURE

In this chapter an attempt is made to review the work done by other researchers related to the topic of investigation. The studies regarding consumption pattern, purchase behaviour and factors influencing the consumption of fruits and vegetables have been reviewed and presented under the following headings.

2.1 Consumption pattern of Fruits and Vegetables

2.2 Factors influencing the consumption of Fruits and Vegetables

2.3 Purchase behaviour

2.1. Consumption pattern of Fruits and Vegetables

Goswami (1994) conducted a study on consumption pattern of dairy products among different income groups across 200 households of shilling town (Meghalaya). Families with Rs. 4000 income per month incurred highest (rs. 700.08) per month expenditure on milk and milk products were expenditure elastic for all income groups. Butter and ghee were judged as luxury items by all respondents.

Gupta (1996) studied the consumption pattern of dairy products in Chandigarh and concluded that 45 per cent of milk purchased was used for making tea, 25 per cent for preparation of curd and butter. As regards the consumption of different milk products, curds ranked the first with consumption being more than one kilogram per capita per month followed by butter and paneer which was 300 g each followed by flavoured and sweets which averaged around 200 gms each and consumption of ghee was negligible.

Perera and Madhujith (2012) conducted a study on the pattern of consumption of fruits and vegetables by undergraduate Students. It was found that the most frequently consumed fruits and vegetables by the study cohort are banana, papaya, mango, oranges and pineapple, and beans, dhal, carrot, potato, leeks, pumpkin, and Gotukola and Mukunuwenna, respectively. The mean fruit and vegetable consumption per day remains 267 g which is far less than the WHO recommendations. Most of the students have a fair knowledge on some of the basic aspects such as health benefits of fruits and vegetables, effect of cooking and handling method on quality, among others. However, most of the students were unaware of the recommended quantity to be consumed. The faculty of study, academic year and religion did not affect the quantity of fruits and vegetables consumed while gender, income, taboos had a significant effect.

Uma *et al.* (2012) conducted a study on noodles buying behaviour from organized retail outlets in Coimbatore city. The study concludes that the availability of wide range of products was the major factor influencing consumer's preference along with the availability of quality products, discounts and offers.

Adebayo *et al.* (2013) studied the household food consumption pattern among small scale farmers in Akinyele local Government area of Oyo with a mean household size of 5, the average household monthly food expenditure was Rs. 21,604 with the highest share spent on cereals which is a necessary. The expenditure elasticities of demand for food were greater than one for all the food items in the study area except cereal.

Gupta (2013) studied the brand preference and consumption pattern of beer in Bareilly. The study revealed that demographic variables have a significant impact on brand preference and consumption pattern of beer. It can also act as a powerful tool for marketers for strategy determination in the areas of beer production and management, marketing, brand positioning, pricing policy and distribution.

Sadika *et al.* (2013) compared food consumption pattern in Rural and Urban areas of Bangladesh between 2005 and 2010. The study aimed to know the food consumption pattern of rural and urban areas of Bangladesh to make comparison of calorie and protein intake in 2005 and 2010. The study revealed that rice, potato and vegetables were consumed more in rural areas than in urban areas. Other food items like pulses, milk, egg, fish, spices, fruits, sugar and other food items were most consumed in urban areas. The average per capita calorie intake per day was 2344.6 kcal in rural areas and 2244.5 kcal in urban areas.

2.2. Factors influencing the consumption of Fruits and Vegetables

Anna and Lambros (2011) surveyed the factors affecting purchase behaviour on local food in Greece and they observed that 45 per cent of consumers were influenced by curiosity, prestige and freshness of the product and other 55 per cent of the consumers were interested in the topicality of the product. The two different groups of consumers were selected those influenced by curiosity, prestige and freshness of the product and others are those interested in the topicality of the product. Discriminant analysis was performed to study how the identified factors derived from principal component analysis could predict cluster membership.

Seo *et al.* (2011) studied current fast food consumption status among middle school students and explored factors influencing fast food consumption behaviors of middle-school students in Seoul. Fast food consumption was considered to be a special event rather than part of another diet, while meeting friends or celebrating & special days. Attitude toward fast food consumption was not significantly associated with behavioral intention. So, effective nutrition education programs on fast food consumption should include components to change the subjective norms of fast food consumption and perceived behavioral control. The studies should examine effective ways of changing subjective norms and possible alternatives to fast food consumption for students to change perceived behavioral control.

Moghana *et al.* (2012) studied the factors influencing the preference for AGMARK products. The purity stands first followed by price and availability. Non-availability in most of the groceries and high price of AGMARK products were perceived as major reasons for not purchasing AGMARK products by the non-users of the same.

Koutroulou and Tsourgiannis (2011) conducted a study on factors affecting consumers purchasing behaviour towards local foods in Greece. The factors that influenced people to buy local food products were the topicality of the products, appearance, freshness, quality, health issues, freshness and taste issues, curiosity and prestige. Two groups of customers were identified: a) those influenced by curiosity, freshness of the product and prestige, b) those interested in topicality of the product. Cluster analysis was employed to classify the consumers with similar buying behaviour.

Ali *et al.* (2013) studied factors affecting consumption of edible oil in Pakistan. Increase in income, population growth, urbanization, brands liking and disliking were the factors affecting consumption of edible oil. The results from primary data suggested that price, income, family size and monthly income significantly affected consumption of ghee and oil.

Cosmos *et al.* (2013) assessed the factors influencing the consumption of pork and poultry meat in Ghana. The study was conducted by taking 224 students of the marketing department by using convenient sample method. The consumers preferred poultry meat than the pork. The study revealed that important factors influencing the purchase of meat are: taste, price and health of meat. The other factors such as gender, age, family size, income levels, and religion are responsible for purchasing of meat.

Tran *et al.* (2014) identified the factors influencing milk consumption of rural households in Northern Vietnam. The result shows that household's income and convenience in milk buying have strongly positive effects on milk consumption of the rural households. Number of children and elders in rural households also has positive effects on the probability of milk purchasing of rural households. Educational level was only found to affect milk expenditure of the rural households. Age of the rural household head and the importance of milk price have significant negative effects on both decisions of milk consumption of the rural households, decision to buy milk and level of milk expenditure.

Shilpa (2014) examined the food consumption pattern in Chikkaballapur district of Karnataka. The results show that the quantity of cereal consumption was more in rural areas (43.24 kgs) than urban areas (36.83 kgs). Red gram, Bengal gram and green gram were the major pulses consumed. The study also revealed that family size and monthly income are the main factors influencing food consumption pattern.

2.3. Purchase behaviour

Raghavendra *et al.* (2009) examined the preference for and consumption pattern of meat in Dharwad district. The study reveals that the most important factor considered by urban households while purchasing meat was the nutritive value followed by taste, freshness, tenderness, source, price, fat content and ease of availability. In rural areas the factors in descending order of importance were taste, freshness, nutritive value, tenderness, source, price, fat content and ease of availability.

Vijaya and Sundaram (2014) studied the consumer purchasing behaviour towards branded processed food in India. The study included brand attributes, brand endorsement, brand equity, ethical concerns and demography. They found that trust and safety are the two vital parameters which drive brands towards consumers and create image in the minds of customers. The study suggests that companies can drive the sales philosophy based on trust and safety to establish a reliable brand in the long run.

Baskar *et al.* (2013) examined the consumers' buying behaviour with the help of consumers' awareness towards instant products, reasons for purchasing and factors influencing purchase. This study was carried out in the Cuddalore district, Tamil Nadu. It proves that consumers' buying behaviour is influenced by the traditional way of manufacturing process, traditional ingredients and the available products next to their shops. Interestingly, the study reveals that consumers are not ready to change their brand.

Kazami (2012) analyzed consumer perception and buying decision for pasta in Pakistan. The study measures the development of perception through different variables and identified the factors which stimulate the buying decision of the consumer. Among various variables, awareness and availability of the product were the two variables which have a strong effect on popularity and sale of the pasta product.

Jegan and Sudalaiyandi (2013) conducted a study on consumers' buying behaviour towards various types of Sunfeast biscuits in Kovilpatti and concluded that consumers' buying behaviour varies from brand to brand on the basis of quantity, quality, taste, price, advertisement etc. The results indicate that the reason for buying Sunfeast biscuits was mostly its quality and its low price.

Srivastava (2013) analyzed factors affecting buying behaviour of consumers in unauthorized colonies for FMCG products in Khora of Uttar Pradesh. The study revealed that consumers in such areas prefer brands over generic products. At the same time, reliability, product features and socio-economic factors have a large impact on buying behaviour along with promotional offers.

Ohen *et al.* (2014) conducted a study on consumer purchasing behaviour for fruits and vegetables among civil servants in Nigeria. The study indicated that frequency of monthly purchase of fruits and vegetables was significantly determined by the monthly income while other variables such as age, sex, marital status and educational level had no significant on the frequency of monthly purchase.

Kaur and Singh (2014) observed consumer behaviour towards purchase of cereal food products in Punjab. The study revealed that the external factors that influence like nice packaging design, advertisements, and availability of wide range of flavors, health, brand consciousness and quality were the major factors that influence consumers to purchase processed cereal food products.

III METHODOLOGY

The chapter concern with description of study area, sampling procedure, tools and techniques used in the analysis of data. At the end of the chapter a few terms are defined for clear understanding of the present study. The details of the methodology adopted for the study is presented under the following headings.

3.1 Description of study area

3.2 Sampling procedure

3.3 Nature and source of data

3.4 Analytical tools and techniques

3.5 Concepts used in the study

3.1 Description of study area

The study conducted in Bengaluru, which is the capital city of Karnataka was selected purposively for the study, as it is one of the fastest growing metropolitan cities, with people of different religions, castes, occupations, cultures, languages and food habits. Bengaluru serves as the cultural, administrative, industrial and the commercial center of Karnataka. It is the information technology (IT) and biotechnology (BT) hub of India, with industrial estates and numerous financial and educational institutions of immense potential for retail food outlets.

Bengaluru is the capital and largest city in the Indian state of Karnataka. With a population of over 10 million (as of March 2014), Bangalore is the third largest city in India and 27th largest city in the world. Bangalore is one of the most ethnically diverse cities in the country, with over 62 per cent of the city's population comprising migrants from other parts of India. Historically a multicultural city, Bangalore has experienced a dramatic social and cultural change with the advent of the liberalization and expansion of the information technology and business process outsourcing industries in India. IT companies in Bangalore employ over 35% of India's pool of 1 million IT professionals

Over the years, Bengaluru has evolved into a manufacturing hub for public sector heavy industries particularly aerospace, telecommunications, machine tools, heavy equipment, space and defence. The establishment and success of business software services firms in Bengaluru after the liberalization of India's economy has contributed in great measure to the growth of India's information technology industry. Bengaluru is referred to as the Silicon Valley of India and accounts for 35 per cent of India's software exports, home to prestigious colleges and research institutions, this is the most advanced

district in Karnataka. Bengaluru city is governed by a Municipal Corporation which comes under Bengaluru Metropolitan Region. About 65 per cent of population speaks Kannada. Remaining population speaks Tamil, English, Hindi, Telugu, Malayalam, Oriya and Urdu. Bengaluru is also known as the Garden City of India because of its climate, greenery and the presence of many public parks.

Bengaluru is well known for the quality of education provided by various eminent institutes, every year it attracts aspiring candidate to this City for the well-known institutes.

Bengaluru is known as the Garden City of India and has two nationally recognized botanical gardens – Lal Bagh and Cubbon Park, which attract a lot of visitors through the year. The city was the recipient of the **Indira Priya darshini Vruksha Mitra award** in the late 1980s, in recognition of its extensive green cover.

3.2 Sampling procedure

Data regarding consumption pattern is collected using a pre tested structured interview schedule. The simple random sampling method was used to select the respondents. Respondents were selected randomly irrespective of characteristics. The data is purposively collected from different localities of Bengaluru north namely Sahakarnagar, Judicial layout, Yelahanka, Byatarayanapura and GKVK to have fair representation of different socioeconomic strata. A total of 90 consumers were interviewed, 20 respondents from each area and 10 respondents were selected from GKVK.

3.3 Nature and source of data

Primary data: The general information regarding socio economic characteristics like name, age, education, occupation, family income, food habit and family details were collected and the data regarding specific objectives like consumption pattern, factors influencing consumption, and purchase behaviour of fruits and vegetables were collected through pre-tested schedule from respondents randomly by personal interview method.

Secondary data: The information regarding the study area, demography and the research topic were collected from the other sources like APEDA and FAO.

3.4 Analytical tools and techniques

To fulfil the specific objectives of the study the followings analytical tools and techniques were used.

3.4.1 Measures of central tendency

Measures of central tendency such as mean and percentages were used to examine the distribution of income, education, family size, frequency of purchase, and distance from the place of purchase.

3.4.2 Factor analysis

Factor analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. Factor analysis searches for such joint variations in response to unobserved latent variables. The observed variables are modelled as linear combinations of the potential factors, plus "error" terms. The information gained about the interdependencies between observed variables can be used later to reduce the set of variables in a dataset.

3.4.2.1 Uses of Factor Analysis

1. To identify underlying factors that explains the correlation among a set of variables. A set of statements can be used to measure the profiles of consumers. These statements may then be factor analysed to identify the underlying factors.
2. To identify a new, smaller set of uncorrelated variables to replace the original set of correlated variables in subsequent multivariate analysis.

3.4.2.2 Factor Analysis Model

$$X_i = A_{i1} F_1 + A_{i2} F_2 + A_{i3} F_3 + \dots + A_{im} F_m + V_i U_i$$

where,

X_i = i^{th} standardized variable

A_{ij} = standardized multiple regression co-efficient of variable on common factor j

F_j = common factor

V_i = standardized regression co-efficient of variable i on unique factor

U_i = Unique factor for variable i

m = number of common factors

The unique factors are uncorrelated with each other and with the common factors. The common factors themselves can be a linear combination of the observed variables.

$$F_i = W_{i1} X_1 + W_{i2} X_2 + W_{i3} X_3 + \dots + W_{ik} X_k$$

Where,

- F_i = estimate of i^{th} factor
- W_i = weight or factor score co-efficient
- k = number of variables

It is possible to select weights or factor score co-efficients so that the first factor explains the largest portion of the total variance. Then a second set of weights can be selected so that the second factor accounts for most of the residual variance subject to being uncorrelated with the first factor. The same principle can be applied for selecting additional weights for the additional factors.

3.4.3 Descriptive Statistics

The following descriptive statistics was used to analyse and interpret the data.

3.4.3.1 Average

A single value (as a mean, median, or mode) that summarizes the general significance of a set of unequal values.

3.4.3.2 Percentage Analysis

Percentage Analysis is applied to create a contingency table from the frequency distribution and represent the collected data for better understanding.

3.4.3.3 Ratio Analysis

Ratio analysis is an attempt to express the relationship between two or more accounts or variables in a simpler, more comprehensive way.

3.5 Concepts used in the study

Factor analysis: It is a useful tool for investigating variable relationships for complex concepts such as socioeconomic status, dietary patterns, or psychological scales.

Factor loading: These are simple correlation between the variables and the factors. These represent how much a factor explains a variable in factor analysis.

Factor score: A factor score is a numerical value that indicates a person's relative spacing or standing on a latent factor.

Scree plot: A graph of Eigen values or singular values that demonstrates the portion of total variance represented by the principal components.

List of preference statements towards factors influencing consumption pattern of Fruits and Vegetables (F&V) in Bengaluru city

Sl. No.	Factors
1.	Consumption of F&V keeps healthy
2.	F&V provide nutrients to the body
3.	F&V contain more fiber
4.	The price of F&V are relatively lower than non veg
5.	Doctors' advice to consume F&V to improve health condition.
6.	It helps to maintain our diet requirement
7.	F&V contain less fat
8.	F&V are easily digestible
9.	Easily available
10.	F&V are freshly available
11.	Organically grown F&V are good for health
12.	Children likes to eat F&V
13.	It is our tradition to consume F&V
14.	Some F&V are available seasonally
15.	F&V are grown in own garden
16.	Taste will be good
17.	Health conscious
18.	F & V are called Protective foods
19.	F&V are source of sugars, vitamins, minerals
20.	F&V are good for Diabetic patients

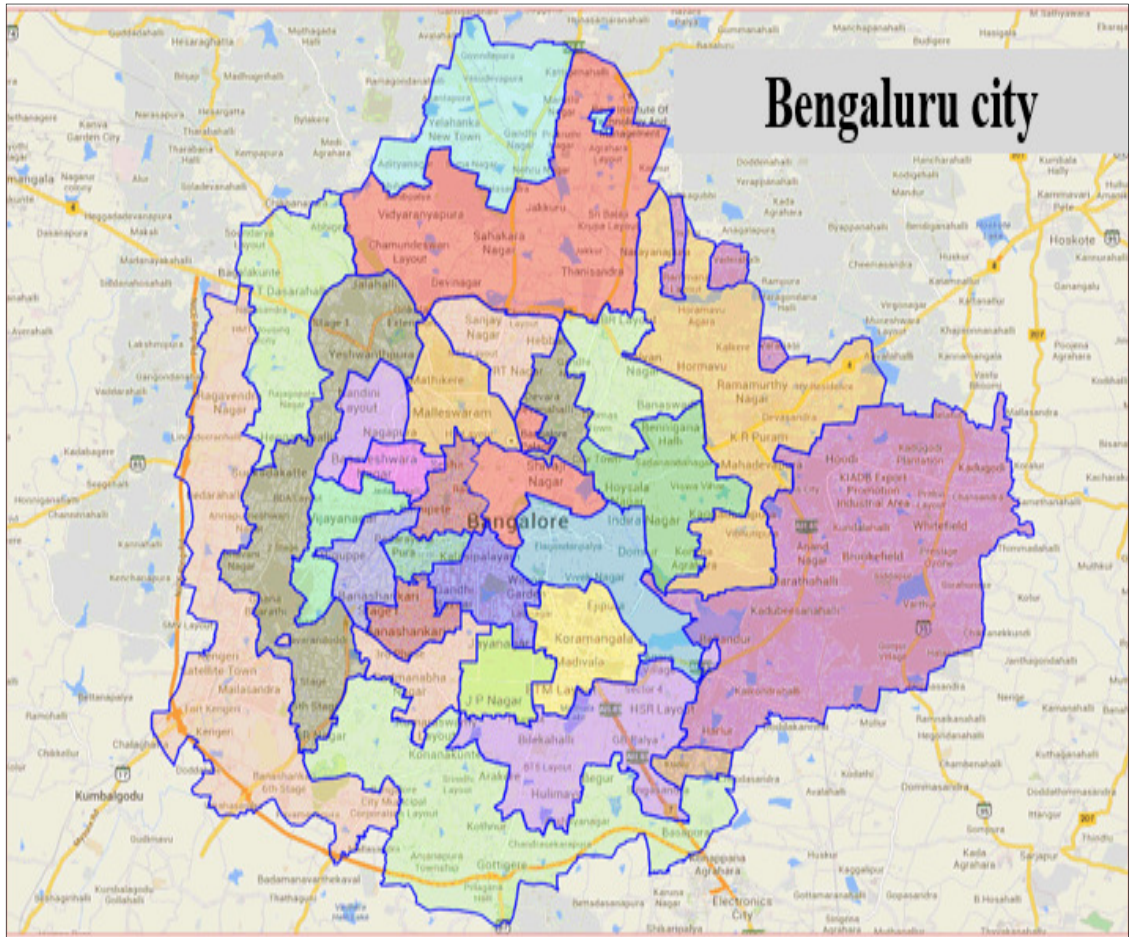


Fig. 01: Map showing the Study Area – Bengaluru city

IV RESULTS

The data was collected according to the objectives and analyzed to find their results. The findings of the study are presented in this chapter under the following headings.

- 4.1 General information of the fruits and vegetables consumers in Bengaluru city
- 4.2 Consumption pattern of fruits and vegetables in Bengaluru city
- 4.3 Factors influencing the consumption of fruits and vegetables
- 4.4 Purchase behaviour of consumers for fruits and vegetables
- 4.5 Preferred time and shops for purchase of fruits and vegetables
- 4.6 Major constraints faced by consumers in purchasing fruits and vegetables

4.1 General information of the fruits and vegetables consumers in Bengaluru city

The general information about respondents on socio-economic characteristics like age, education, gender, family size, occupation, family income was analyzed using percentages and results pertaining to these variables are presented as below under different sub headings.

4.1.1 Socio-economic profile of consumers towards fruits & vegetables in Bengaluru city

The socio-economic characteristic of the consumers gives an idea about kind of people or section of the society consuming fruits and vegetables. The details of general information about consumers is presented in Table 4.1 which includes information about age, education, gender, family size, occupation of decision maker and annual income. It could be seen from table 4.1 that 35.56 per cent of the consumers belonged to the age group of 25-35 years and 45-45 years each, 18.88 per cent of them belongs to 35-45 years, 5.56 per cent consumers belong to the age group of 65 and above, only 4.44 per cent of the consumers belongs to the age 55-65 years respectively.

The education level of sample consumers was analysed and found that 31.11 per cent were graduates and 11.11 per cent of consumers have completed their post-graduation, 22.22 per cent consumers studied up to high school, 22.22 per cent of the respondents studied up to PUC, 13.33 per cent of respondents studied up to primary school and 11.11 per cent of consumers have completed their post-graduation. Among the respondents interviewed 61.11 per cent are female and rest of 38.89 per cent are male. With regard to family type, 76.67 per cent of families were of nuclear families which consists of parents and one or two children followed by 23.33 per cent joint families which consisting of parents, children and grandchildren.

Table 4.1: Socio-economic profile of consumers of fruits & vegetables in Bengaluru City

(N=90)

Sl. No.	Particulars	No. of respondents	Percentage to the total
1.	Age (Years)		
a)	25-35	32	35.56
b)	35-45	17	18.88
c)	45-55	32	35.56
d)	55-65	4	4.44
e)	65 and above	5	5.56
	Total	90	100.00
2.	Education level		
a)	Primary	12	13.33
b)	High School	20	22.22
c)	PUC	20	22.22
d)	Under Graduation	28	31.11
e)	Post- Graduation	10	11.12
	Total	90	100.00
3.	Gender		
a)	Male	35	38.89
b)	Female	55	61.11
	Total	90	100.00
4.	Family Type		
a)	Nuclear	69	76.67
b)	Joint	21	23.33
	Total	90	100.00
5.	Food Habit		
a)	Vegetarians	20	22.22
b)	Non Vegetarians	70	77.78
	Total	90	100.00
6.	Employment pattern		
a)	Private job	45	50.00
b)	Government job	18	20.00
c)	Own business	7	7.77
d)	House wife	15	16.67
e)	Students	5	5.56
	Total	90	100.00
7.	Monthly income(Rs)		
a)	Up to 25,000	30	33.33
b)	25,001 -50,000	25	27.78
c)	50,001 -75,000	20	22.22
d)	75,001 - 1,00,000	10	11.11
e)	More than 1,00,000	5	5.56
	Total	90	100.00

Fifty per cent of respondents were working in private sector, 20 per cent were in government jobs, 16.67 per cent were housewives, 7.77 per cent had their own business and 5.56 per cent were students. With regard to family monthly income of the respondents, 33.33 per cent were earning income upto Rs.25,000 per month, 27.78 per cent of them were earning Rs. 25,001 –35,000 per month, 22.22 per cent of them are earning Rs. 50,001 – 75,000 per month, 11.11 per

4.2 Consumption pattern of fruits and vegetables in Bengaluru City

The quantity wise fruits and vegetables consumed in Bengaluru city is presented in Table 4.2 and 4.3 further, the weekly average per family consumption of fruits and vegetables in terms of physical quantities was analysed and the same was presented in the following tables.

4.2.1 Weekly average quantity of fruits consumed by households in Bengaluru City

The details of fruits consumed frequently, occasionally and seasonal or festive seasons were analysed in terms of quantity and presented in the Table 4.2. The examination of the composition of individual fruits in all available varieties of fruits in Bengaluru city revealed that the frequently consuming fruits were Banana (2.0 kgs) followed by Papaya (1.8 kgs), Pomegranate (1.8 kgs), Apple (1.5 kgs) and Orange (1 kg) per week respectively. The occasionally consuming fruits are Sapota (1 kg) followed by Grapes (0.7 g), and imported fruits like Kiwi (0.7kgs) and Rose apple (0.9 kgs) and Strawberry (0.25 Kgs). The fruits consumed during festive seasons or seasonally were Mango (5.5 kgs) followed by Muskmelon (4kgs) Watermelon (2kgs), Pomegranate (2kgs), Guava (1kg), Grapes (1kg) respectively.

Table 4.2: Weekly average quantity of fruits consumed by households in Bengaluru City in Kgs

Sl. No.	Fruits	Frequently (Kgs)	Occasionally (Kgs)	Festive season/Seasonal (Kgs)
1.	Apple	1.5	1	0.5
2.	Orange	1	1	0.5
3.	Banana	2	0.7	2
4.	Sapota	1	1	1
5.	Watermelon	0.5	1	2
6.	Papaya	1.8	1	0
7.	Pomegranate	1.8	1	2
8.	Mango	0	0	5.5
9.	Guava	0.4	0.4	1
10.	Grapes	0.7	0.7	1
11.	Muskmelon	0	1	4
12.	Strawberry	0	0.25	0
13.	Kiwi	0	0.7	0
14.	Rose apple	0	0.9	0

4.2.2 Weekly average quantity of vegetables consumed by households in Bengaluru City in Kgs

The vegetables consumption of households were analysed and results are presented in the Table 4.3. Frequently consuming vegetables were Green leafy vegetables (2 bundles), Cucumber (2.3 kgs), Tomato (2.1 kgs), Onion (2.1 kgs), Carrot (2 kgs), Beans (1.8 kgs), Beetroot (1.6 kgs), Cabbage (1.5 kgs), Capsicum (1.5 kgs) and Cabbage (1.5 kgs). The vegetables which were consumed occasionally are Ridge guard (1.7 kgs), Brinjal (1.5 kgs), Knol-khol (1.4 kgs), Drumstick (1.4 kgs), Bottle guard (0.5 kgs) and Bitter guard (0.5kg) respectively. Vegetables like Field bean (2.5 kgs), Mangalore cucumber (1.5 kgs), and bottle guard (1.5 kgs) were consumed during festival seasons or seasonally due to their availability and tradition.

Table 4.3 Weekly average quantity of vegetables consumed by households in Bengaluru City in Kgs

Sl. No.	Vegetables	Frequently (Kgs)	Occasionally (Kgs)	Festive season (Kgs)
1.	Tomato	2.1	1	1.5
2.	Onion	2.1	2	0
3.	Potato	1.7	2	0
4.	Carrot	2	0.8	1
5.	Beetroot	1.6	1	1
6.	Beans	1.8	1	1
7.	Knol- khol	0.8	1.4	1
8.	Brinjal	1.6	1.5	0
9.	Bottle guard	0.7	1.1	1.5
10.	Ridge guard	1.3	1.7	0
11.	Bitter guard	0	0.5	0
12.	Drumstick	1.4	1.1	0.5
13.	Cucumber	2.3	0.6	2
14.	Snake guard	1	0.9	0
15.	Green leafy vegetables	2	1	0
16.	Cabbage	1.5	1.4	1.2
17.	Cauliflower	1.2	1.1	0
18.	Capsicum	1.5	0.8	1
19.	Field bean	0	2.4	2.5
20.	Mangalore cucumber	1.5	1.6	1.5

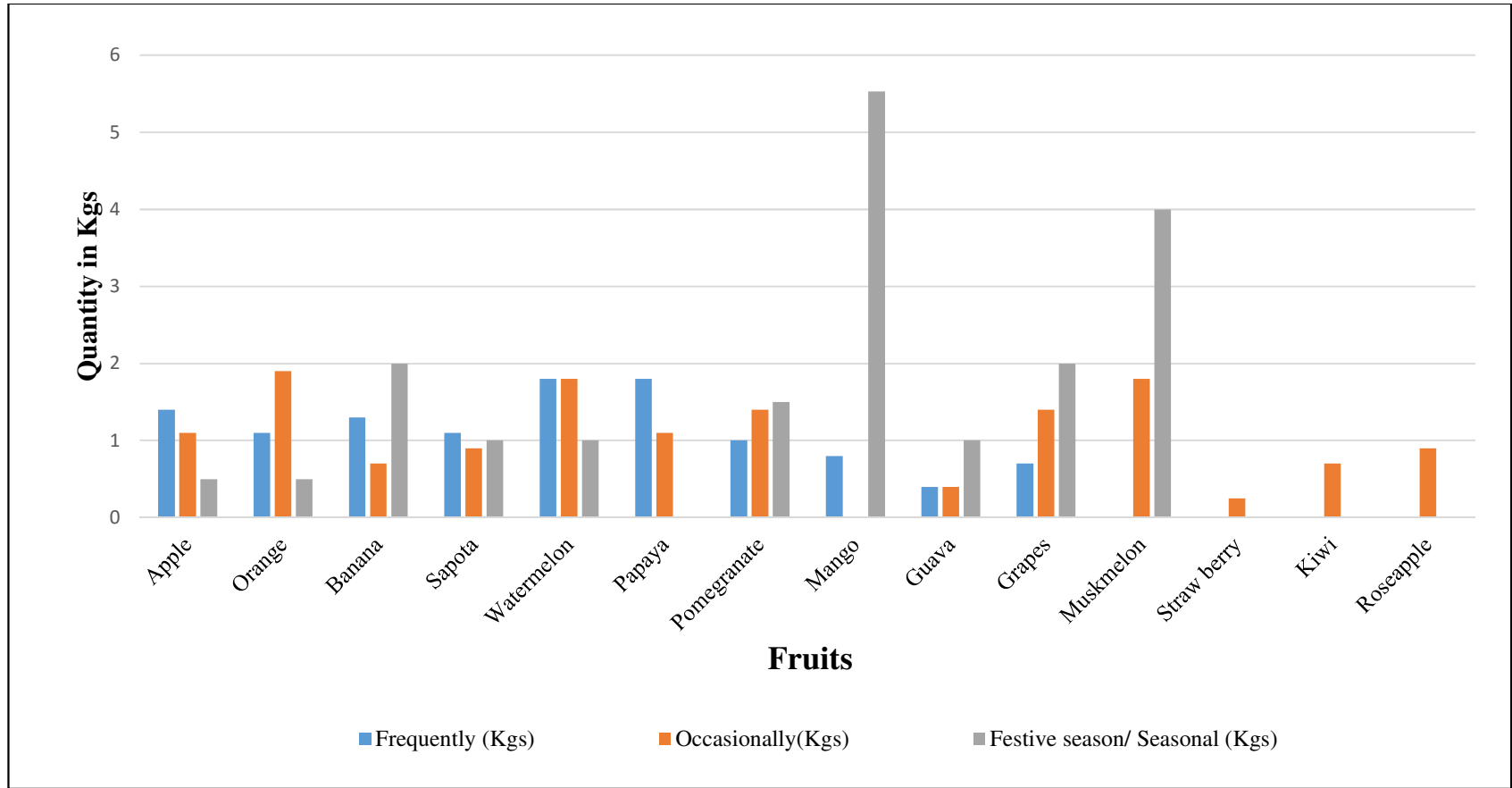


Fig. 02: Weekly average quantity of fruits consumed by households in Bengaluru City

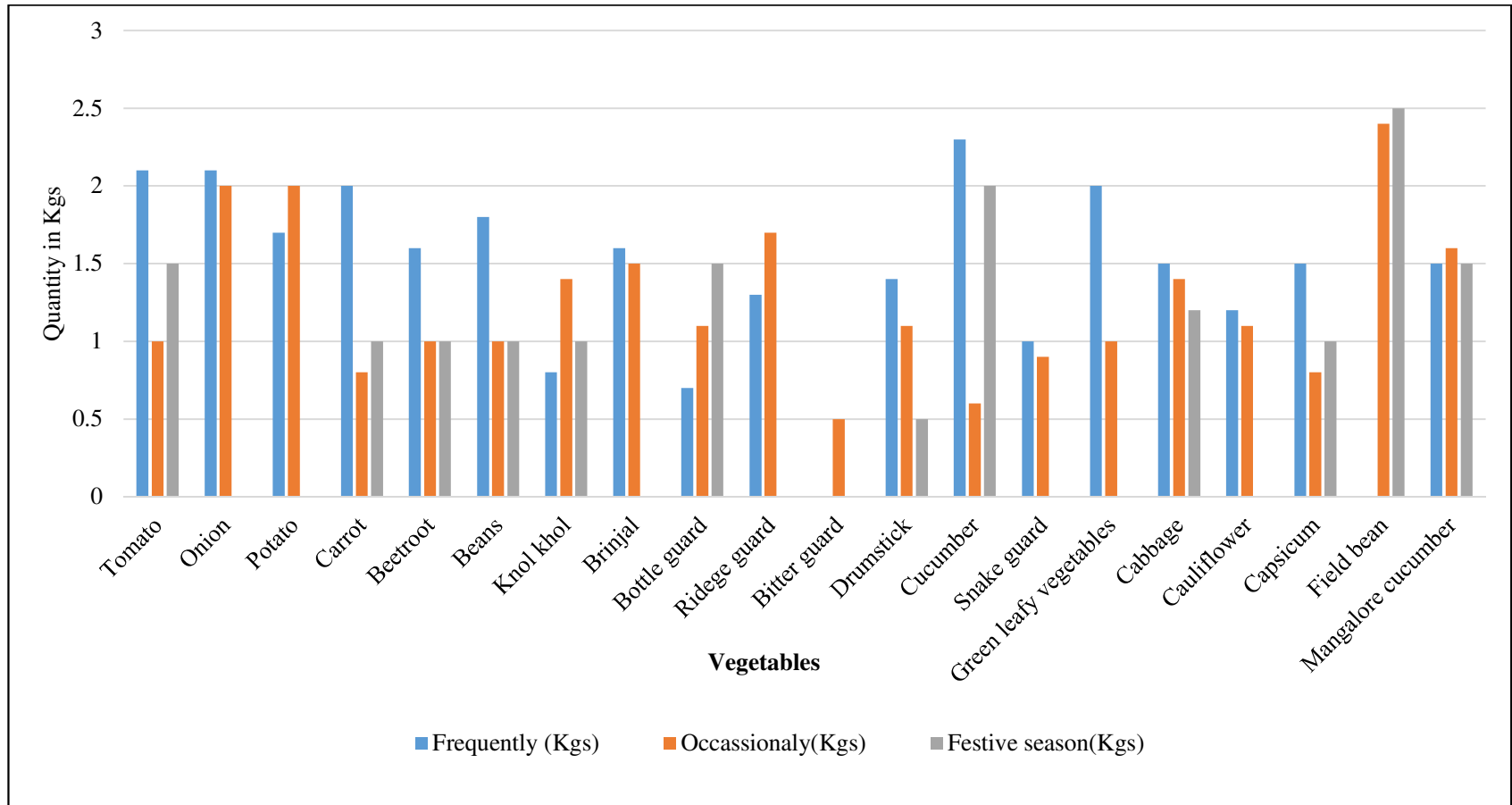


Fig. 03: Weekly average quantity of vegetables consumed by households in Bengaluru city

4.2.3 Frequency and form of consumption of fruits per day in Bengaluru City

The frequency and form of consumption of fruits varies from family to family and results regarding the same are presented in Table 4.4. About 66.67 per cent of consumers consume fruits once a day followed by 27.78 per cent of the consumers consume two times a day and 5.56 per cent of the consumers consume all three times a day. About 77.78 per cent of the consumers consume fruits in raw, juices and salads form followed by 11.11 per cent consume in raw form, 6.67 per cent of the consumers consume in juice form and only 4.44 per cent of the consumers consume as salads.

Table 4.4: Frequency and form of consumption of fruits per day in Bengaluru City

Sl. No.	Frequency	No. of respondents	Percentage to the total
1.	Once	60	66.67
2.	Twice	25	27.78
3.	Thrice	05	5.56
	Total	90	100.00
Sl. No.	Form of consumption	No. of respondents	Percentage to the total
1.	Raw	02	11.11
2.	Juices	06	6.67
3.	Salads	04	4.44
4.	Raw, Juices and Salads	70	77.78
	Total	90	100.00

4.2.4 Frequency and form of consumption of vegetables per day in Bengaluru City

The frequency and form of consumption of vegetables are presented in Table 4.5. About 50 per cent of consumers consume vegetables two times a day followed by 38.89 per cent of the consumers consume all three times a day and 11.11 per cent of the consumers consume only once a day. About 77.78 per cent of the consumers consume vegetables in cooked form followed by 20 per cent consume in both raw and cooked form, 2.22 per cent of them consume vegetables in raw form only.

Table 4.5: Frequency and form of consumption of vegetables per day in Bengaluru City

Sl. No.	Frequency	No. of respondents	Percentage to the total
1.	Once	10	11.11
2.	Twice	45	50.00
3.	Thrice	35	38.89
	Total	90	100.00
Sl. No.	Form of consumption	No. of respondents	Percentage to the total
1.	Raw	02	02.22
2.	Cooked	70	77.78
3.	Both raw and cooked	18	20.00
	Total	90	100.00

4.3 Factors influencing the consumption of fruits and vegetables in Bengaluru City

Factor analysis was used to identify the important attributes influencing the consumption of fruits and vegetables by consumers. The first step is to check the adequacy of factor analysis with the help of Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's Test (Table 4.6). The KMO measure was 0.363 revealed that the factors extracted will account for fair amount of variance. The Chi-square value for Bartlett's test was significant. Thus, rejecting the null hypothesis of independence among variable.

Eigen values greater than one are considered for determining the number of factors, with the help of Cattell's scree plot the factors are determined (Fig. 06). The scree plot is an alternative method of identifying the number of factors to extract via factor analysis as it displays the sharpest drop in the Eigen values of the factors, which highlighted that the factors would not explain a significant amount of the variance of scale items. It could be noticed that eight factors has Eigen value greater than 1 and as such only eight values were retained. Altogether 16 attributes were identified consumption of fruits and vegetables keeps us healthy, they provide nutrients to the body, they contain more fiber, price of F&V are relatively lower than non veg, doctors' advice to consume fruits and vegetables, It helps to maintain our diet requirement, fruits and vegetables contain less fat etc. Among these major attributes retained were perception, health conscious, affordability, nutrition, diet requirement and source of energy.

Table 4.6: KMO and Bartlett's test for variance among factors influencing Consumption of Fruits and Vegetables in Bengaluru City

KMO and Bartlett's Test		
Kaiser-Mayer- Olkin Measure of Sampling		0.363
Bartlett's Test of Sphericity	Approx. chi-square	1206.8
	Degrees of freedom	190
	Significance level	0

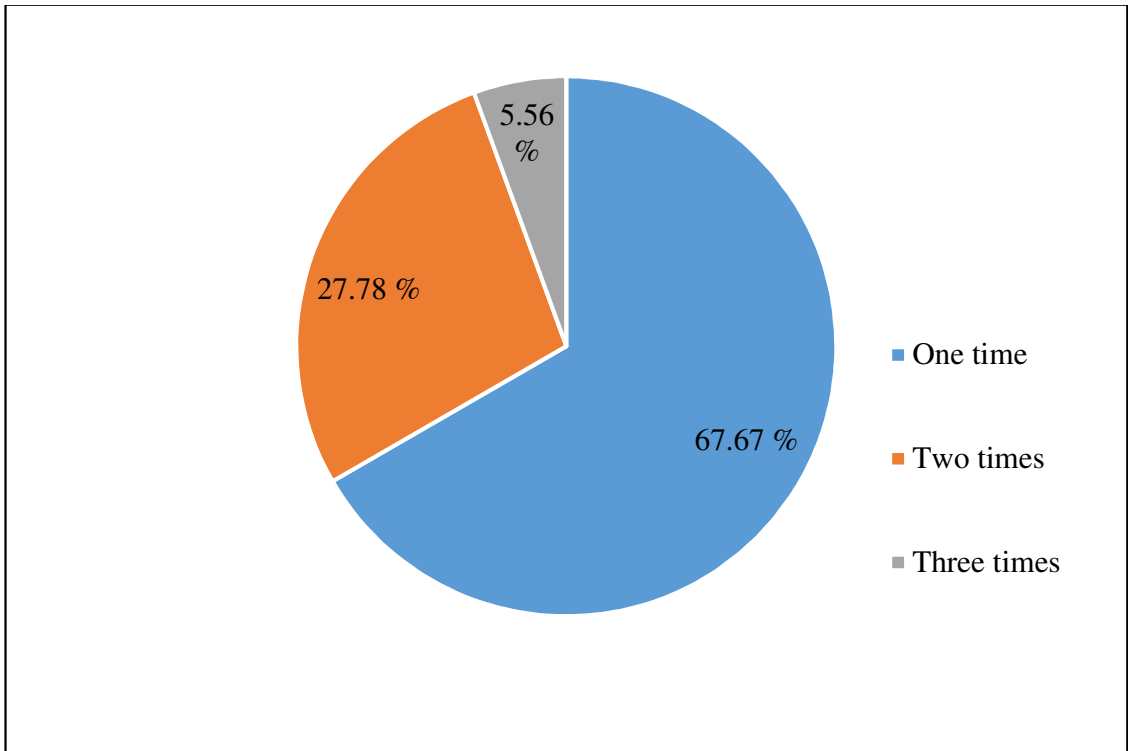


Fig.04: Frequency of consumption of fruits per day in Bengaluru city

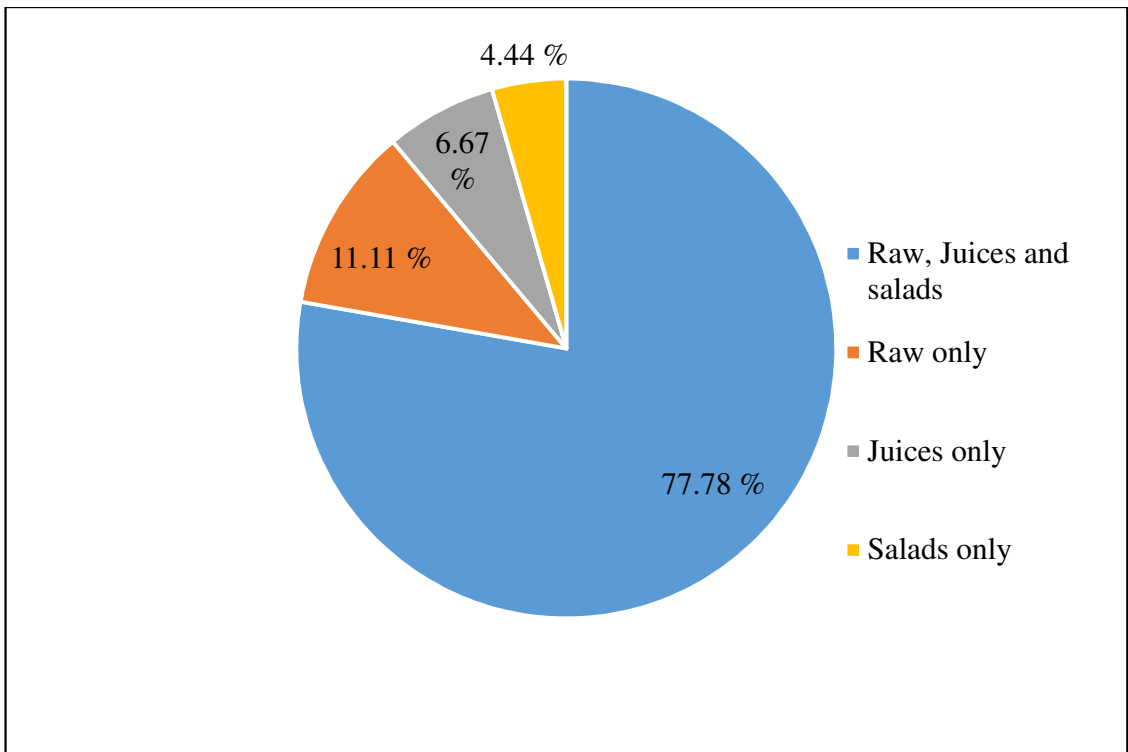


Fig.05: Form of consumption of fruits per day in Bengaluru city

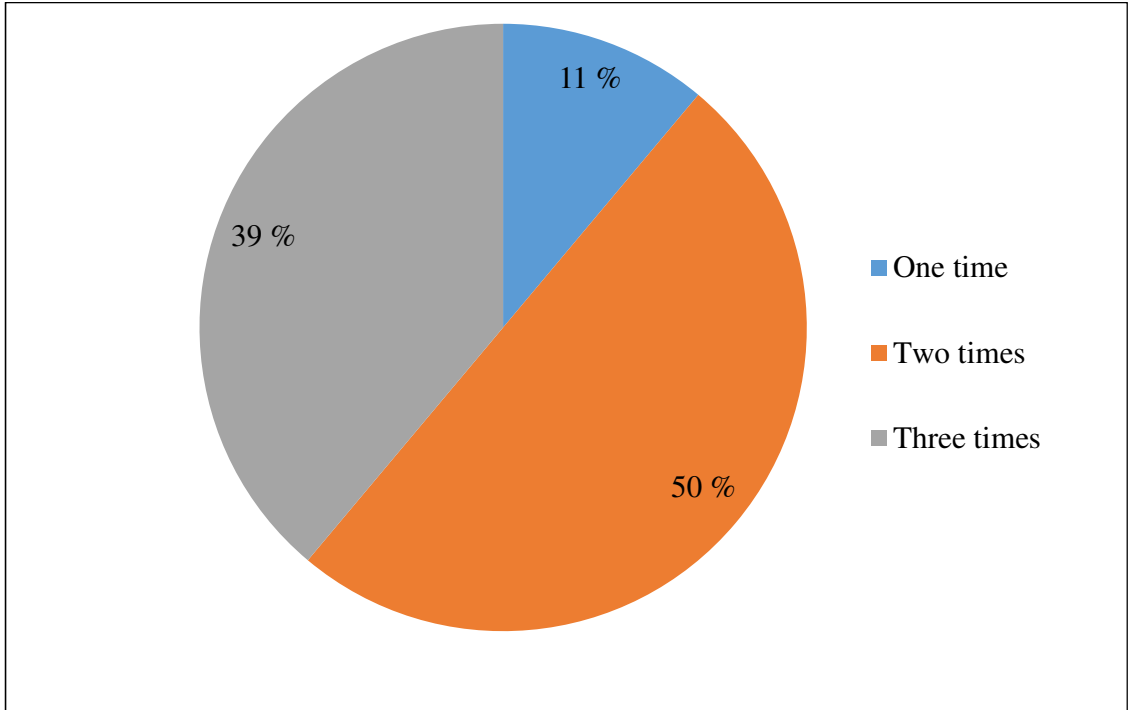


Fig.06: Frequency of consumption of vegetables per day in Bengaluru city

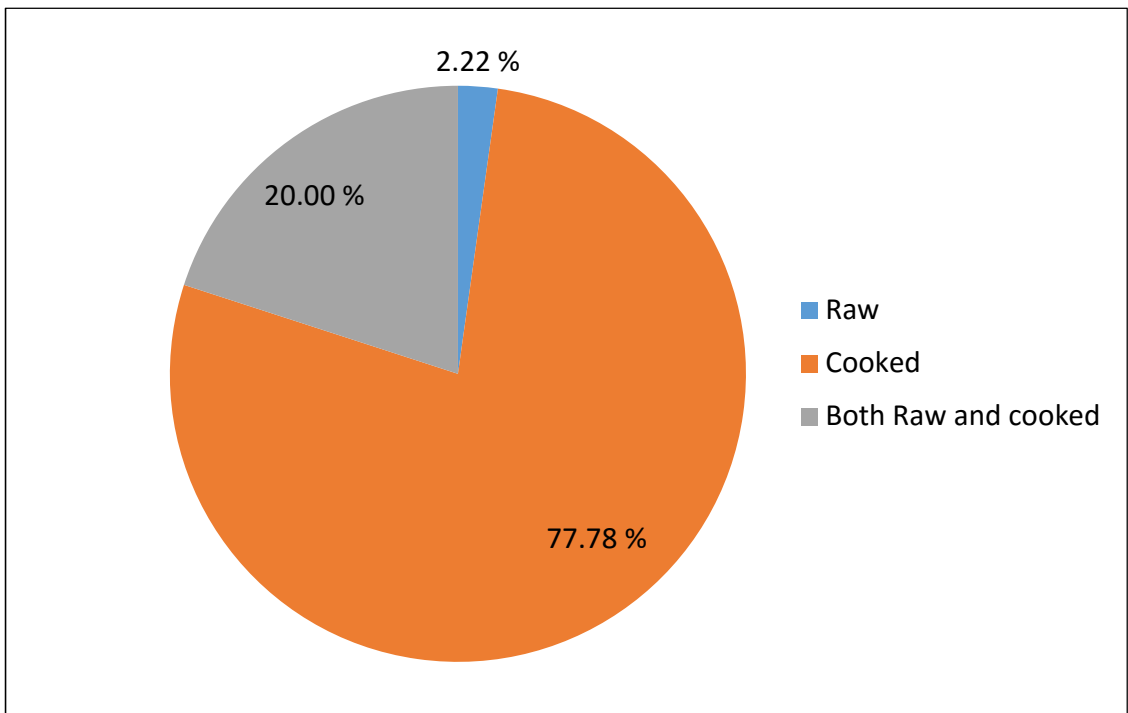


Fig.07: Form of consumption of vegetables in Bengaluru city

Table 4.7: Factors influencing consumption of fruits and vegetables in Bengaluru City**(N=90)**

Sl. No.	Attributes	Component						
		1	2	3	4	5	6	7
1.	Consumption of F&V keeps us healthy	0.127	-0.027	0.025	-0.035	0.831	0.004	-0.013
2.	F&V provide nutrients to the body	0.122	0.391	-0.051	0.154	0.641	0.322	0.09
3.	F&V contain more fiber	-0.139	0.004	-0.126	-0.108	-0.048	0.721	-0.145
4.	The price of F&V are relatively lower than non veg	-0.205	0.222	0.401	0.411	-0.47	0.143	-0.172
5.	Doctors' advice to consume F&V.	0.255	0.603	0.284	-0.159	-0.346	0.498	-0.051
6.	F&V helps to maintain our diet requirement	0.142	0.053	0.013	0.023	0.099	0.178	0.022
7.	F&V contain less fat	0.903	0.272	0.109	0.225	-0.019	-0.071	0.094
8.	F&V are easily digestible	0.469	-0.047	-0.09	-0.099	0.06	-0.015	-0.13
9.	Easily available	0.277	-0.016	0.115	0.125	0.053	0.153	0.581
10.	F&V are freshly available	-0.064	-0.154	0.261	-0.222	0.39	-0.127	0.237
11.	Organically grown F&V are good for health	0.026	0.264	-0.293	-0.559	0.001	0.053	0.022
12.	Children likes to eat F&V	0.611	0.108	-0.084	-0.104	0.056	0.401	0.358
13.	Our tradition is to consume F&V	0.786	0.162	-0.103	0.223	0.138	-0.064	0.173
14.	Some F&V are available seasonally	0.303	0.264	-0.765	0.053	0.041	0.282	-0.042
15.	Grow F&V in the garden	0.112	0.322	0.079	0.12	0.054	0.104	0.123
16.	Taste will be good	0.166	0.971	-0.04	0.008	0.093	-0.036	-0.134
17.	Health conscious	0.086	0.679	0.091	-0.021	-0.027	0.103	0.483
18.	F & V are called Protective foods	-0.088	0.017	0.473	-0.448	0.133	0.527	0.161
19.	F&V are source of fibers, vitamins, minerals	0.092	-0.029	-0.018	0.031	-0.081	0.22	-0.733
20.	F&V are good for Diabetic patients	0.2	0.129	-0.156	0.867	-0.022	-0.138	0.137

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization

4.4 Purchase behaviour of consumers for fruits and vegetables in Bengaluru city

4.4.1 Frequency of purchase of fruits and vegetables per week by households in Bengaluru city

The frequency of purchase of fruits and vegetables are indicated in Table 4.8. There is considerable variation in purchase behaviour with respect to the frequency of purchase, 53.33 per cent of the households buy fruits and vegetables as and when needed, 26.67 per cent of the households purchase once in two days, 11.11 per cent of the households weekly once and 9 per cent buy daily.

Table 4.8 Frequency of purchase of fruits and vegetables by households in Bengaluru city

Sl. No.	Frequency of purchase	No. of respondents	Percentage to the total
1.	As and when	48	53.33
2.	Daily	8	8.89
3.	Once in two days	24	26.67
4.	Weekly	10	11.11
	Total	90	100.00

4.4.2 Expenditure of households on fruits and vegetables per week in Bengaluru city

The consumer's weekly expenditure on fruits and vegetables is presented in the Table 4.9. The consumer's expenditure on fruits and vegetables varies significantly based on frequency of purchase, quantity of purchased, family size and price of fruits and vegetables. The consumers making purchase once in two days spend Rs. 400.00 on fruits and Rs. 450.00 on vegetables followed by the consumers making purchase as and when needed spend Rs. 350.00 on fruits and Rs. 275.00 on vegetables, weekly once purchasing consumers spend Rs. 300 on each and consumers buying daily spend Rs. 268.00 on fruits and Rs. 290.00 on vegetables respectively.

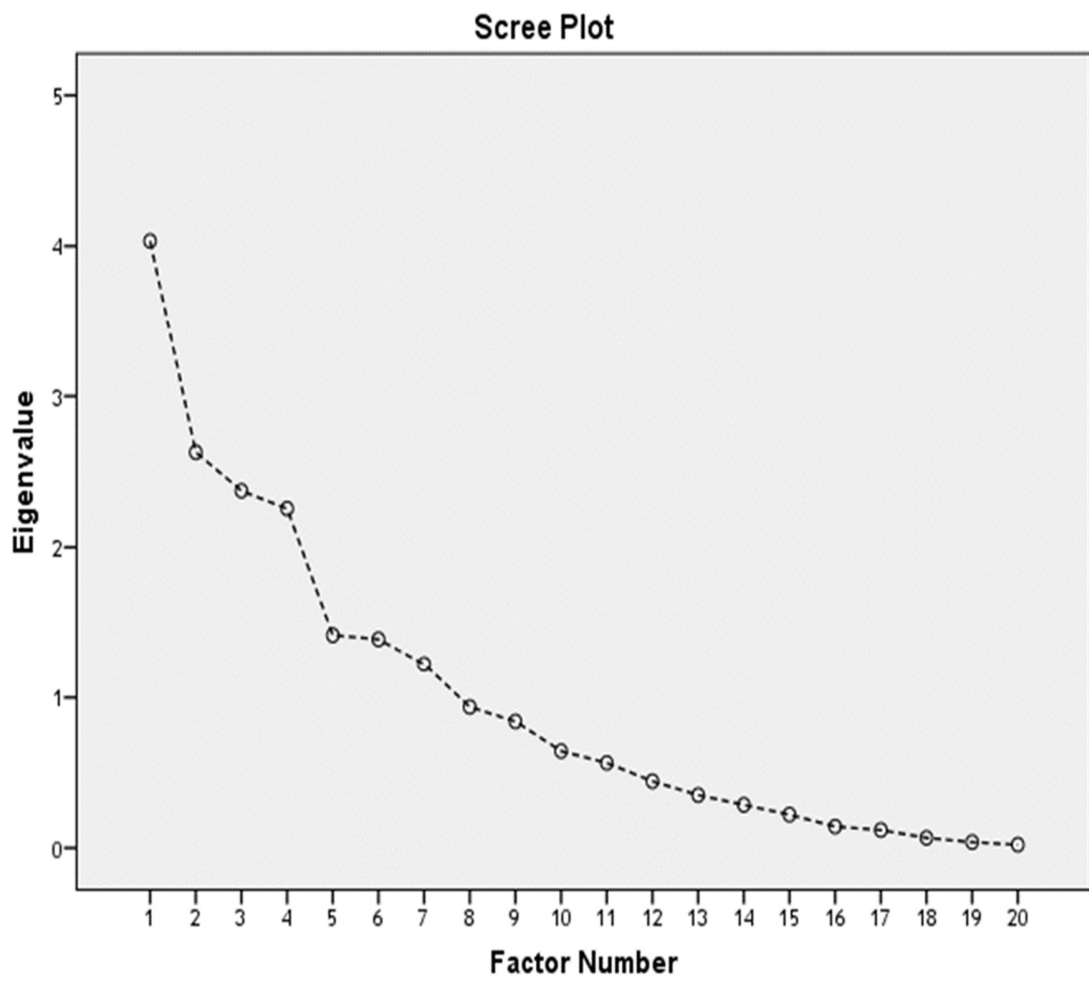


Fig. 08: Cattell's scree plot for factors influencing consumption of F&V

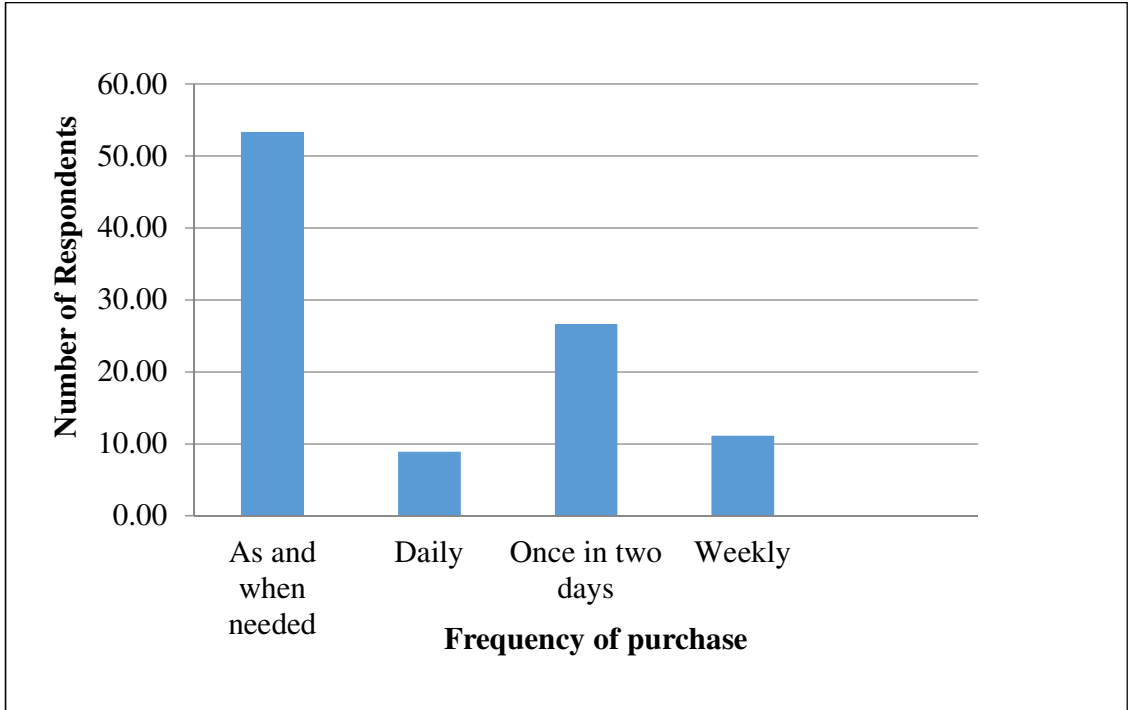


Fig.09: Frequency of purchase of fruits and vegetables by households per week in Bengaluru city

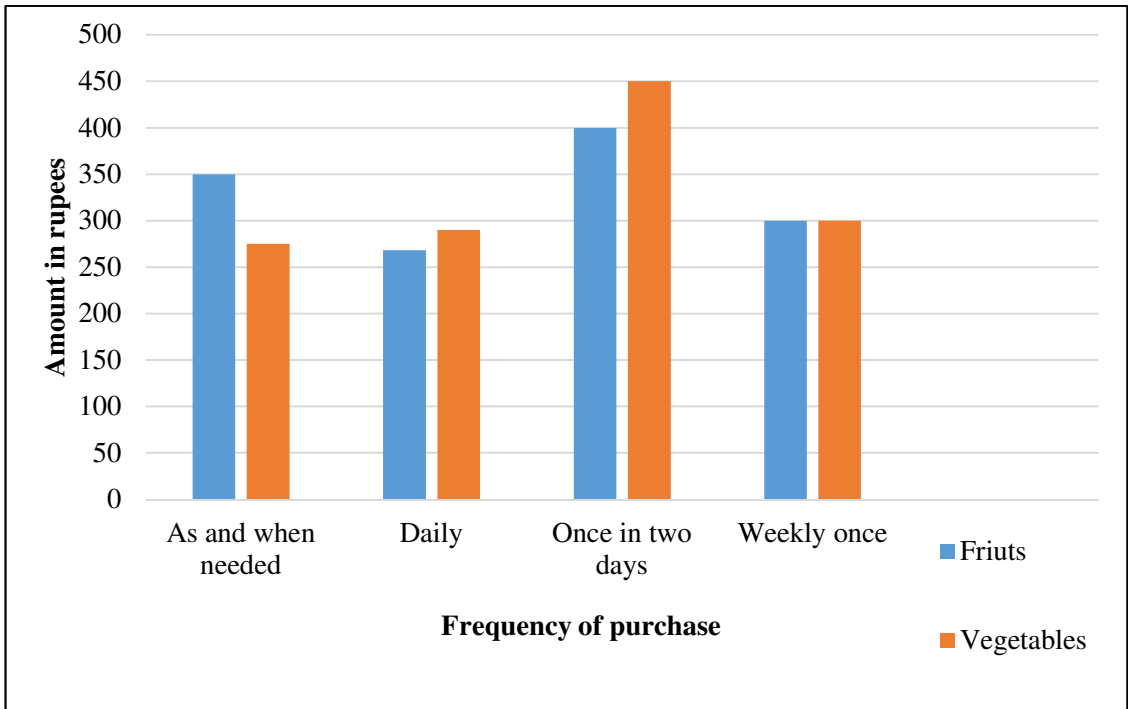


Fig.10: Expenditure of households on fruits and vegetables per week in Bengaluru city

Table 4.9: Expenditure of households on fruits and vegetables per week in Bengaluru City

Sl. No.	Frequency	Fruits (in Rs.)	Vegetables (in Rs.)
1.	As and when	350.00	275.00
2.	Daily	268.00	290.00
3.	Once in 2 days	400.00	450.00
4.	Weekly once	300.00	300.00

4.4.3 Nature and decision maker in the family to purchase fruits and vegetables in Bengaluru city

Purchase decision consists of planned, unplanned and both. The planned purchase of fruits and vegetables constitutes of 13.33 per cent followed by unplanned is of 47.78 per cent and 38.89 per cent of the households purchase both by planned and unplanned. Decision maker for purchase of fruits and vegetables varies from family to family. The Table 4.10 shows that around one third (31.11%) of housewives make the decision to purchase fruits and vegetables followed by 27.78 per cent of husband and wife together, 24.44 per cent by only husband, 11.11 per cent by maid and rest of 5.56 per cent by children.

Table 4.10: Nature and decision maker in the family to purchase fruits and vegetables in Bengaluru city

Sl. No.	Nature of Purchase	No. of respondents	Percentage to the total
1.	Planned	12	13.33
2.	Unplanned	43	47.78
3.	Both planned & unplanned	35	38.89
	Total	90	100.00
	Decision maker to purchase F&V	No. of respondents	Percentage to the total
1.	Husband	22	24.44
2.	Wife	28	31.11
3.	Together	25	27.78
4.	Children	5	5.56
5.	Maid	10	11.11
	Total	90	100.00

4.4.4 Preference of consumers in purchasing kind of fruits and vegetables in Bengaluru city

The details of preference of consumers in purchasing kind of fruits and vegetables in Bengaluru city is presented in Table 4.11. The table shows that majority 77.78 per cent consumers prefer fresh fruits and vegetables and 22.22 per cent of consumers prefer cut fruits and vegetables.

Table 4.11: Preference of consumers in purchasing kind of fruits and vegetables in Bengaluru city

Sl. No.	Kind of fruits and vegetables	No. of respondents	Percentage to the total
1.	Cut fruits and vegetables	20	22.22
2.	Fresh fruits and vegetables	70	77.78
	Total	90	100.00

4.5 Preferred time and shops for purchase of fruits and vegetables in Bengaluru city

From the Table 4.12 it could be seen that the majority 67.78 per cent of consumers prefer evening time, followed by 26.67 per cent prefer afternoon time and 5.55 per cent prefer morning time for purchase of fruits and vegetables. The preferred shops for purchase of fruits and vegetables are as follows. 54.44 per cent of consumers prefer modern retail stores, 18.89 per cent prefer shandy i.e. Yalahanka Raithara Santhe, 11.11 per cent prefer direct sale, 11.11 per cent prefer markets and rest of 4.45 per cent prefer online purchase.

Table 4.12: Preferred time and Shops for Purchase of fruits and vegetables in Bengaluru City

Sl. No.	Preferred Time	No. of respondents	Percentage to the total
1.	Morning	5	5.55
2.	Afternoon	24	26.67
3.	Evening	61	67.78
	Total	90	100
Sl. No.	Preferred Shops	No. of respondents	Percentage to the total
1.	Modern Retail Stores	49	54.44
2.	Shandy	17	18.89
3.	Markets	10	11.11
4.	Direct Sale	10	11.11
5.	Online Purchase	4	4.45
	Total	90	100

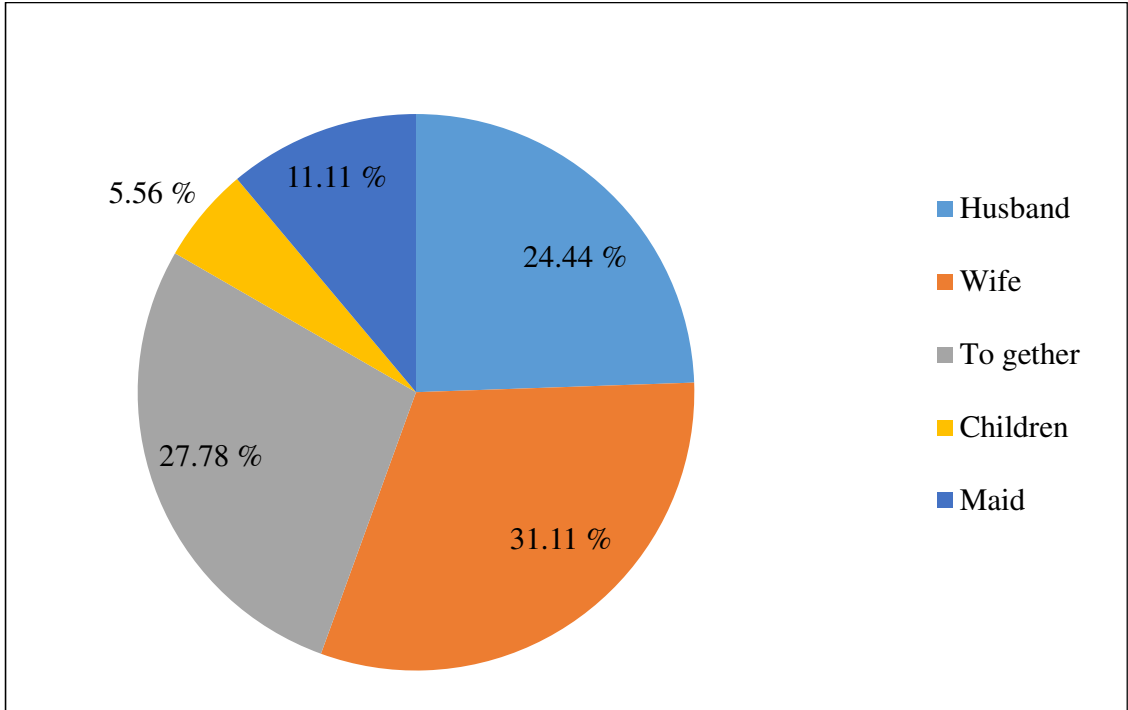


Fig.11: Decision maker in the family to purchase fruits and vegetables in Bengaluru city

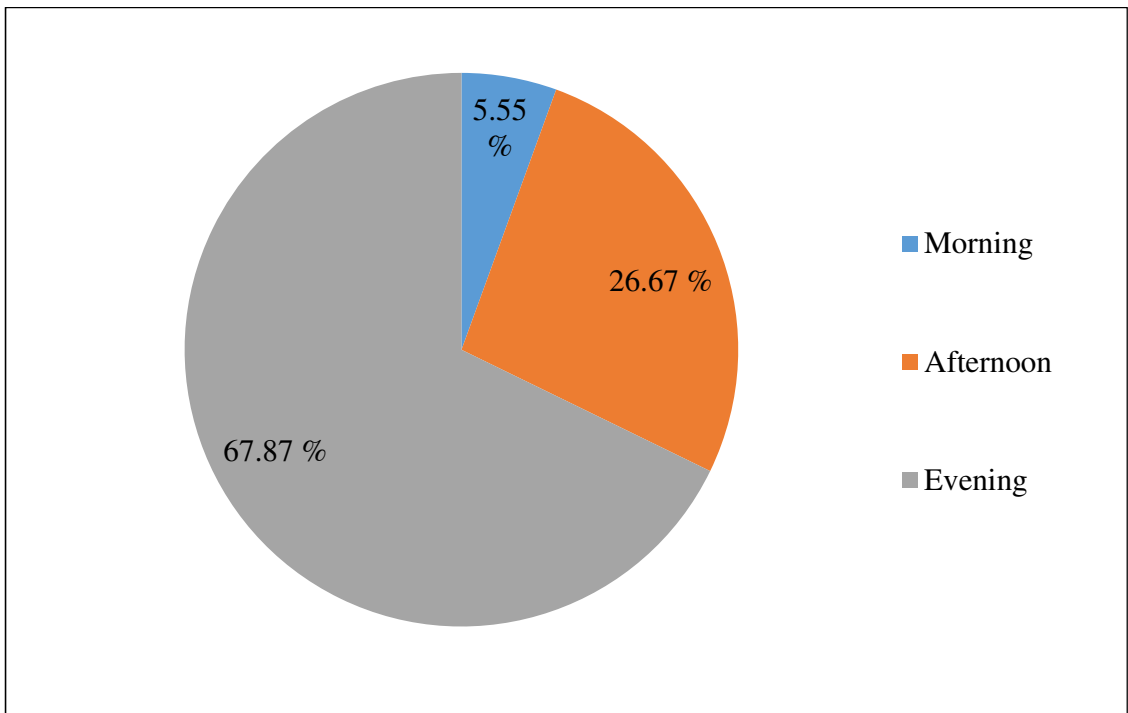


Fig.12: Preferred time for Purchase of fruits and vegetables in Bengaluru city

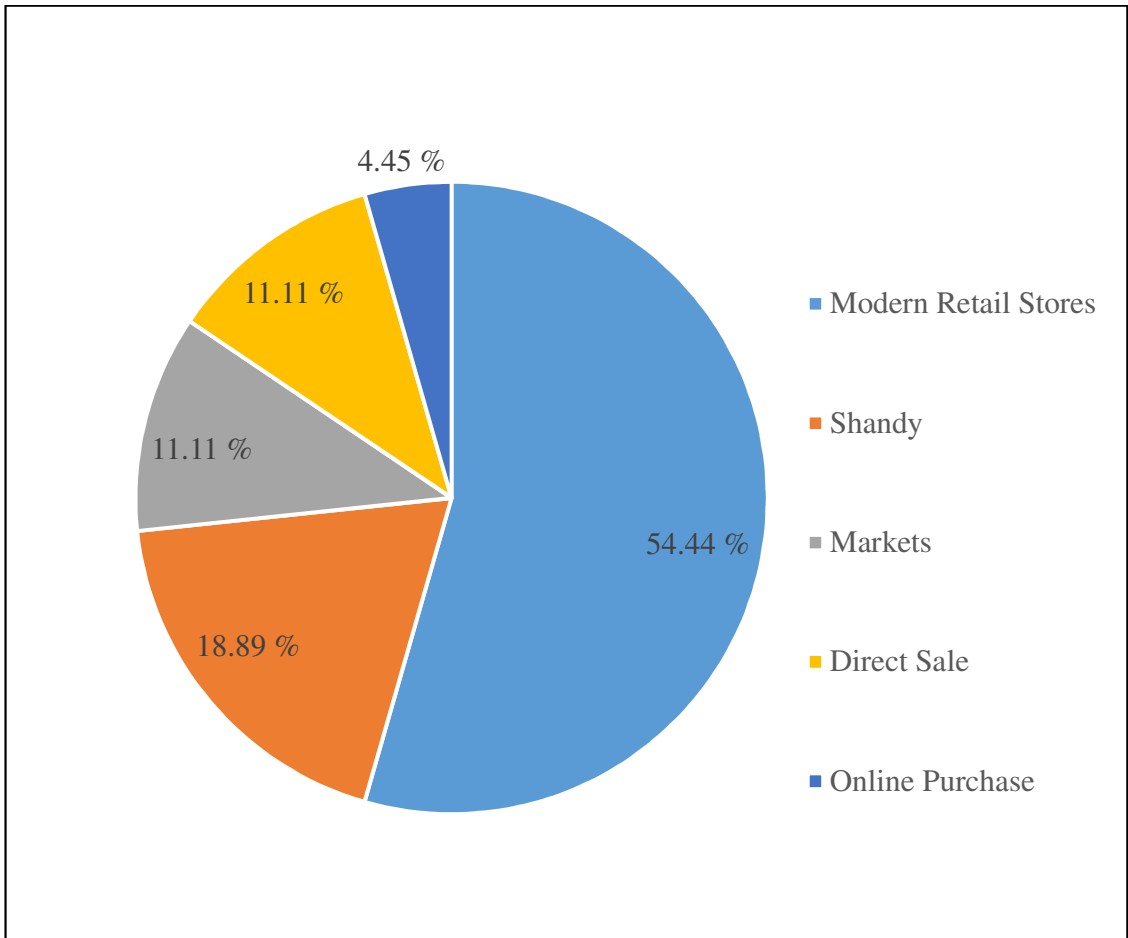


Fig.13: Preferred shops for Purchase of fruits and vegetables in Bengaluru city

4.6 Major constraints faced by consumers in purchasing fruits and vegetables in Bengaluru city

The major constraints faced by consumers in purchasing Fruits and Vegetables is presented in the Table 4.13. The table indicates that 55.56 per cent of consumers face constraint that high prices of Fruits and Vegetables is the major constraint followed by 50 per cent of them face constraint with non-availability of required type of fruits and vegetables, 44.44 per cent of consumers face constraint with non-availability of required quality of fruits and vegetables, 33.89 per cent face the problem with Pesticide residues in fruits and vegetables, 38.89 per cent of the sample consumers say that produce will not be cleaned as required.

Table 4.13: Major constraints faced by consumers in purchasing fruits and vegetables in Bengaluru city

Sl. No	Constraints	No. of respondents	Percent age
1.	Non availability of required type of fruits and vegetables	45	50.00
2.	Non availability of required quality of fruits and vegetables	40	44.44
3.	High prices	50	55.56
4.	Pesticide residues will be more in	35	38.89
5.	Produce not cleaned as required	35	38.89

V DISCUSSION

The results presented in the previous chapter are discussed under the following headings.

- 5.1 General information of the fruits and vegetables consumers in Bengaluru city
- 5.2 Consumption pattern of fruits and vegetables in Bengaluru city
- 5.3 Factors influencing the consumption of fruits and vegetables
- 5.4 Purchase behaviour of consumers for fruits and vegetables
- 5.5 Preference time and shops for purchase of fruits and vegetables
- 5.6 Major constraints faced by consumers in purchasing fruits and vegetables

5.1 General information of the fruits and vegetables consumers in Bengaluru city

5.1.1 Socio-economic profile of consumers towards fruits and vegetables in Bengaluru city

It could be observed from the Table 4.1 that among the total respondents about 35.56 percent of the sample respondents belong to the age group of 25-35 years and 45-55 years each.

With respect to literacy level of the sample respondents, it was observed that most of the respondents were graduates and none of the respondents were illiterates. Since the study was undertaken in Bengaluru city it is quite obvious for the respondents to have at least minimum education. Among the respondents interviewed 61.11 per cent are female and rest of 38.89 per cent were male.

With regard to family type, majority of families in the study belonged to nuclear type, this can be associated to the fact that the changing life style of the people in the present days does not favour joint family type. Therefore, the number of nuclear families were more in number than joint families. Majority of the consumers were non-vegetarians (77.78%) and vegetarians were very less in number (22.22%). The food habit of the respondents varies based on their tastes and preferences and health consciousness.

Majority of 50 per cent of respondents were working in private sector since, the study was conducted in Bengaluru city, the IT and BT hub of India, so the people residing here have huge opportunities of private jobs followed by 20 per cent of respondents working in Government jobs, with 16.67 per cent were house wives, and 7.78 per cent were doing own business.

It could be seen from the Table 4.1 that the sample consumers numbering 90 were well distributed among the 5 income groups. About 33.33 per cent of the sample consumers belonged to the income of Rs. 1,000 – Rs.25, 000 per month and second major group found was 27.73 per cent consumers belonged to earn Rs. 25,000 – Rs. 50,000 per month followed by 22.22 per cent of consumers belong to Rs. 50,001 – Rs. 75,000 per month, 11.11 per cent of consumer's monthly household income range Rs. 75,001 – Rs. 1, 00, 00 and rest of 5.56 per cent belong to the income group of more than Rs. 1, 00,000 per month respectively.

5.2 Consumption pattern of fruits and vegetables in Bengaluru city

5.2.1 Weekly average quantity of fruits consumed by households in Bengaluru city

It is inferred from the study that frequently consuming fruits are Banana, Papaya, Pomegranate, Apple and Orange were consumed frequently due to their nutritional properties, availability as Banana and papaya are good for health and available at low price. In most of the families Banana will be eaten after the food, Papaya will be consumed due to its price is low and blood purifying property. The fruits like Sapota, Grapes and Orange and imported fruits like Kiwi, Rose apple and Strawberry are consumed occasionally because of their high price and Pomegranate, Mango, Guava, Banana are consumed in more quantities due to their seasonal availability and festive seasons.

5.2.2 Weekly average quantity of vegetables consumed by households in Bengaluru city

The study revealed that in majority of the families the frequently and more consuming vegetables were Green leafy vegetables, Tomato, Onion, Carrot, Cucumber, Beans and Beet root due to their nutritional values and availability in all the seasons. The vegetables like Ridge guard, Brinjal, Knol-khol, Drumstick, Bottle guard and Bitter guard were consumed occasionally because consumption of these vegetables daily cause some health imbalance and most of the consumers does not like to consume bitter guard because of bitterness. Vegetables like Field bean, Mangalore cucumber and bottle guard were consumed during festival seasons or seasonally due to their tradition and availability.

5.2.3 Frequency and form of consumption of fruits per day in Bengaluru city

The results showed in Table 4.4 revealed the frequency and form of consumption of fruits and vegetables. Majority 66.67 per cent of consumers consume fruits once a day for their breakfast as the working people cannot spend time for cleaning, cutting of fruits during afternoon times followed by 27.78 per cent of the consumers consume two times a day due to their health consciousness and 5.56 per cent of the consumers consume fruits

all three times a day in these families the majority of women will be housewives so, the availability of time will be more to clean and cut fruits.

About 77.78 per cent of the consumers consume fruits in raw, juices and salad form as these consumers like to add more sweetness to fruits and increase the taste followed by 11.11 per cent of consumers consume in raw form only, as these consumers were diabetic patients and does not like more sweet, 6.67 per cent of the consumers consume fruits as juices only and 4.44 per cent of the consumers consume in salad form after their dinner or lunch.

5.2.4 Frequency and form of consumption of vegetables per day in Bengaluru city

The results showed in Table 4.5 revealed that the frequency and form of consumption of fruits and vegetables. Majority 50 per cent of consumers consume vegetables twice a day for their lunch and dinner because they consume breakfast without fruits and vegetables and spend more time for cooking during afternoon and night times. 38.89 per cent of the consumers consume all three times a day due to their health consciousness and in these families the majority of women will be housewives so, the availability of time will be more to cook all three times a day. Most of the families will be dual income i.e. both husband and wife will be working so, the time for cooking of vegetables will be less hence 11.11 per cent of the consumers consume only once a day.

About 77.78 per cent of the consumers consume vegetables in cooked form as they don't like the taste of vegetables without cooking followed by 20.00 per cent consume in both raw and cooked form as all vegetables cannot be consumed without cooking and taste will not be without cooking only 2.22 per cent of the consumers consume fruits and vegetables in raw form respectively.

5.3 Factors influencing the consumption of Fruits and Vegetables in Bengaluru city

Factor analysis was used to identify the attributes influencing the consumption of Fruits and Vegetables by the consumers. The major advantage of factor analysis is to delineate and group different variables which were correlated. Thus factor analysis was useful in studying the important dimensions which influence the consumers.

KMO measure was found to be 0.336. It shows that the factors that were extracted will account for fair amount of variance. The overall significance of correlation matrices was tested with Bartlett test of Sphericity (Table 4.6).

Eigen values greater than one were considered for determining the number of factors, with the help of Cattell's screen plot the factors were determined (Fig. 07). The scree plot is an alternative method of identifying the number of factor to extract via factor analysis as it displays the sharpest drop in the Eigen values of the factors, which

highlights that further factors would not explain a significant amount of the variance of scale items. It can be noticed that eight factors have Eigen value greater than 1 and as such only eight values were retained. Altogether 16 attributes were identified consumption of fruits and vegetables keeps us healthy, they provide nutrients to the body, they contain more fiber, price of fruits and vegetables are relatively lower than non veg, doctors' advice to consume fruits and vegetables, It helps to maintain our diet requirement, fruits and vegetables contain less fat etc. Among these major attributes retained were perception, health conscious, affordability, nutrition, diet requirement, and source of energy.

Loading on the factors may be positive or negative. The upper the loadings the more important is the factor. The correlation matrix of the rotated factor loadings is presented in Table 4.6 the rotation factors is calculated to give an idea of how the factors initially extracted differ from each other and provide a clear picture of which item load on which factor. Rotation does not actually change anything but makes the interpretation of the analysis easier. It could be observed that fruits and vegetables contain less fat, easily digestible, Children likes to eat F&V and tradition to consume were substantially loaded on factor (component) 1. While Doctors' advice to consume fruits and vegetables, Grown in own garden, Taste will be good and health conscious were substantially loaded on factor 2. Freshly available and seasonally available were substantially loaded on factor 3. The price of fruits and vegetables are relatively lower than non veg and organically grown fruits and vegetables are good for health were substantially loaded on factor 4. Consumption of fruits and vegetables keeps us healthy, provide nutrients to body were substantially loaded on factor 5. Fruits and vegetables contain more fiber, helps to maintain our diet requirement and Protective foods were substantially loaded on factor 6. Easily available and source of sugars, vitamins, minerals were substantially loaded on factor 7.

The correlation matrix of rotated factor loadings revealed that Factor 1 collects four variables they are fruits and vegetables contain less fat, easily digestible, children likes to eat fruits and vegetables, it is our tradition to consume fruits and vegetables this factor indicates that most of the consumer's perception influence them to consume fruits and vegetables hence, labeled as 'perception'. Factor 2 collects two variables that relate to Doctors advice to consume fruits and vegetables and Grown in own garden and labeled as 'health conscious'. Factor 3 collects two variables that relate to freshly available and seasonally available since all types of Fruits and Vegetables will not be available in all seasons in required quality and hence this factor is labeled as 'convenience', Factor 4 collects three variables relate to price of fruits and vegetables are relatively lower than non veg and Organically grown fruits and vegetables are good for health its consumers convenience to spend money and availability of required type of fruits and vegetables hence labeled as 'affordability'. Factor 5 collects two variables related to Consumption of fruits and vegetables keeps us healthy, provide nutrients to body and hence labeled as 'nutrition'. Factor 6 collects three variables such as fruits and vegetables contain more fiber, helps to maintain our diet requirement and Protective foods since all these factors are related to nutritional requirement for the body and labeled as 'diet requirement'.

Factor 7 collects two variables such as easily available and source of sugars, vitamins, minerals and labeled as 'source of energy' (Table 4.7).

The results of factor analysis revealed that the important factors that influence the consumers to consume fruits and vegetables are consumer's perception, health consciousness, convenience, affordability, nutrition, diet requirement and source of energy.

5.4 Purchase behaviour of consumers for fruits and vegetables in Bengaluru city

5.4.1 Frequency of purchase of fruits and vegetables per week by households in Bengaluru city

The frequency of purchase of fruits and vegetables is presented in Table 4.8. It could be observed that 53.33 per cent of the consumers buy fruits and vegetables as and when needed. This is mainly because of the perishable nature of the fruits and vegetables. The fruits and Vegetables are available every day in nearby location and hence one-time purchase is not in practice. About 26.67 per cent of consumers buy once in two days since they feel comfortable to store fruits and vegetables for next day. 11.11 per cent of them buy daily since the women in these families are house wives and spend time for purchasing daily and only 8.89 per cent of the sample consumers buy weekly once. Since both husband and wife were working and they do not get time to purchase daily and as and when needed.

5.4.2 Expenditure of households on fruits and vegetables per week in Bengaluru city

The household's expenditure on fruits and vegetables varies significantly based on frequency of purchase and family size. The households making purchase once in two days spend more because most of these were joint families and buy more quantity for two or three days and need to pay more even when the price of fruits and vegetables are high and hence spends rupees 400.00 on fruits and 450.00 on vegetables followed by the households making purchase as and when needed spend rupees 350.00 on fruits and 275.00 on vegetables as they purchase very less quantities and they go for less price vegetables, weekly once purchasing households spends rupees 300 fruits and rupees 300.00 on vegetables as they visit near markets and purchase the required fruits and vegetables weekly for low price and the households buying daily purchase in less quantities and spend less i.e. rupees 268.00 on fruits and 290.00 on vegetables respectively.

5.4.3 Nature and decision maker in the family to purchase fruits and vegetables in Bengaluru city

Most the households purchase fruits and vegetables unplanned (47.78%) as the households does not spend more time for shopping and they purchase by looking at the available fruits and vegetables in the shops and markets. 38.89 per cent of the households purchase both by planned and unplanned because sometimes they prefer to eat the particular fruits and vegetables because of seasonal availability and 13.33 of the households plan a schedule to purchase different fruits and vegetables as in these families the wives will be housewives and health conscious.

The Table 4.10 shows the decision maker for purchase of fruits and vegetables in the family. Among the sample consumers 31.11 per cent were housewives and make the decision to purchase fruits and vegetables, since they stay in home and make decisions followed by 27.78 per cent by husband and wife together during evening times as they go out for a walk or during relaxing time they spend for purchasing, 24.44 per cent by only husband because while returning from the work place they purchase fruits and vegetables, 11.11 per cent by maid and rest of 5.56 per cent by children make the purchase decision regarding fruits and vegetables.

5.4.4 Preference of consumers in purchasing the kind of fruits and vegetables in Bengaluru city

77.78 per cent consumers prefer fresh fruits and vegetables as they will be fresh, tasty, good appearance, doesn't want to store them for many days as the fruits and vegetables are available everywhere and they can afford whenever they require and 22.22 per cent of consumers prefer cut fruits and vegetables as they will not get time to clean and cut the fruits and vegetables because both husband and wife will be working.

5.5 Preference time and shops for purchase of fruits and vegetables in Bengaluru city

Majority 67.78 per cent of consumers prefer evening times for purchasing fruits and vegetables because majority of the customers were working and after the work they will be free and get time to spend outside. 26.67 per cent prefer afternoon times, since they will be housewives and spend time for purchasing and rest of 5.56 per cent prefer morning time for purchase of fruits and vegetables as fresh fruits and vegetables will be available in the morning times. Among the respondents 54.44 per cent of households prefer modern retail stores for their convenience, quality, packing and availability of all kinds of fruits and vegetables followed by 18.89 per cent of the households prefer shandy as the price of fruits and vegetables will be less in shandy and freshly available, 11.11 per cent of the households prefer markets, direct sale consists of 11.11 per cent as they feel comfortable and purchase directly from the sellers who sell door to door in push carts and only 4.44 per cent of the households prefer online purchasing due lack of time for purchasing.

5.6 Major constraints faced by consumers in purchasing fruits and vegetables in Bengaluru city

The consumers express more than one constraint they face in purchasing fruits and vegetables. About 55.56 per cent of consumers face constraint with high prices of fruits and vegetables, the price of the fruits and vegetables are relatively higher than other food items and low income group of consumers cannot spend more on fruits and vegetables when the prices are high followed by 50 per cent of the consumers face constraint with non-availability of required type of fruits and vegetables due to seasonal availability, 44.44 per cent of consumers face constraint with non-availability of required quality of fruits and vegetables due to lack of proper storage facilities in stores, 33.89 per cent face the problem with pesticide residues in fruits and vegetables and consuming those fruits and vegetables may cause health problems and 38.89 per cent of the consumers face problem with produce not cleaned as required.

VI SUMMARY AND SUGGESTIONS

Fruits and vegetables consumption is crucial to the availability of micronutrients to the body. This is because these food items are a rich source of vitamins and minerals which are required for the normal functioning of the human body. Although required in small proportions, vitamins and minerals are a needed part of the daily diet as the human body is not able to synthesize them in sufficient amounts to meet the nutritionally recommended allowances.

Apart from providing micronutrients, fruits and vegetables are known to provide dietary fibers (soluble and insoluble) which are vital for the optimal functioning of the gastro-intestinal tract. They also enable the body to use other nutrients required for its normal functioning (like the energy from fats and carbohydrates). However, the knowledge and intake of this essential aspect of nutrition is globally poor. This study therefore aimed at assessing the knowledge and intake of vegetables and fruits among the consumers in Bengaluru city.

In the backdrop of this the present study seeks to document Consumption pattern of Fruits and Vegetables by consumers, to analyze the factors influencing consumption, purchase behaviour of consumers for fruits and vegetables and the constraints faced in purchasing. This study will bring forth very useful information for Fruits and Vegetables business makers for reorienting retailing of Fruits and Vegetables.

The increasing importance for Fruits and Vegetables in consumption basket highlights the growth potential for this sector. Keeping in this view, the study aims at addressing the following specific objectives.

1. To examine the consumption pattern of Fruits and Vegetables (F&V) in Bengaluru city,
2. To analyse the factors influencing the consumption of Fruits and Vegetables and
3. To analyse the purchase behaviour of consumers for Fruits and Vegetables.

Data regarding consumption pattern was collected using a pre tested structured interview schedule. The simple random sampling method was used to select the respondents from different localities in Bengaluru city. A total of 90 consumers were interviewed. The general information regarding socio economic characteristics, data regarding specific objectives like consumption pattern, factors influencing consumption, and purchase behaviour of fruits and vegetables were collected from respondents randomly by personal interview method. The secondary information regarding the study area, demography and the research topic were collected from APEDA and FAO.

6.1 Major findings of the study

- 35.56 per cent of the sample respondents belong to the age group of 25-35 years and 45-55 years each.
- Most of the respondents were graduates and none of the respondents were illiterates.
- Around three fourth (76.67%) of the families in the study belonged to nuclear type and only 23.33 per cent are joint families.
- Majority of consumers are non-vegetarians (77.78%) and vegetarians are very less in number i.e. 22.22 per cent.
- 50 per cent are working in private sector followed by 20 per cent of respondents working in Government jobs, with 16.67 per cent are house wives, and 7.78 per cent are doing own business.
- One third (33.33%) of the sample consumers belonged to the income upto Rs..25,000 per month and 5.56per cent belong to the income group of more than Rs. 1, 00,000 per month.
- The frequently consuming fruits are Banana, Papaya, Pomegranate, Apple and Orange followed by Sapota, Grapes, Strawberry and imported fruits like Kiwi, Rose apple are consumed occasionally and Pomegranate, Mango, Guava, Banana are consumed in more quantities due to their seasonal availability and festive seasons.
- The frequently consuming Vegetables are Green leafy vegetables, Tomato, Onion, Carrot, Cucumber, Beans and Beet root followed by Ridge guard, Brinjal, Knolkhol, Drumstick, Bottle guard and Bitter guard are consumed occasionally and Field bean, Mangalore cucumber, and bottle guard are consumed during festival seasons or seasonally due to their availability and tradition.
- Majority 66.67 per cent of consumers consume fruits once a day followed by 27.78 per cent of the consumers consume two times a day and 5.56 per cent of the consumers consume fruits all three times a day.
- About 77.78 per cent of the consumers consume fruits in raw, juices and salad form as these consumers like to add more sweetness to fruits and increase the taste.

- Half (50 %) of consumers consume vegetables twice a day, 38.89 per cent of the consumers consume all three times a day 11.11 per cent of the consumers consume only once a day.
- Majority 77.78 per cent of the consumers consume vegetables in cooked form as they don't like the taste of vegetables without cooking followed by 20 per cent consume in both raw and cooked form and only 2.22 per cent of the consumers consume fruits and vegetables in raw form only.
- The results of factor analysis revealed that the important factors influencing the consumers to consume fruits and vegetables are consumer's perception, health consciousness, convenience, affordability, nutrition, diet requirement and source of energy.
- Frequency of purchase constitute of 53.33 per cent of the consumers buy fruits and vegetables as and when needed, 26.67 per cent of consumers buy once in two days, 11.11 per cent of them buy daily and 8.89 per cent of the consumers buy weekly once.
- The unplanned purchase of fruits and vegetables constitute of 47.78 per cent followed by both planned and unplanned is of 38.89 per cent and planned purchase is of 13.33 per cent.
- The households making purchase of fruits and vegetables spend less amount as the fruits and vegetables are purchased in bulk quantities in shandy or markets at low prices.
- 31.11 per cent of housewives make the decision to purchase fruits and vegetables followed by 27.78 per cent of husband and wife together with least importance to maid, children.
- The majority 77.78 per cent consumers prefer fresh fruits and vegetables, 22.22 per cent of consumers prefer cut fruits and vegetables.
- The majority 67.78 per cent of consumers prefer evening times followed by 26.67 per cent prefer afternoon time and 5.55 per cent prefer morning time for purchase of fruits and vegetables.
- More than half of the consumers prefer modern retail stores (54.44%) with least preference to online shopping (4.45%).
- High price of fruits and vegetables and non-availability of required quality and type of fruits and vegetables are the major constraints faced by the consumers.

6.2 Suggestions

- The Modern retail stores involved in fruits and vegetables retail business can display the nutritional value and advantages of consuming the fruits and vegetables on the top of the shelves in the outlet that may influence most of the consumers to purchase fruits and vegetables.
- The replenishment of fruits and vegetables stock by retail outlets to maintain freshness should be done by splitting over less quantity in the morning and more quantity in the evening as majority of consumers buy during evening times and prefer fresh vegetables.

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