

The Contents of Soft Drinks & Their Impacts on Health

¹D.Karishma, ²M.Surekha, ³V.Shahinaz Begum

¹9th Class Student, ² 9th Class Student, ³Physical Science Teacher
¹Z.P. Girls High School, Banaganapalle (V&M), Kurnool (Dt)
 Banaganapalle (V&M), Kurnool(Dt), Andhra Pradesh, India.

Abstract: A Healthy diet during childhood and adolescents promotes optimal health, growth and cognitive development of the child, adolescents and may contribute to the prevention of chronic diseases in later life. Evidence however suggests that eating habits adopted early in life tracks back to some extent into adulthood. While the transition from childhood to adolescence is often associated with unhealthy dietary changes. It therefore becomes necessary to establish healthful eating behaviours early in life. The changing food habits to suit modern living pose a serious threat to a healthy life. Among others, consumption of soft drinks invariably forms a part of modern life. Mostly children and adolescents are the target groups vulnerable to frequent consumption.

Although soft drinks are very popular around the world, their consumption in large quantities has raised serious questions about their effects on health. It has been noted that, unless fortified with vitamins and minerals, they provide almost no nutrition, while displacing healthier drinks such as milk and fruit juices. Generally sweetened with refined sugar or high fructose corn syrup, the drinks supply an over-abundance of calories. Moreover, the drinks often contain artificial flavoring, coloring and other additives that may not be good for health. Consumption of soft drinks plays a major role in a variety of diseases like obesity, diabetes, dental and bone disorders and others, more so among in children and adolescents.

This study sought to evaluate the knowledge, practice and awareness of taking soft drinks in the society. Consulting people of almost all age groups in our area, who are consuming the soft drinks with a structured questionnaire, has done the study. The data has been collected and analyzed and interpreted by the help of the graphical representation technique. The objective of this project is to provide a comprehensive scrutiny of the impact of soft drinks on health, as well as to suggest alternatives for a healthy life style.

In summary, all stake holders including the soft drink companies, Governments, parents and teachers should all play a concerted and critical role towards solving the problems related to soft drink consumption with the sole aim of "Prevention is better than cure".

Keywords: Non-alcoholic beverages, Toxic chemicals, health impacts.

I. Introduction

"An ounce of prevention is worth a pound of cure" is a well-known proverb. Today, man is constantly exposed to a variety of toxic chemicals primarily due to changes in life style. The food we eat, the water we drink, the air we breathe and the environment we live in are contaminated with toxic xenobiotics (man-made compounds). Progressive globalization of the food supply and the increase in food intake, such as snacks, soft drinks and fast food, typically form a significant part of daily life. Eating habits and food consumption have a direct relation with obesity, diabetes, cancer, hypertension and coronary heart disease. Already the planet earth is alarmingly polluted due to modernization and industrialization, and to add these woes, a healthy life style is also probably jeopardized through indiscriminate consumption of soft drinks. It is most appropriate to mention that an early intervention is the need of the hour to prevent the potential harms of indiscriminate consumption of soft drinks. The present project provides a comprehensive analysis of the impact of soft drinks on human health, and suggests alternatives for a healthy life style.

Soft drinks are non-alcoholic water-based flavoured drinks that are highly sweetened, acidulated and carbonated. Some carbonated soft drinks also contain caffeine; mainly the brown-colored cola drinks.

Definition of Soft Drink

The term soft drink—more commonly known as soda refers to non alcoholic beverages that are usually (though not always) carbonated. By contrast, the term "hard drink" (or sometimes just "drink") is used for beverages that contain alcohol. Common soft drinks include colas, sparkling water, lemonade, squash, and fruit punch. Drinks such as hot chocolate, coffee, tea, milk, tap water, alcohol and milkshakes do not fall in this classification.

Soft Drinks can be classified into major heads namely carbonated and non-carbonated drinks on the basis of their composition. A Soft Drink carbonated beverage is a non-alcoholic beverage that typically contains water, a sweetener and a flavour of agent. The sweetness may be sugar, high-fructose corn syrup or a sugar substitute (in the case of diet drinks) for e.g.:- coca-cola, Thumps Up, Mountain Dew, Sprite, 7 Up, Mirinda, Fanta, Limca. Whereas non-carbonated drinks can be further classified into nectar and juices. Nectar is made from fruit or vegetables but with 25-99% juice content and usually with added sugar juice mostly contains natural fruit or vegetable. It is prepared by mechanically squeezing or macerating fresh fruits or vegetables. Juice is always 100% fruit juice for example saint juices, Reak fruit and vegetables juices, Tropicanna Juices e.t.c. to name a few.

Soft Drinks is a fast moving consumer goods. Soft Drinks are consumed for various reasons and in various occasions by consumers based on various aspects like price, convenience and social status. It includes all types of non-alcoholic, carbonated and flavoured beverages. These artificially sweetened drinks are available in different flavours, different sizes and in different packages.

Reasons for Elevated Soft Drink Consumption

Cultural shift plays a major role in changing food habits. Television viewing is one of the major environmental factors influencing the food habits of young children and adolescents. There is an association with high television viewing rates and the less healthy food option, among adolescents with consequent increased risk for obesity. Television advertisements directly affect children's eating habits and their food consumption. More than half of the foods advertised in the television are rich in fat and sugar. Children insist their parents to buy them television advertised goods, thus affecting their healthy food consumption.

Movies are yet another major environmental influence, particularly with regard to the use of branded soft drinks by favourite artists, which have a tremendous influence over children and adolescents.

Market Scenario

Global Scenario

Globally, carbonated soft drinks are third most consumed beverages. Per capita annual consumption of carbonated soft drinks is nearly four times the per capita consumption of fruit beverages.

Indian Scenario

Most of the sales of soft drinks take place during summers while just 5-6% of total sales take place in winters. In summers the high season lasts for 70-75 days, which contributes more than 50% of the total yearly sales. Orange flavored drinks and sodas are popular in southern states. Western markets have preference towards mango-flavored drinks. Non-alcoholic beverage market can be divided into fruit drinks and soft drinks. Soft drinks available in glass bottles, aluminum cans, PET bottles or disposable containers can be divided into carbonated and non-carbonated drinks. Cola, lemon and oranges are carbonated drinks and non-carbonated drinks include mango drinks. Soft drinks can also be divided into cola products and non-cola products. Cola products in India include brands like Pepsi Cola, Diet Pepsi, Coca-Cola, Diet Coke, Thumps Up etc. Cola drinks account for nearly 61-62% of the total soft drinks market in India. Non-Cola products account for 36% the total soft drink market

Major Players in India

The two global majors PepsiCo and Coca-Cola dominate the soft drink market in India. Coca-Cola, which had winded up its India operations during the introduction of the FERA regime, re-entered India 16 years later in 1993. Coca-Cola bought local brands-Thumps Up, Limca and Gold Spot from Parle Beverages and soft drink brands Crush, Canada Dry and Sport Cola from Cadbury Schweppes in early 1999. Pepsi started a couple of years before Coca Cola in 1991 has bought over Mumbai based Duke's range of soft drink brands. There are conflicting figures about their market share. Some estimates put the market share of PepsiCo to be higher and some put the market share of Coca Cola to be higher.

History Of Soft Drinks In India

Down the ages, people consume soft drink to give them a refreshing feeling. Gold spot is considered as the first brand of soft drink in India, it was introduced in 1965. Coca-cola at the same time entered the Indian market and dominated the whole market. It faced no tough competition from the domestic market. Due to certain circumstances the Coca cola Company discontinued its operations in India. In 1993 Coca Cola was launched in Agra (India) again with a slogan of "OLD WAVE HAVE COME AGAIN" Joining the hand with Parle export Pvt. Ltd., The Company was trying its best to regain prestige which it had before. At present only Coca Cola and Pepsi Food are giving tough competition to each other.

Coca Cola was the first foreign drink came in India in the year 1965. Coca cola had a very good beginning in the Indian market and it hardly faced any competition in India. The marketing people did not even require advertising Coca Cola. This extra ordinary success of soft drink could be attributed to following factors. Later in 1970, it introduced Limca a lemony soft drink. Before limca they had tentatively introduced by Cola-Pepsi which they had to withdraw soon in the face battering confrontation with Coca-Cola. The Indian drink had a significant opportunity in 1977 when Coca Cola decided to wind up its operation rather than bowing to the government of India insistence of dilution of equity.

II. Aim & Objectives

Comparative Study and Qualitative analysis of five different Brands of Soft Drinks available in market and their impact on health.

Objectives

- To determine the ingredients present in the soft drinks by doing various experiments using different chemicals in the laboratory.
- To aware people how these ingredients present in soft drinks damage their health on consumption.
- To study the preferences of the people for Soft Drinks.
- To find out the factors that influences the consumer's consumption of Soft Drinks.
- To determine the consumer's perception on the taste, price, advertisements and celebrity endorsements related to Soft Drinks products and brands.
- To find whether the consumers are aware regarding the adverse effect of Soft Drinks concerning their health.

Hypothesis

Soft drink consumption has tripled in recent decades, paralleling the dramatic increases in obesity prevalence and other health issues. The purpose of this project is to evaluate the link between sugar-sweetened soft drink consumption and weight gain etc.

Need Statement

This statement is intended to inform people about potential health problems associated with high intake of soft drinks are

- Overweight or obesity attributable to additional calories in the diet
- Displacement of milk consumption, resulting in calcium deficiency with an attendant risk of osteoporosis and fractures
- Dental caries and potential enamel erosion.

People need to become well informed about the health implications of Soft drinks before their consumption. A clearly defined policy is needed to restrict the sale of soft drinks will safeguard against health problems.

Work Plan

This study examined the relative contributions of taste and health considerations on consumer liking and purchase intent of Soft drinks. Five types of commercial Soft drinks were evaluated by 50 consumers who also completed a brief questionnaire on Soft Drinks. Data was analyzed using factor analysis. These data suggest that in spite of current concern about reducing dietary fat, health remains secondary to taste in the selection of Soft Drinks for consumers in this population.

Selection of Sample Size

For the study, a sample size of 50 has been taken into consideration. The aim was to collect 50 samples for the analysis. The samples should be such that they are consumers of soft drinks. We also tried to get an adequate ratio of men and women in the samples. The main demographics targeted were the younger age group as they are one who consumes more of soft drinks. Also we tried to focus more on the college going crowd and young professionals. Buyers who have been consuming soft drinks were better able to answer the questions regarding the influencing factors and the reasons for their consumption and purchase.

Methodology

Cold drinks of different brands are composed of alcohol, carbohydrates, carbon dioxide, phosphate ions etc. These soft drinks give feeling of warmth, lightness and have a tangy taste which is liked by everyone. Carbon dioxide is responsible for the formation of froth on shaking the bottle.

The carbon dioxide gas is dissolved in water to form carbonic acid which is also responsible for the tangy taste. Carbohydrates are the naturally occurring organic compounds and are major source of energy to our body. General formula of carbohydrates is $C_x(H_2O)_y$.

On the basis of their molecule size carbohydrates are classified as:-

Monosaccharide, Disaccharides and Polysaccharides. Glucose is a monosaccharide with formula $C_6H_{12}O_6$. It occurs in Free State in the ripen grapes in bones and also in many sweet fruits. It is also present in human blood to the extent of about 0.1%. Sucrose is one of the most useful disaccharides in our daily life. It is widely distributed in nature in juices, seeds and also in flowers of many plants. The main source of sucrose is sugar cane juice which contain 15-20 % sucrose and sugar beet which has about 10-17 % sucrose. The molecular formula of sucrose is $C_{12}H_{22}O_{11}$. It is produced by a mixture of glucose and free dose.

Apparatus

- pH Meter and P^H paper
- Test tube
- Test tube holder
- Test tube stand
- Stop watch
- Beaker
- Burner
- Tripod stand
- China dish
- Wire gauge
- Water bath

Chemicals Required

- Iodine solution
- Potassium iodine
- Sodium hydroxide
- Fehling's A & B solution
- Lime water
- Concentrated HNO_3
- Benedict solution
- Ammonium molybdate

DETECTION OF P^H

We took the Soft Drinks samples of 100 ml and dipped the electrode of P^H meter to find the value of P^H of different Soft Drink samples.

1-2 drops of the sample of Soft Drink of each brand was taken and put on the p^H paper. The change in the color of p^H paper was noticed and was compared with the standard p^H scale.

Observation

S.NO	Name of the Drink	Color Change	P ^H Value
1.	Coca Cola	Red	2.8
2.	Pepsi	Red	2.9
3.	Sprite	Yellow	3.4
4.	Limca	Orange	3.2
5.	Fanta	Orange	3.0

Inference

Soft drinks are generally acidic because of the presence of citric acid and phosphoric acid. pH values of Soft Drink of different brands are different due to the variation in amount of acidic contents.

pH measures the degree of acidity or basicity of a solution. To be more exact, pH is the measurement of the hydrogen ion concentration, [H⁺]. Every aqueous solution can be measured to determine its pH value.

Test for Carbon Dioxide (CO₂)**Experiment**

As soon as the bottles were opened, one by one the sample was passed through lime water. The lime water turned milky.

Observation

S.NO	Name of the Drink	Time Taken (Sec)	Conclusion
1.	Coca Cola	26	CO ₂ is present
2.	Pepsi	28	CO ₂ is present
3.	Sprite	21	CO ₂ is present
4.	Limca	32	CO ₂ is present
5.	Fanta	36	CO ₂ is present

Inference

All the soft drinks contain dissolved carbon dioxide in water. The carbon dioxide (CO₂) dissolves in water to form carbonic acid, which is responsible for its tangy taste.

Chemical Reaction Involved

Lime water turns milky as the Calcium hydroxide (chemical name for limewater) reacts with carbon dioxide to form Calcium Carbonate which is insoluble in water and thus forms a milky white precipitate.

Test for Glucose (C₆H₁₂O₆)

Glucose is a reducing sugar acid. Its presence is detected by the following test

Benedict's Solution Test

A small sample of Soft Drink of different brands was taken in a test tube and a few drops of Benedict's reagent were added. The test tube was heated for few seconds. Formation of reddish color confirms the presence of glucose in cold drinks.

Observation

S.NO	Name of the Drink	Observation	Conclusion
1.	Coca Cola	Reddish Colour	C ₆ H ₁₂ O ₆ is present
2.	Pepsi	Reddish Colour	C ₆ H ₁₂ O ₆ is present
3.	Sprite	Reddish Colour	C ₆ H ₁₂ O ₆ is present
4.	Limca	Reddish Colour	C ₆ H ₁₂ O ₆ is present
5.	Fanta	Reddish Colour	C ₆ H ₁₂ O ₆ is present

Inference

All the samples gave positive test for glucose with Benedict's reagent.

Hence all the drinks contain glucose.

Fehling's Solution Test

A small sample of Soft Drink of different brands was taken in a test tube and a few drops of Fehling's A solution and Fehling's B solution was added in equal amount. The test tube was heated in a water bath for 10 minutes. Appearance of brown precipitate confirms the presence of glucose in cold drinks.

Observation

S.NO	Name of the Drink	Observation	Conclusion
1.	Coca Cola	Reddish Brown Precipitate	C ₆ H ₁₂ O ₆ is present
2.	Pepsi	Reddish Brown Precipitate	C ₆ H ₁₂ O ₆ is present
3.	Sprite	Reddish Brown Precipitate	C ₆ H ₁₂ O ₆ is present
4.	Limca	Reddish Brown Precipitate	C ₆ H ₁₂ O ₆ is present
5.	Fanta	Reddish Brown Precipitate	C ₆ H ₁₂ O ₆ is present

Inference

All the samples give positive test for glucose with Fehling's solutions (A&B). Hence all the cold drinks contain glucose.

Test for Phosphate (PO₄³⁻)

Sample of each brand of Soft Drink was taken in a separate test tube and ammonium molybdate followed by concentrated nitric acid (HNO₃) was added to it, the solution was taken heated and the color of the precipitate confirms the presence of phosphate ions.

Observation

S.NO	Name of the Drink	Observation	Conclusion
1.	Coca Cola	Canary Yellow Precipitate	PO ₄ ³⁻ is present
2.	Pepsi	Canary Yellow Precipitate	PO ₄ ³⁻ is present
3.	Sprite	Canary Yellow Precipitate	PO ₄ ³⁻ is present
4.	Limca	Canary Yellow Precipitate	PO ₄ ³⁻ is present
5.	Fanta	Canary Yellow Precipitate	PO ₄ ³⁻ is present

Inference

All the soft drinks contain phosphate ions which are detected by the presence of phosphate when canary yellow precipitate is obtained.

Chemical Reaction Involved**Test for Alcohol (C₂H₅OH)**

Samples of each brand of Soft Drinks are taken in sample test tube and iodine followed by potassium iodide and sodium hydroxide (NaOH) solution is added to each test tube. Then the test tube are heated in hot water bath for 30 minutes yellow colored precipitate confirmed the presence of alcohol in cold drinks.

Observation

S.NO	Name of the Drink	Observation	Conclusion
1.	Coca Cola	Yellow Precipitate	C ₂ H ₅ OH is present
2.	Pepsi	Yellow Precipitate	C ₂ H ₅ OH is present
3.	Sprite	Yellow Precipitate	C ₂ H ₅ OH is present
4.	Limca	Yellow Precipitate	C ₂ H ₅ OH is present
5.	Fanta	Yellow Precipitate	C ₂ H ₅ OH is present

Inference

All the Brands of Soft Drinks Contain Alcohol.

Chemical Reaction Involved**Test for Sucrose (C₁₂H₂₂O₁₁)**

5 ml samples of each brand of Soft Drinks was taken in a china dish and heated very strongly until changes occur. Black colored residue left confirms the presence of sucrose in cold drinks.

Observation

S.NO	Name of the Drink	Observation	Conclusion
1.	Coca Cola	Black Residue	C ₁₂ H ₂₂ O ₁₁ is present
2.	Pepsi	Black Residue	C ₁₂ H ₂₂ O ₁₁ is present
3.	Sprite	Black Residue	C ₁₂ H ₂₂ O ₁₁ is present
4.	Limca	Black Residue	C ₁₂ H ₂₂ O ₁₁ is present
5.	Fanta	Black Residue	C ₁₂ H ₂₂ O ₁₁ is present

Inference

All the brands of cold drinks contain sucrose. But amount of sucrose varies in each brand of drink.

The Main Ingredients Present In Soft Drinks

1. Water
2. Phosphoric Acid
3. Sweeteners
4. Carbon dioxide
5. Caffeine
6. Traces of Alcohol
7. Caramel Colour
8. Bisphenol A (BP A)
9. Artificial Preservatives

Content of Soft Drinks and their impact on health

1. Water

Conventional Soft Drinks contain 90 percent water, while diet soft drinks may contain up to 99% water. Drinking water includes trace amounts of various ions which alter its taste. Soft drinks manufacturers usually use softened water to prevent off-tastes from chlorine residues. The most frequent methods of removing water hardness employ ion-exchange polymers or reverse osmosis. Other approaches include precipitation methods and sequestration using chelating agents. These procedures reduce the concentration of metal ions to approximately 50 ppm Mg and Ca

Water used in the beverage industry has to be treated to remove undesirable substances and to control the alkalinity. A drink made from untreated water or water of poor quality would result in off tastes in the finished beverage. The carbonated-drink-producing industry uses huge amounts of water; like all other industries, they use product-ingredient sources that are least expensive.

2. Phosphoric Acid

Phosphoric acid interferes with the body's ability to use calcium, possibly leading to osteoporosis (weakening of teeth), and works to neutralize hydrochloric acid in the stomach, thus interfering with the proper digestion of nutrients in food.

Impacts on health

a. Tooth Corrosion

In addition to loss of calcium, the acidity and corrosive nature of phosphoric acid negatively impacts the protective covering on teeth called enamel. The p^H measure of most Soft Drink is below 3. Sugar and other acids in Soft Drink contribute to acidity, but phosphoric acid is the primary factor. Phosphoric acid oxidizes or corrodes the tooth enamel on contact, although exposure time and dental hygiene are obviously important factors.

b. Bone Loss

Phosphoric acid, present in carbonated drinks is violently poisonous, it de-oxidizes blood. In detergent manufacturing industries, phosphoric acid is used to produce water softener. Water softener removes Ca^{2+} and Mg^{2+} ion from hard water. In human body, the function remains the same by removing Ca^{2+} from bones causing osteoporosis (porous bones).

use of Soft Drinks correlates with a decrease in milk consumption along with the vitamin D, vitamin B6, vitamin B12, calcium, protein and other micronutrients. Phosphorus, a micronutrient, can be found in cola-type beverages, but there may be a risk in consuming too much. Phosphorus and calcium are used in the body to create calcium-phosphate, which is the main component of bone. However, the combination of too much phosphorus with too little calcium in the body can lead to a degeneration of bone mass.

The phosphoric acid contained in some soft drinks (colas) displaces calcium from the bones, lowering bone density of the skeleton and leading to weakened bones, or osteoporosis.

c. Effect on Gastro-Intestinal System

When you open the bottle of a soft drink, bubbles and fizz are immediately emitted out. This is due to phosphoric acid and carbon dioxide (CO_2) content, which make these drinks highly acidic. The pH of soft drink ranges from 2.5-3.4 which generates a highly acidic environment in the stomach.

d. Effect on Kidneys

Kidneys are less able to excrete phosphoric acid when it is in excess. Thus, there is extra work for kidney. Soft drinks remove Calcium from the body, causing an excess amount of Calcium that tend to be deposited in kidney, resulting in nephrolithiasis (kidney stones).

e. effect on Skin

Acidic blood affects the action of glutathione, which is an antioxidant enzyme. In addition, these drinks lack vitamins and minerals. By taking these drinks, people cut their intake of fresh juices, milk and even water and deprive themselves from essential vitamins and minerals that are mandatory for skin. Thus, the skin becomes more prone to wrinkles and aging.

f. It can change the ratio of Phosphorus and Calcium in the body.

3. Sweeteners

Aspartame (E951) , is 200 times sweeter than sucrose and leaves no unpleasant aftertaste. In the body, aspartame is broken down into phenylalanine (about 50% by weight), aspartic acid (40%), and methanol (10%).

Acesulfame K (E950) is 200 times sweeter than sucrose, thermo- and pH-stable, and freely soluble in water. This compound is neither metabolized nor stored in the body.

Sucralose (E955) is 600 times sweeter than sucrose but has no calories. Readily soluble in water and acid solutions, Saccharin (E954) is 300 times sweeter than sucrose but leaves a bitter/metallic aftertaste. Use of saccharin in foods dates back to 1907. This sweetener is permitted in more than 100 countries around the world .

Impacts on health

a. Tooth Decay

All soft drinks are acidic which corrodes the teeth by eroding its enamel. The high amount of sugar consumed through soft drinks lead to the development of bacteria that attack the teeth thus aggravating dental problems. Therefore, soft drinks contain acid and sugar that corrode and destroy the teeth in one shot. Most Soft Drinks contain high concentration of simple carbohydrates: Glucose, Fructose , Sucrose and other simple Sugars.

Oral bacteria ferment carbohydrates and produce acids, which dissolves tooth enamel during the dental decay process. ; thus, sweetened drinks are likely to increase risk of dental caries. The risk is greater if the frequency of consumption is high. A large number of soft drinks are acidic, and some may have a pH of 3.0 or even lower. Drinking acidic drinks over a long period of time and continuous sipping can therefore erode the tooth enamel.

b. Type -2 Diabetes

High glucose consumption rapidly elevates blood glucose and insulin. This may affect brain function, including mood and fatigue. Because high blood glucose is linked to diabetes, consumption of high-glucose drinks may also raise the risk of diabetes and cardiovascular (heart) disease.

Sweetened beverages and diabetes. Sweetened, sugary drinks can cause sharp rises in blood sugar levels for people with diabetes or glucose intolerance (including prediabetes and gestational diabetes) and so it's usually best to avoid drinking sugary drinks.

c. Obesity and weight-related diseases

Whether it is high fructose corn syrup or unnecessarily-high amounts of sucrose, carbonated sodas provide more calories than are generally needed by the average drinker. All this sugar can cause people to gain weight which leads to obesity.

d. Liver Diseases:

When high amounts of sugar enter into the stomach, pancreas have to produce more insulin, which sends more fat to fatty cells, muscle cells, liver ,which leads to different liver diseases.

4. Carbon dioxide

The gas used to make soda bubbly is the same poison we eject out of our bodies through our lungs. This gas is great for plants but it is bad news for human beings.

5. Caffeine

Caffeine in carbonated drink is more readily absorbed than any other drink (like coffee, chocolate etc.). Caffeine disturbs sleep by stimulating nervous system. It also makes premenstrual syndrome worse, causes dehydration and induces stomach to produce acids, aggravating hyperacidity. Since caffeine disturbs sleep, the body is more likely to produce C - reactive protein, which plays an important role in heart disease. Caffeine has been linked to birth defects, some forms of cancer, insomnia, irregular heartbeat, high blood pressure, high cholesterol, breast lumps, and depletion of some nutrients.

6. Traces of Alcohol

Alcohol has shown the negative health effects of drinking Soft Drinks on your waistline and your teeth. Regular consumption of sugary drinks is linked to numerous health problems including diabetes, heart disease, asthma and obesity.

7. Caramel Colour

Caramel color, added to many soft drinks and some foods to turn them brown, may sound harmless, even appetizing. But in no way does it resemble real caramel. Some types of this artificial coloring contain a potentially carcinogenic chemical called 4-methylimidazole (4-MeI) which leads to different types of Cancers.

8. Bisphenol A (BPA)

A known hormone disruptor, Bisphenol A, a chemical used to line soda cans for the sake of preservation, has been linked to a number of public health and medical problems, including a negative effect on fetuses and the proper development of children.

9. Artificial Preservatives

Chemical preservatives are used to improve the microbiological stability of soft drinks. The types of chemical preservatives that can be used depend on the chemical and physical properties of both the preservative and the beverage. The pH of the product, the presence of vitamins, the packaging, and the conditions of storage will determine what types of preservative, if any, should be used to prevent microbial growth. Sorbates (E 200–203), benzoates (E 210–213), and dimethyl dicarbonate (DMDC) (E 242) are permitted preservatives.

III. Data analysis and Interpretation

Sources of Data Collection

Research will be based on two sources:

Primary Data

Questionnaire: Primary data was collected by preparing questionnaire and the people were randomly being requested to fill them.

Secondary Data

Secondary data was collected from different literatures like books which are published and research websites.

In order to reach relevant conclusion, research work needed to be designed in a proper way.

Study Area

Data has been collected from different age groups, different areas of Banaganapalle (V&M),Kurnool district during the period 16th August to 22nd September 2018.

The responses were recorded and the data file is prepared. 50 respondents were questioned at different areas like Schools, Colleges, Houses and Shops of Banaganapalle (V&M),Kurnool district. Andhra Pradesh. India.

1. 10 samples near, Z.P.Girls High School.
2. 10 Samples near, Sri Lakshmi D.Ed College.
3. 10 Samples near, Gnana Saraswathi D.Ed College.
4. 10 Samples near, Houses.
5. 10 Samples near, Shops.

Selection of Sample Size

For the study, a sample size of 50 has been taken into consideration including adolescent girls and boys.

Statistical Tools Used

The main statistical tools used for the analyses of data in this project are: (1) Pie Charts, (2) Bar Diagrams.

Analysis and Interpretation

Q1. Gender of the respondent?

Table 1: Gender of the respondent.

Gender of the respondent	Frequencies	Percentage
Male	25	50
Female	25	50
Total	50	100

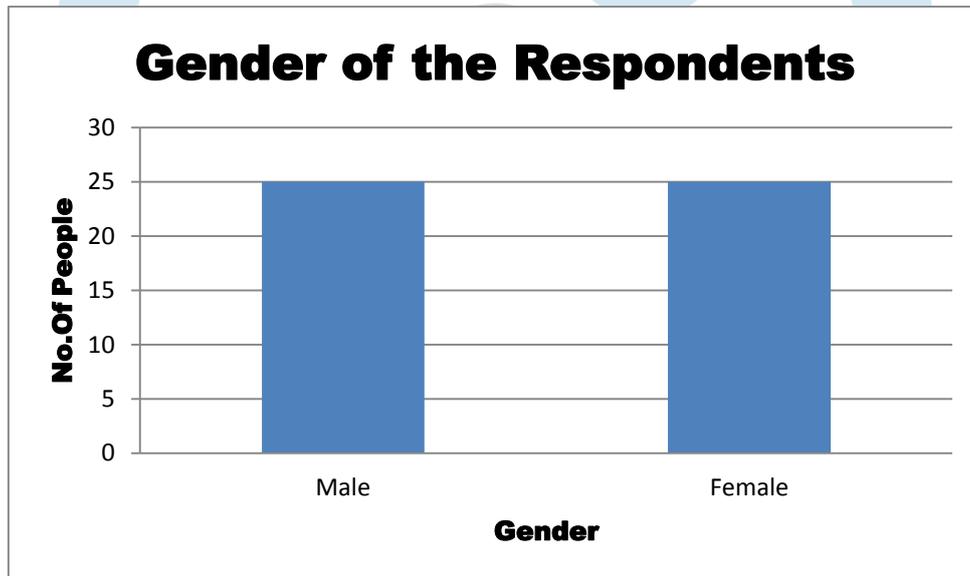


Fig.1

Analysis:

Figure 1 and table 1 show that amongst 50 respondents on whom survey was conducted 50% are male and 50% are female.

Q2. Do you like soft drinks?

Table 2: Do you like soft drinks.

Do you like soft drinks	Frequencies	Percentage
Yes	32	64
No	18	36
Total	50	100

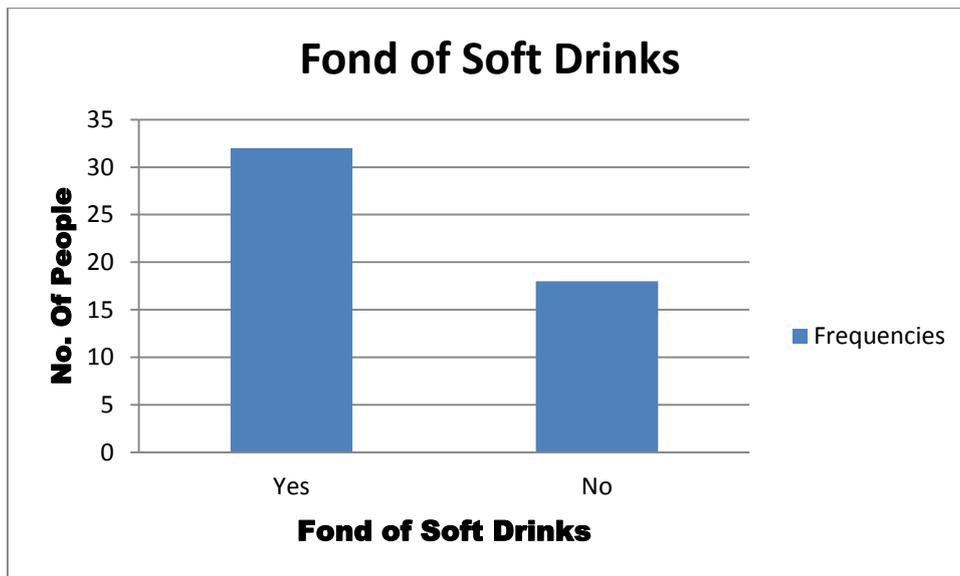


Fig.2

Analysis:

From the survey, it was found that amongst 50 respondents 64% of the people like soft drinks and 36% of the people do not like soft drinks. Table 2 and figure 2 shows how soft drinks are attracting the people by their taste, flavours, colours etc.

Q3. Which soft drink do you like more?

Table 3: Preference of soft drinks

Preference of Soft Drinks	Frequencies	Percentage
Coca Cola	07	14
Pepsi	02	04
Sprite	20	40
Fanta	4	08
Others	17	34
Total	50	100

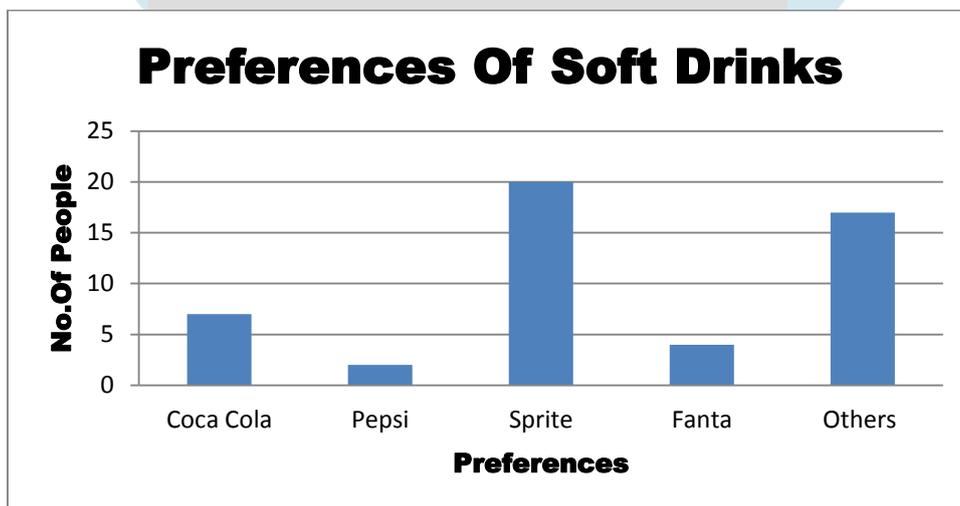


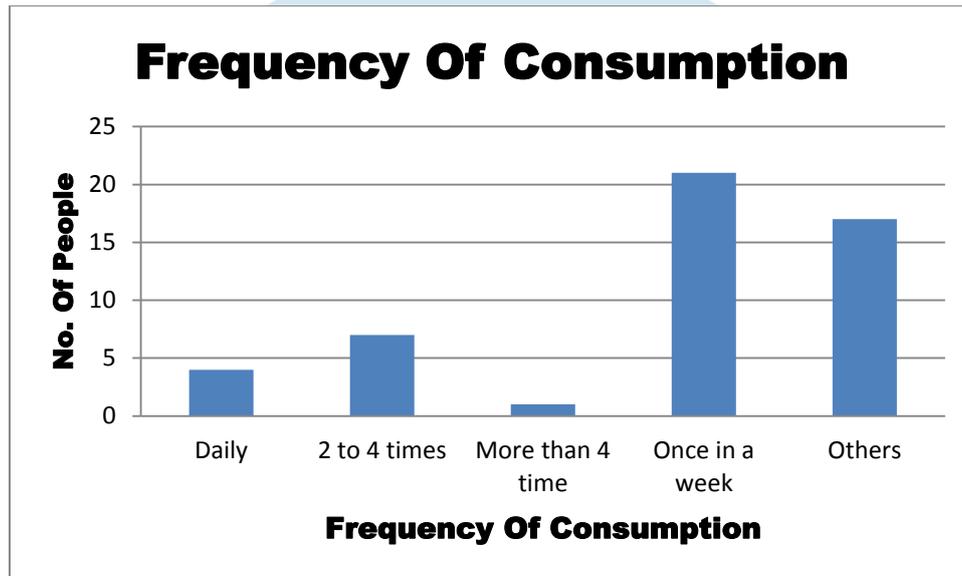
Fig.3

Analysis:

The results of the survey showed that 14% of the respondents among 100 preferred Coca-cola drink, 04% preferred Pepsi, 40% preferred Sprite, 08% preferred Fanta, 34% preferred others. (table 3 and figure 3).

Q.4 Frequency of consumption of soft drink in a week?**Table 4:** Frequency of consumption of Soft Drink.

Frequency of consumption of Soft Drinks	Frequencies	Percentage
Daily	04	08
2 to 4 times	07	14
More than 4 time	01	02
Once in a week	21	42
Others	17	34
Total	50	100

*Fig.4***Analysis:**

When the frequency of consumption of soft drink was studied among 50 respondents, the results showed that 42% of the people consumed soft drinks once in a week, 08% consumed soft drinks daily, 02% consumed drinks more than four times a week, 14% consumed them two to four times a week (figure 4, table 4). It is surprising to know that nobody is there among the 100 respondents who do not like soft drinks.

Q.5 On what occasions do you often consume the soft drink?**Table 5:** Occasions where soft drinks are consumed.

Occasions where soft drinks are consumed	Frequencies	Percentage
Feeling thirsty	07	14
Without any reason	06	12
Parties or celebrations	30	60
Others	07	14
Total	50	100

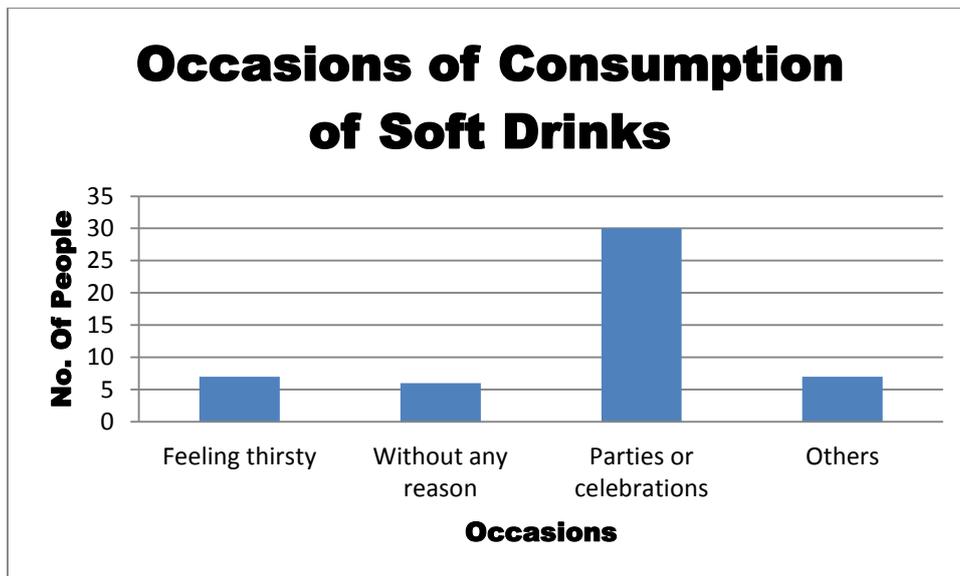


Fig.5

Analysis:

The results of the survey show that among the 50 respondents, 12% consume soft drinks without any reason. Figure 5 and table 5 shows 14% consume soft drinks depending on season to fulfill their thirst. 60% of the people consume them on parties and occasions.

Q.6 What induces you to buy soft drinks?

Table 6: Factors influencing Soft Drink purchase.

Factors influencing Soft Drink purchase	Frequencies	Percentage
Price with quantity	04	08
Health drink	10	20.
Status symbol	04	08
Taste	26	52
Advertisement	06	12
Total	50	100

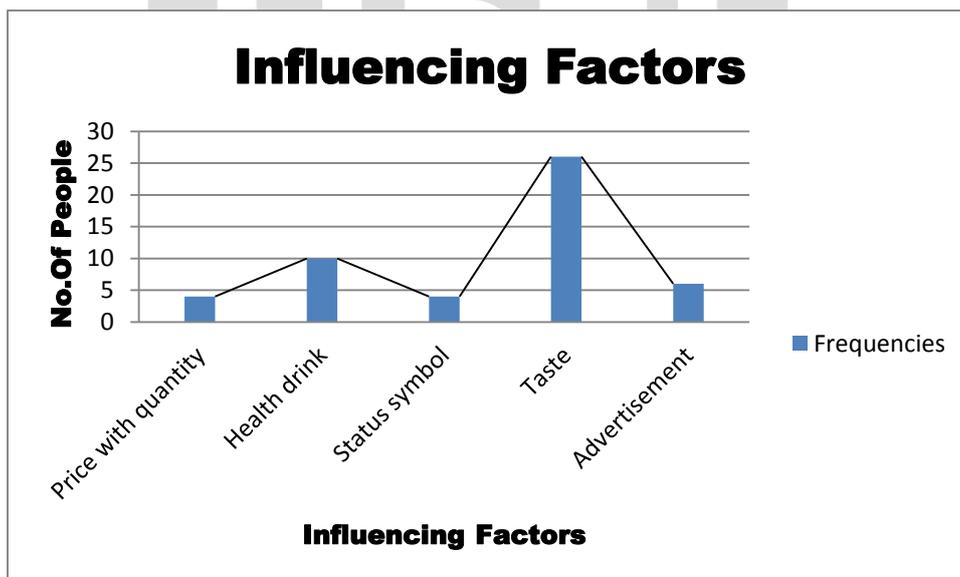


Fig.6

Analysis: Factors inducing soft drink purchase were depicted in figure 6 and table 6 which are as follows.

- 08% of the people consider offering to or receiving from guests soft drinks on an occasion stands as their status symbol.
- 08% are attracted by the low cost for good taste.
- 52% of the people are carried away by the taste.

- 20% of the people are under the imagination that a soft drink is equal to a fruit drink.
- 12 % of the respondents are influenced by advertisements.

Q7. Do you drink the same soft drink every time?

Table 7: Preference of same soft drink every time

Preference of same soft drink every time	Frequencies	Percentage
Yes	18	36
No	32	64
Total	50	100

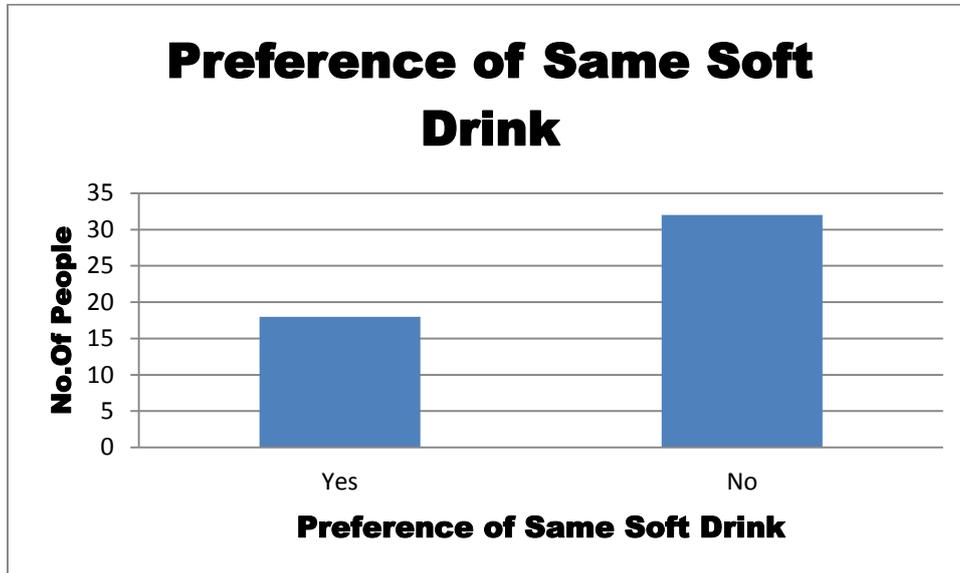


Fig.7

Analysis:

The results depicted in figure 7 and table 7 showed that 64% of the total respondents preferred variety, i.e., they wanted to taste different drinks with different flavours. Only 36% of the respondents stuck on to same drink which they tried and liked once.

Q. 8 Do advertisements affect your purchases?

Table 8: To what extent advertisement affect your purchases?

Advertisements influence on Soft Drink purchase	Frequencies	Percentage
Yes	13	26
No	37	74
Total	50	100

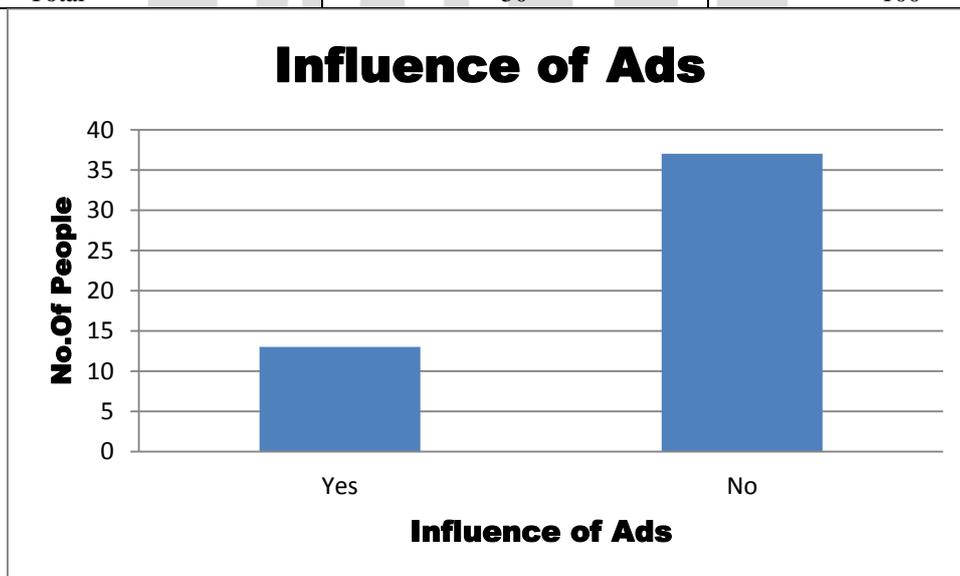


Fig.8

Analysis:

The results of analysis presented in table 8 and figure 8 show that only 26% are influenced by advertisements with regard to the consumption of soft drinks.

Q.9 Considering the TV ad which soft drink do you like more?

Table 9: Considering the TV ad which soft drink do you like more?

Depending on TV ad preferable Drink is	Frequencies	Percentage
Coca Cola	08	16
Pepsi	06	12
Sprite	19	38
7 Up	12	24
Others	05	10
Total	50	100

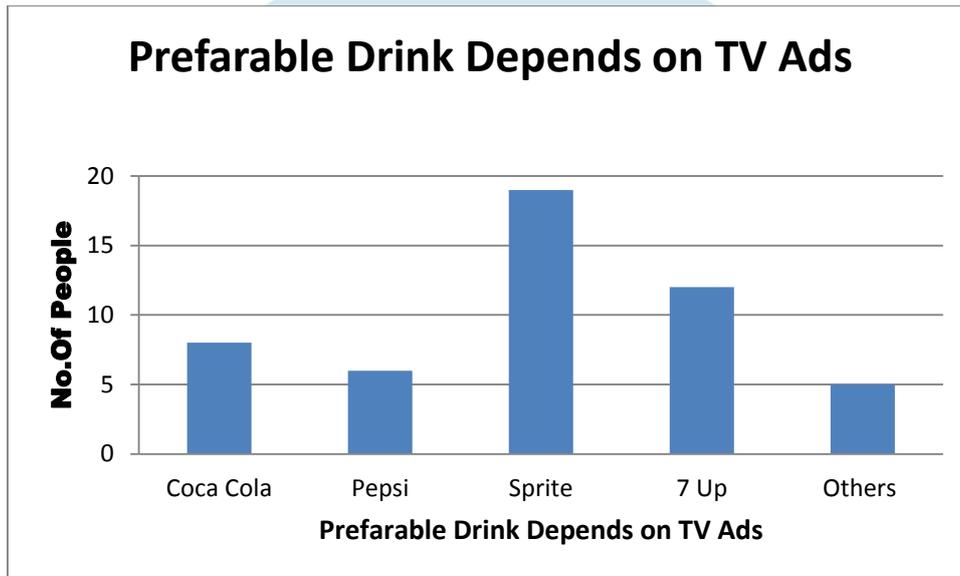


Fig.9

Analysis:

Being influenced by the television advertisements, according to the results of the survey (Table 9 and figure 9) 38% of the respondents chosen Sprite, 24% 7 up, 16% chosen Coca-Cola, 12% of the respondents preferred Pepsi, 10% of the respondents preferred other drinks.

Q10. Do you think taking too much soft drink would cause health problems?

Table 10: Does soft drinks cause health problems

Does soft drinks cause health problems	Frequencies	Percentage
Yes	25	50
No	25	50
Total	50	100

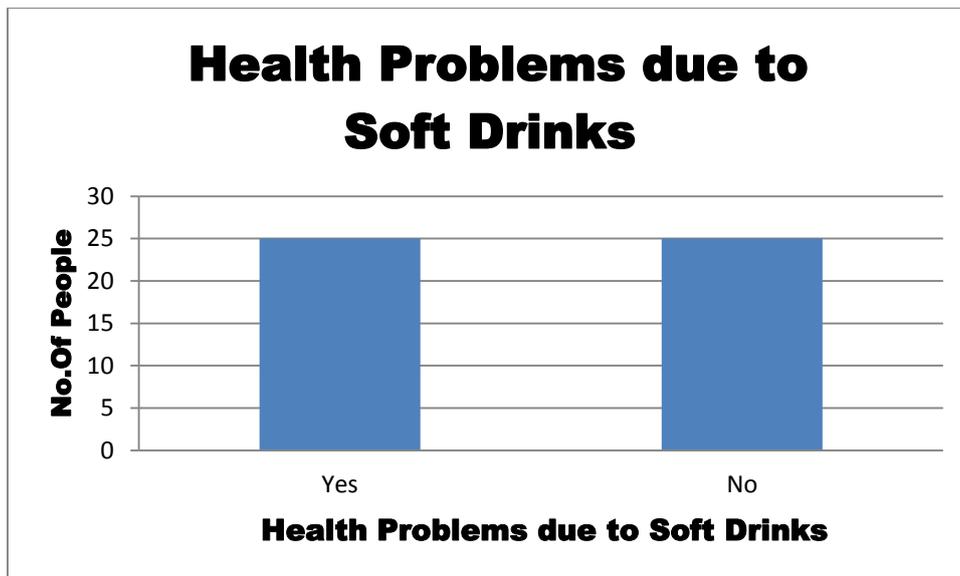


Fig.10

Analysis:

The results of the survey presented in figure 10 and table 10 showed that 50% of the respondents are well aware of the health problems caused by soft drinks; only 50% of the respondents are unaware of the health issues caused by soft drinks.

Post Survey

Q1. Do you still like soft drinks?

Table 1: Preference of soft drinks.

Do you still like soft drinks	Frequencies	Percentage
Yes	07	14
No	43	86
Total	50	100

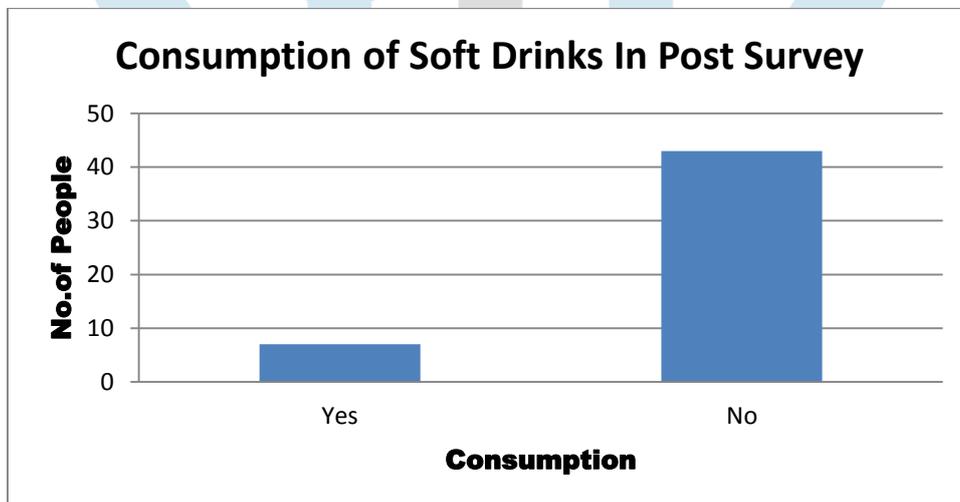


Fig.1

Analysis:

From the survey, it was found in Fig.1 and Table.1,that amongst 50 respondents only 14% of the people still like soft drinks and 86% of the people do not like soft drinks.

Q2. Are there any changes in your health after prevent the Soft Drinks?

Table 2: Prevention of Soft Drinks made any health changes

Prevention of Soft Drinks made any health changes	Frequencies	Percentage
Yes	46	92
No	04	08
Total	50	100

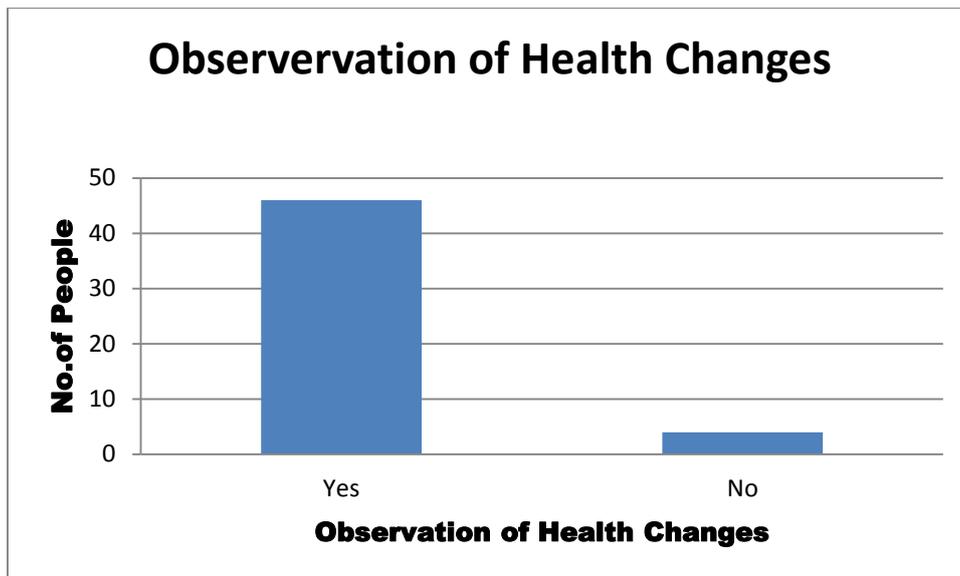


Fig.2

Analysis:

The results of the survey presented in figure 2 and table 2 showed that 92% of the respondents observe change in their health and only 08% of the respondents are do not find any change.

Q3. Do you think Govt. has to take action to stop the consequences of soft drinks?

Table 3: Govt. actions to stop the consequences of soft drinks.

Govt. actions to stop the consequences of soft drinks	Frequencies	Percentage
Yes	50	100
No	00	00
Total	50	100

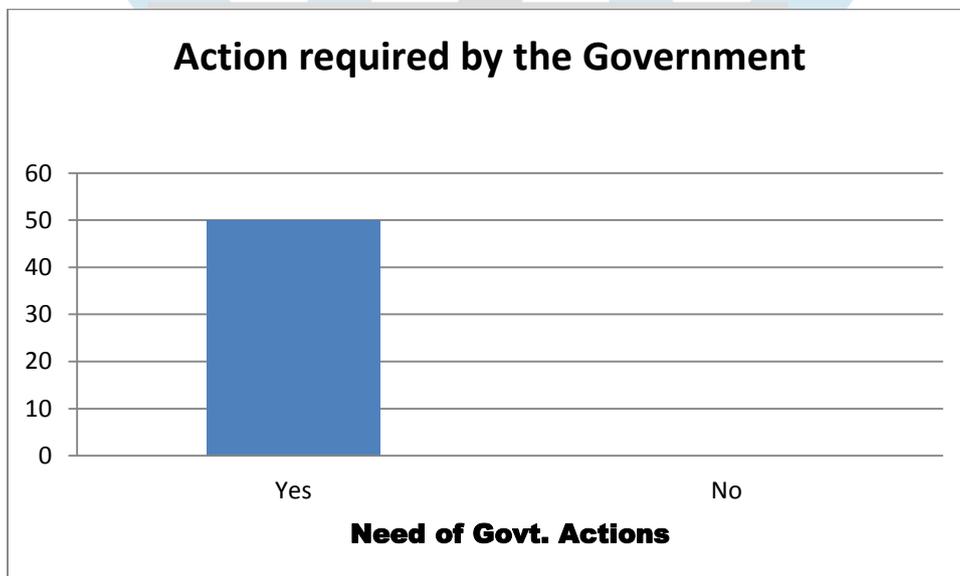


Fig.3

Analysis:

From the survey, it was found that from Fig.3 and Table.3 amongst 50 respondents 100% of the people wanted that Govt. has to take action to stop the consequences of soft drinks.

Q 4. Do you aware the people about the consequences of soft drinks consumption?

Table 4: Did you create awareness in people regarding the consequences of soft drinks.

Did you aware people regarding the consequences of soft drinks	Frequencies	Percentage
Yes	46	92
No	04	08
Total	50	100

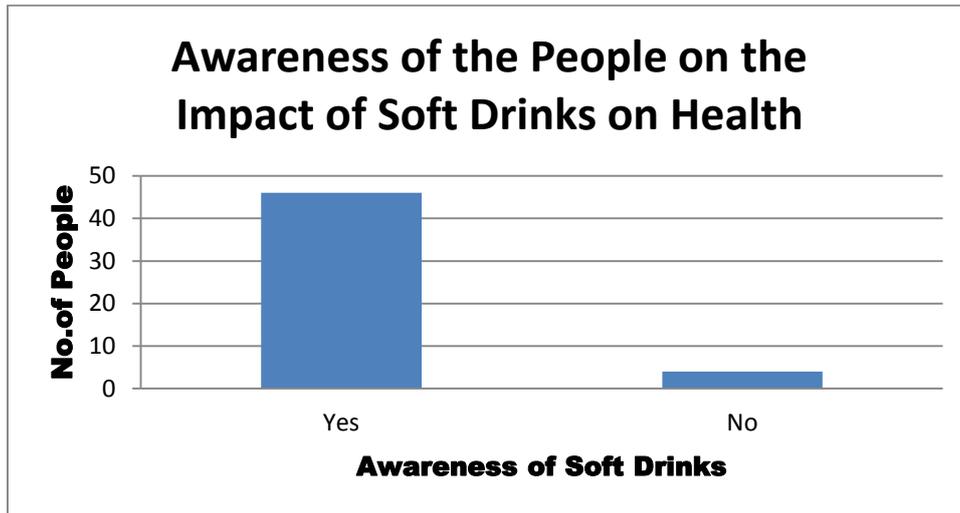


Fig.4

Analysis:

From the survey, it was found that in Table 4 and Fig.4 amongst 50 respondents 92% aware the people about the consequences of soft drinks consumption and 08% of the people do not aware the people about the consequences of soft drinks consumption.

Q.5 Is the Questionnaire is useful to you?

Table 5: Is it a useful Questionnaire?

Is the Questionnaire is useful to you	Frequencies	Percentage
Yes	49	98
No	01	02
Total	50	100

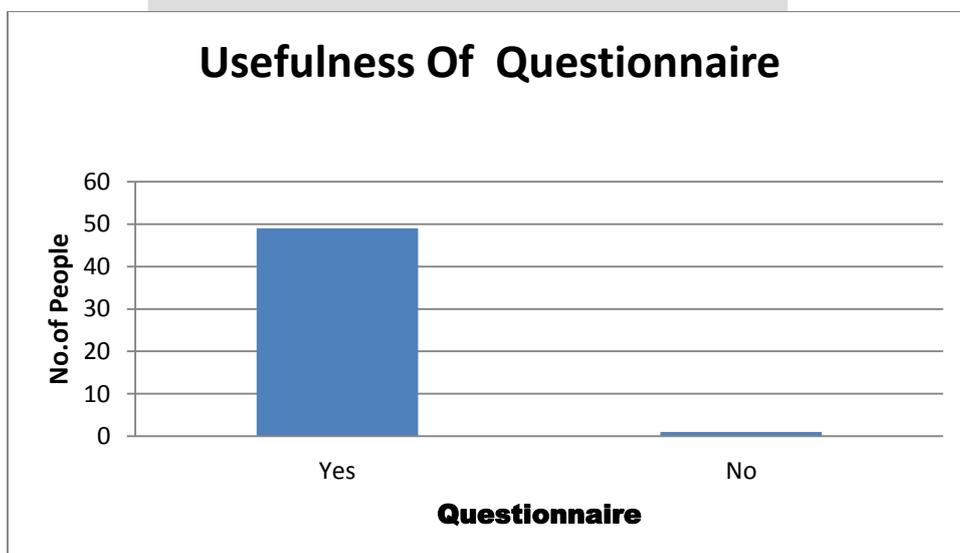


Fig.5

Analysis:

According to the results of the survey presented in figure 05 and table 05, 98% of the respondents think that it is a useful Questionnaire and 2% of them think that some more questions are to be added.

IV. Discussion

Figure 1 and table 1 show that amongst 50 respondents on whom survey was conducted 50% are male and 50% are female. From the survey, it was found that amongst 50 respondents 64% of the people like soft drinks and 36% of the people do not like soft drinks. Table 2 and figure 2 shows how soft drinks are attracting the people by their taste, flavours, colours etc. The results of the survey showed that 14% of the respondents among 100 preferred Coca-cola drink, 04% preferred Pepsi, 40% preferred Sprite, 08% preferred Fanta, 34% preferred others. (table 3 and figure 3).

When the frequency of consumption of soft drink was studied among 50 respondents, the results showed that 42% of the people consumed soft drinks once in a week, 08% consumed soft drinks daily, 02% consumed drinks more than four times a week, 14% consumed them two to four times a week (figure 4, table 4). It is surprising to know that nobody is there among the 100 respondents who do not like soft drinks. The results of the survey show that among the 50 respondents, 12% consume soft drinks without any reason. Figure 5 and table 5 shows 14% consume soft drinks depending on season to fulfill their thirst. 60% of the people consume them on parties and occasions.

08% of the people consider offering to or receiving from guests soft drinks on an occasion stands as their status symbol. 08% are attracted by the low cost for good taste. 52% of the people are carried away by the taste. 20% of the people are under the imagination that a soft drink is equal to a fruit drink. 12% of the respondents are influenced by advertisements. The results depicted in figure 7 and table 7 showed that 64% of the total respondents preferred variety, i.e., they wanted to taste different drinks with different flavours. Only 36% of the respondents stuck on to same drink which they tried and liked once. The results of analysis presented in table 8 and figure 8 show that only 26% are influenced by advertisements with regard to the consumption of soft drinks. Being influenced by the television advertisements, according to the results of the survey (Table 9 and figure 9) 38% of the respondents chosen Sprite, 24% 7 Up, 16% chosen Coca-Cola, 12% of the respondents preferred Pepsi, 10% of the respondents preferred other drinks. The results of the survey presented in figure 10 and table 10 showed that 50% of the respondents are well aware of the health problems caused by soft drinks; only 50% of the respondents are unaware of the health issues caused by soft drinks. From the survey, it was found in Fig.1 and Table.1, that amongst 50 respondents only 14% of the people still like soft drinks and 86% of the people do not like soft drinks. The results of the survey presented in figure 2 and table 2 showed that 92% of the respondents observe change in their health and only 08% of the respondents do not find any change. From the survey, it was found that from Fig.3 and Table.3 amongst 50 respondents 100% of the people wanted that Govt. has to take action to stop the consequences of soft drinks. From the survey, it was found that in Table 4 and Fig.4 amongst 50 respondents 92% aware the people about the consequences of soft drinks consumption and 08% of the people do not aware the people about the consequences of soft drinks consumption. According to the results of the survey presented in figure 05 and table 05, 98% of the respondents think that it is a useful Questionnaire and 2% of them think that some more questions are to be added.

V. Results

After conducting several tests, it was concluded that the different brands of Soft drinks namely Coca cola, Pepsi, Sprite, Limca, Fanta

All contains Glucose, Phosphate, Alcohol, Sucrose ions and Carbon dioxide. All are acidic in nature. On comparing the pH value of different brands coca cola is most acidic and Sprite is least acidic of all the five brands taken. pH value of coca cola is nearly equal to disinfectant which is harmful for body.

Carbon Dioxide

Among the five samples of Soft drinks taken – Sprite has maximum amount of dissolved carbon dioxide and Fanta has minimum amount of dissolved carbon dioxide.

VI. Conclusion

The additives of soft drinks were found to have adverse effects. Soft drinks are most favorable in summer season but regular usage may degrade the health. Soft drinks are more harmful in comparison to Natural drinks. The carbonated soft drinks were found to show more toxic effects on health status. The pH level of soft drinks was less and they were more acidic in nature than Natural drinks. The study also showed that regular consumption of these drinks degrades the status of teeth and can cause various toxicities mainly soft drinks which after long run may create further complications.

Consumers require further education on the use of ingredients, additives and packaging materials of soft drinks and their potential effects on human health. In turn, producers are under pressure to ensure the health safety of their goods, both from legislation and from consumer demand.

VII. Solution to the Problem

It is a trend that parents, schools and communities have the capacity to reverse.

Parents can

- Help children learn to enjoy water as the thirst quencher of choice.
- Provide a variety of low-fat milks, 100% fruit and vegetable juices that are high in nutrients.

Schools Can

- Be a role model by making healthy beverage choices.
- Advocate for healthful environments that are consistent with classroom nutrition education.

Communities can

- Secure funding for marketing campaigns focused on healthful eating.
- Work through community partnerships to ensure that milk, water and other nutritious beverages are Offered wherever less nutritious beverages are available.
- Fund education so that schools do not compromise the health of children and youth by raising funds through the sale of foods and beverages low in nutrients and high in calories.

Government can

We would like to suggest the Government to do frequent quality check at industry level, in order to increase the quality and definite standards of various Soft Drinks during the production.

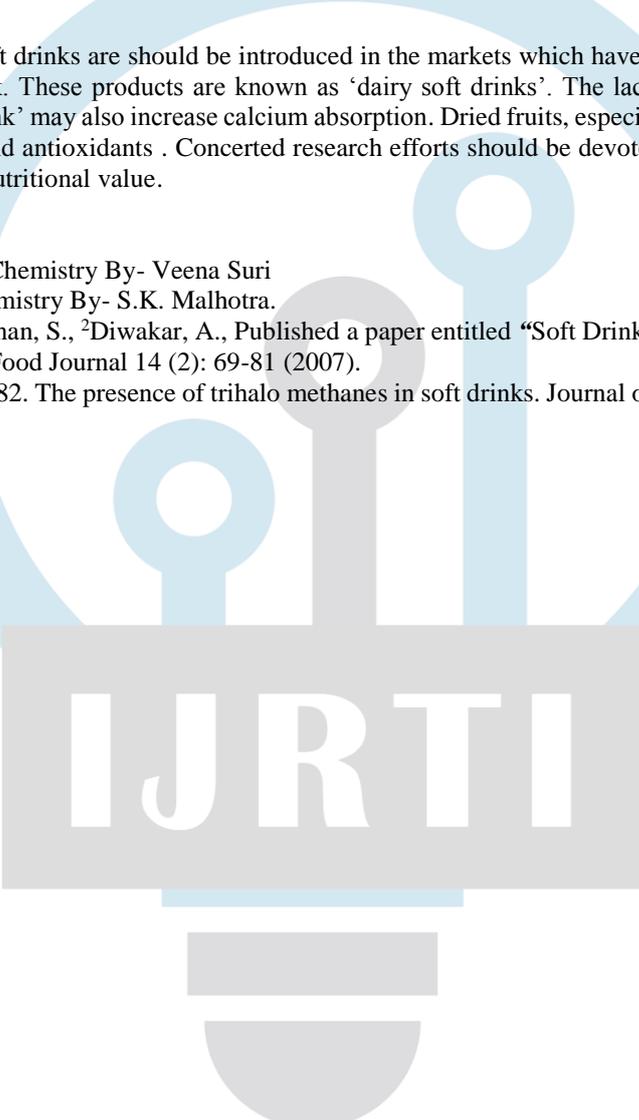
In summary, all stake holders including the soft drink companies, Governments, parents and teachers should all play a concerted and critical role towards solving the problems related to soft drink consumption with the sole aim of “Prevention is better than cure”.

VIII. Future Plan

Alternative forms of soft drinks are should be introduced in the markets which have a high bioavailability of calcium and nutrients similar to that of milk. These products are known as ‘dairy soft drinks’. The lactose and the carbonation used in the production of the ‘dairy soft drink’ may also increase calcium absorption. Dried fruits, especially figs are a convenient and superior source of important nutrients and antioxidants . Concerted research efforts should be devoted to developing soft drinks based on dry fruits and fruits with high nutritional value.

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