



# Consumption of Soft Drink and it's Implication on Health

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**Abstract:** Soft drink consumption has expanded rapidly, so much so that soft drinks are currently the largest single contributors to energy intake. In this paper, we investigate the factor which leads to the consumption of soft drink and effect of the consumption of soft drink. Data was collected by the help of questionnaire and chi square test was used to relate the different variables. 70% are male respondents and 30% are female respondents from age group 20-40 years. Factors considered to know the influence of soft drink preference are price, flavour, advertisement, availability, brand, nutritive value, temperature. This study identifies that male consumers are greater than female consumers which are mainly from 20-40 years of age. Advertisement does not affect much the buying preference. Main factors which effect the buying preference are flavour, availability and temperature. Factors taken in consideration to know the effect of consumption of soft drink are health effect and artificial sweetener. Calculated chi square values for these factors are  $X^2 = 0.159805$ (advertisement), 0.361596(flavour), 0.312476(price), 0.22484(nutritive value), 1.399375(temperature), 0.113782(artificial sweetener). These values are calculated by statistical tool chi square from the responses received.

**Keywords:** Soft drinks, Consumer satisfaction, Consumption, Chi-square Test, Survey.

## 1. Introduction:

A soft drink (also called soda, pop, coke, soda pop, fizzy drink, tonic, seltzer, mineral, sparkling water, lolly water or carbonated beverage) is a beverage that typically contains water (often, but not always carbonated water), a sweetener and usually a flavouring agent. The sweetener may be sugar, high-fructose corn syrup, fruit juice, sugar substitutes (in the case of diet drinks) or some combination of these. Soft drinks may also contain caffeine, colourings, preservatives and other ingredients. Soft drinks are called "soft" in contrast to "hard drinks" (alcoholic beverages) (Somavarapu, 2017).

Soft drinks may be served chilled or at room temperature, and some, such as Dr. Pepper, can be served warm. The first marketed soft drinks in the Western world appeared in the 17th century. They were made of water and lemon juice sweetened with honey. In 1676, the *Compagnie des Limonadiers* of Paris was granted a monopoly for the sale of lemonade soft drinks. Vendors carried tanks of lemonade on their backs and dispensed cups of the soft drink to thirsty Parisians.

In the late 18th century, scientists made important progress in replicating naturally carbonated mineral waters. In 1767, Englishman Joseph Priestley first discovered a method of infusing water with carbon dioxide to make carbonated water when he suspended a bowl of distilled water above a beer vat at a local brewery in Leeds, England. His invention of carbonated water (also known as soda water) is the major and defining component of most soft drinks.

Priestley found that water treated in this manner had a pleasant taste, and he offered it to friends as a refreshing drink. In 1772, Priestley published a paper entitled Impregnating Water with Fixed Air in which he describes dripping oil of vitriol (or sulfuric acid as it is now called) onto chalk to produce carbon dioxide gas, and encouraging the gas to dissolve into an agitated bowl of water. Swedish chemist Torbern Bergman invented a generating apparatus that made carbonated water from chalk by the use of



sulfuric acid. Bergman's apparatus allowed imitation mineral water to be produced in large amounts. Swedish chemist **Jon Jacob Berzelius** started to add flavors (spices, juices, and wine) to carbonated water in the late eighteenth century.

In 1990 in an article titled '**Soft drinks, infants' fruit drinks and dental health**' Grenby wrote "a lot of research has been done on the influence of various kinds of solid foods on dental health, but comparatively little has been published on the effects of drinks". Since this article almost 14 years ago there has been many studies conducted to determine any potentially harmful effects of soft drinks on teeth. The commercial sale of soft drinks has increased by 56% over the last 10 years and it is now estimated that they will keep rising at about 2–3% a year. The average daily requirement for water in man is 2–3 l, of which, in Western countries, more than half comes from soft drinks. In many so-called advanced societies, the use of milk as a main liquid source for children is declining while consumers drink greater amounts of soft drinks, including fruit juices and carbonated beverages.

With the changing lifestyle and income level, people are shifting their consumption patterns and have therefore become more health conscious thus leading to increase in demand of soft drinks.

## 2. Materials and Methods:

**Primary Data:** The study was done with help of the questionnaire which was distributed to the participants in different cities of India. 106 responses received. Mostly participants are the age of 20-40 years (83%). Male respondents are (70%).

**Secondary Data:** Secondary data will consist of different literatures like books which are published, articles, journals, magazines, internet and websites.

**Statistical Tool:** The main statistical tools used for the analyses of data in this research will be:

- a) Pie chart: Pie chart is used to represent the data in percentage, obtained from survey.
- b) Bar diagrams: Bar diagram is used to represent the numeric value (exact value) of the data obtained from survey.
- c) Chi-square test: Chi-square test is used to analyze the data obtained from survey at 5% significance level (**Hebden et.al (2013)**).

To fulfil the objectives of research work various questions responses was taken into consideration for chi-square analysis.

## 3. Results and Discussion:

Analysing the data received we found that the factors which leads to the consumption of soft drink are Flavour, Brand, Availability, Advertisement, Packaging manner.

### 3.1 Influence of Age & Gender: -

Total number of respondents are 106 in which 73 are males and 33 are females from different locations of India. The percentage of males are 74% and that of females are 26%. According to the data obtained this is clear that males consume more soft drinks than females. There are different age group respondents who give their response towards the consumption of soft drink. Age group was categorized into 4 categories i.e. Below 20 Years, 20-40 Years, 40-60 Years, above 60 Years. Highest number of responses come from 20-40 years age groups people, 88 in numbers and 84 in percentage and the lowest is below 20 Years and that is only 3 (3%) responses. To check the relationship between given variable, chi-square test was done.

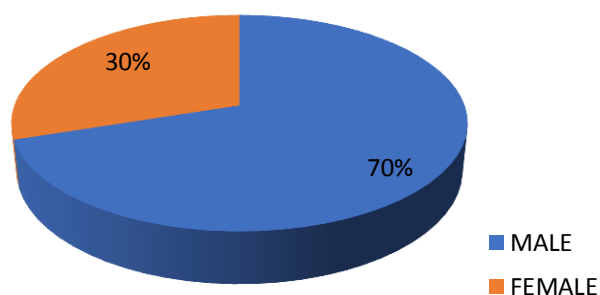


Figure 1: Responses for Gender

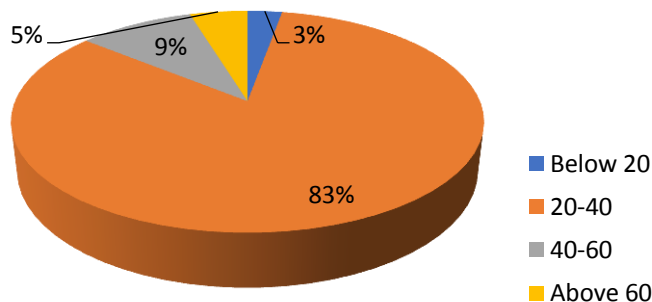


Figure 2: Responses for Age

Table 1: Chi-square test result (P=0.05)

Parameter		Responses		X <sup>2</sup> (Calculated)	X <sup>2</sup> (Tabulated)	D.F
		Yes	No			
Gender	Male	54	19	0.597805	3.841	1
	Female	19	11			
Age	Below 20 Years	3	0	2.028919	7.815	3
	20 to 40 Years	63	25			
	40 to 60 Years	6	4			
	Above 60 Years	4	1			

This study shows that male consumers are greater than female consumers. Female consumer who likes to consume soft drink are only 30% while rest 70 % are males. This study supports the previous study in which it was found that female consumers are less than female consumer (French *et.al*, 2013) in which it was found that males consumed twice as much sugar-sweetened soft drink compared to females. In this present study results are highest for consumption of soft drink for age group 20-40years. This data indicates that consumption of soft drink increases as youth grows older. This result supports the previous study in which 1 percent consumption increased of the 16-21 years of age consumers (Lien *et.al*). The result of previous study shows that More specifically, the proportion consuming only sugar-sweetened soft drinks decreased with age (P < .01). The majority of 16- to 24-year-olds consumed only sugar-sweetened soft drinks, whereas more than one third of 55- to 65-year-olds consumed no soft drinks. These results may be because soft drinks are popular drink and easily available. Soft drinks can be used as refreshing drink also. As consumer prefer cold soft drinks to consume so in summer consumption may be increase. consumption may be increase. People age between 20-40 years travel more so they consume more soft drink because of it's easy availability.

### 3.2 Factor affecting consumption of soft drink:

**Advertisement:** Out of 106 respondents, 35 or 33% respondents say that advertisement effect there buying decision while rest of the respondents says that advertisement does not affect their buying decision. Here Pie Charts shows the responses in number while bar diagram shows the responses in numbers.



**Flavor:** Flavour is the most influential factor of purchase 81, or 76% of answer. This question was added to know the effect of flavour on the marketing of the soft drink. On the basis of the responses, we can conclude that flavour effects on buying decision of the soft drink.

**Price:** People are more concerned about the price. Results from the data received conclude that price does not effect on buying. Although both the answers are near to each other, 46, or 43%respondents says yes that price effect on their purchase and 60, or 57% gave response no for this question. Pie Chart represent the response in Percentage and Bar Chart represent the responses in Numbers. To check the relationship between given variable, chi-square test was done.

**Nutritive Value:** Out of 106 respondents, 32 respondents think that soft drink have any nutritional value which count 30% and 74 respondents which counts for 70% think that soft drink doesn't have any nutritional value.

**Availability:** Availability is different at different locations, not all the soft drinks available at all locations. Availability effects the buying decision of the consumer. Data from responses concluded that availability effect the purchase. Two options given to the respondents and they are Yes and No. Out of 106 respondents, 64 respondents which counts for 60% says yes while 42 which counts for 40 says no.

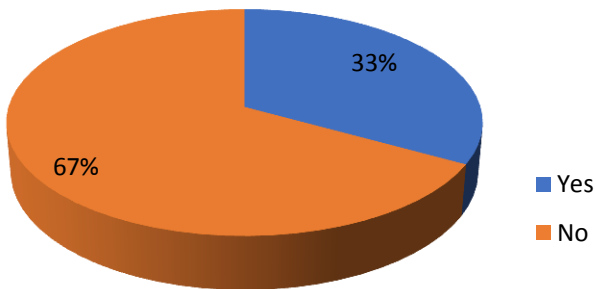


Figure 3: Advertisement Responses

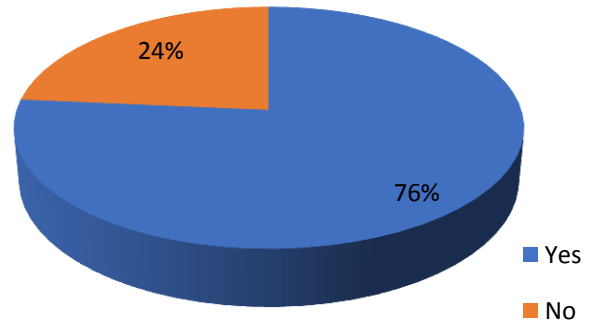


Figure 4: Responses for Flavour

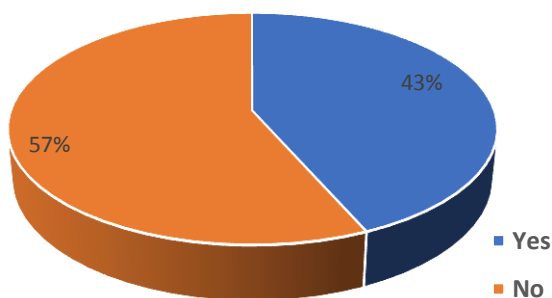


Figure 5: Responses for Price

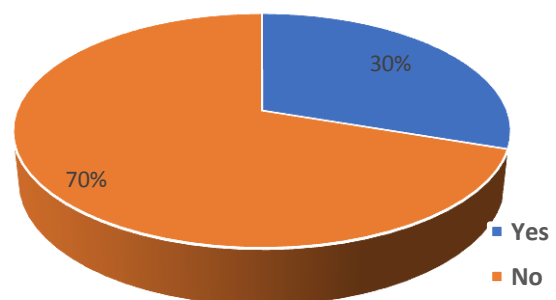


Figure 6: Responses for Nutritive value

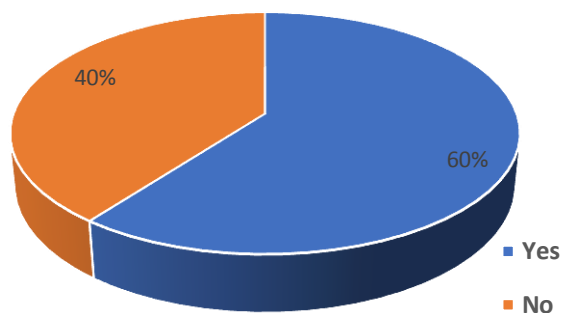


Figure 7: Responses for Availability

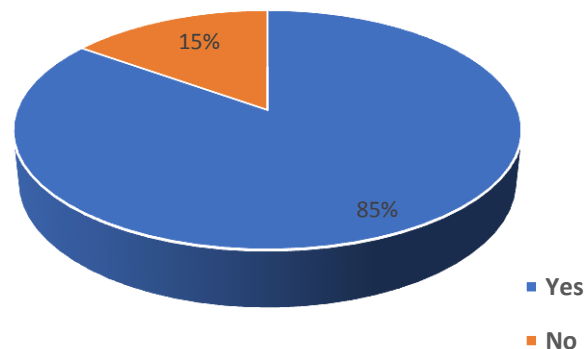


Figure 8: Responses for Temperature

Parameter		Responses		X <sup>2</sup> (Calculated)	X <sup>2</sup> (Tabulated)
		Yes	No		
Advertisement	Male	25	48	0.159805	3.841
	Female	10	23		
Flavour	Male	57	16	0.361596	3.841
	Female	24	9		
Price	Male	33	40	0.312476	3.841
	Female	13	20		
Nutritive value	Male	21	52	0.22484	3.841
	Female	11	22		
Availability	Male	48	25	2.832869	3.841
	Female	16	17		
Temperature	Male	64	9	1.399375	3.841
	Female	26	7		

Here are different factors studied which can effect the consumer buying decision. These factors are linked with each other directly or indirectly. Advertisement is way to spread about the products launched by any company. Availability can give more choice to the consumer and consumer can able to buy preferred brand soft drink. If soft drinks are available nearby to the consumer then they are likely to consume more soft drinks. These results were supporting the previous study (Hebden *et.al*, 2013) in which it was found that school students who usually purchase SSBs from the school canteen were almost three times as likely to be high consumers. Composition of the soft drink mentioned on the label of the soft drink packaging. In previous study (Hebden *et.al*, 2013) it was observed that consumption of soft drink increases with the increase in availability. In this study we also found that



availability effect the consumption of soft drink. This may be due to availability of soft drink in their immediate environment helps them in easy buy.

As soft drinks have no such nutritive values like fruit juice or other milk product so consumer does not think much about the nutrition while consuming soft drink. Diet soft drink introduce in the market to increase the nutritive value of soft drinks. Some consumer like to consume diet drinks but they are not available in every area so this limits the consumption. Previous study (Hebden *et.al*, 2013) concludes that soft drinks should be replaced by milk or fruit juice to encourage the consumption of more nutritive beverages alternatives. This study also supports the previous study. Nutritive value factor also effect the buying decision of the consumer.

Price does not effect much on buying decision this may be because there are no such price variation in different brands soft drinks, so consumer like to buy its favourite brand soft drink. In previous study (Strum *et.al*. 2011) same results analysed. The author found that the price variation is either too small to affect children's consumption frequency of fast food or soft drinks, or the consumption of these foods is less price sensitive.

**Brand:** 8 different brand Options were given to the respondents these are Coca-Cola, Pepsi, Thumsup, Mountain Dew, Mrinda, Maaza, Limica and Appy Fizz. Coke is the overall most ever drink across all locations with 36 people having ever drunk it, or 34% of the total respondents. Appy Fizz is the 2nd overall most ever drink across all locations with 14 people having ever drunk it, or 13% of the total respondents. Pepsi and Mrinda are the lowest ever drunk, with 6 respondents each or 6% each. When looking across locations some brands emerged as being clearly more popular in some location rather than some others.

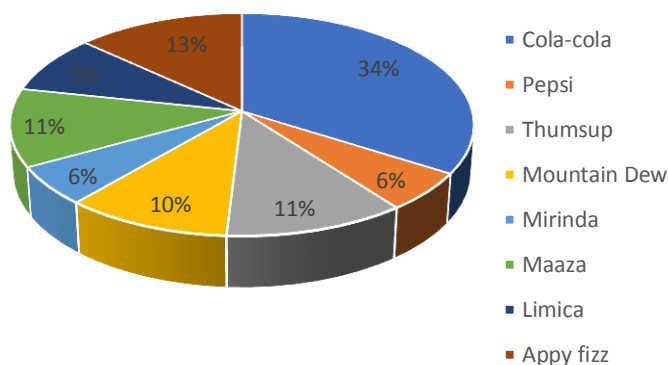


Figure 4: Pie Responses for Brand Preference

Parameter	Responses		X <sup>2</sup> (Calculated)	X <sup>2</sup> (Tabulated)
	Yes	No		
Coca-cola	24	12	5.001004	14.01
Pepsi	4	2		
Thumsup	9	3		
Mountain Dew	8	3		
Mirinda	5	1		



Maaza	9	3		
Limca	7	2		
Appy Fizz	10	4		

This study shows the different brand preference this may be due to availability or flavour or price. Highest consumer consumes coca cola. This study supports the previous study in which different factors were studied to know what effects the purchasing decision of the consumers (Enneking *et.al* 2017).

Previous study shows the price variation effect buying preference of the consumers. This study supports the previous study (Sturm *et.al*, 2007). This study also shows the same may be due to the financial status of the consumers.

### Conclusion:

The purpose of this study has been to establish what are the factors and the implication of consumer's behaviour towards carbonate soft drinks. Data was gathered by survey; Questionnaire was prepared in which different factors were there which effect the consumer preference and some question related to health.

First, an overall description of the average carbonate soft drink consumer has been established, providing a simple but effective picture of the consumer. From that data mainly consumers are male (70%) and female consumer are only 30%. The 2nd objective to this study was to determine what are the most influential factors in the purchase decision process are Price, Flavor, Availability, Temperature, Brand, Nutritional value, Price. From the data gathered and the analysis of this report, it has been established that all these factors have different influence on the consumers.

This study has been able to answer all the major research questions and sub research questions. It has been able to establish the attitude of the carbonate soft drinks consumers, their behavior, and the driving factors behind it.

We observed different variables influence soft drink consumption both indirectly and directly. Different factors were studied to know the effect of consumption of soft drink and to consume the soft drink and they are health effect, artificial sweetener, price, brand, availability, nutritive value, flavor, advertisement and this study shows that each variable have different effect on consumer's choice.

## REFERENCES

- [1]. **A.M. Adachi-Mejia, M.R. Longacre, M. Skatrud-Mickelso, Z. Li, L.A. Purvis, L.J. Titus, M.L. Beach, M.A. Dalton (2013)** Variation in access to sugar-sweetened beverages in vending machines across rural, town and urban high schools.
- [2]. **Anna M. Adachi-Mejia, Lisa A. Sutherland, Meghan R. Longacre, Michael L. Beach, MD, PhD, Linda Titus-Ernstoff, Jennifer J. Gibson, MS2, Madeline A. Dalton (2010)** Adolescent Weight Status and Receptivity to Food TV Advertisements. doi:10.1016/j.jneb.2010.08.002
- [3]. **C.A. Knight, I. Knight, D.C. Mitchell, J.E. Zepp (2004)** Beverage caffeine intake in US consumers and subpopulations of interest: estimates from the Share of Intake Panel survey. doi:10.1016/j.fct.2004.05.002.
- [4]. **Charles Spence (2012)** Auditory contributions to flavor perception and feeding behaviour doi: 10.1016/j.physbeh.2012.04.022.
- [5]. **Gail c. Rampersaud, Ms, RD; Lynn B. Bailey, phd; Bail P. A. Kauwell, phd, RD (2003)** National survey beverage consumption data for children and adolescents indicate a need to encourage the shift toward nutritive beverages. doi: 10.1053/jada.2003.50006.



- [6]. **J.F.Tahmassebi, M.S. Duggal, G.Malik-Kotru, M.E.J.Curzon (2006)** Soft Drink and dental health: a review of current literature.
- [7]. **J James and D Kerr (2005)** Prevention of childhood obesity by reducing soft drinks. doi: 10.1038/sj.ijo.0803062.
- [8]. **K. Elfhag, P. Tynelius, F. Rasmussen (2007)** Sugar-sweetened and artificially sweetened soft drinks in association to restrained, external and emotional eating. doi:10.1016/j.physbeh.2007.02.005
- [9]. **Lana Hebden, Debra Hector, Louise L. Hardy, Lesley King (2013)** A fizzy environment: Availability and consumption of sugar-sweetened beverages among school students. <http://dx.doi.org/10.1016/j.ypped.2013.02.017>
- [10].**Lenny R. Vartanian, PhD, Marlene B. Schwartz, PhD, and Kelly D. Brownell, PhD (2007)** Effects of Soft Drink Consumption on Nutrition and Health: A Systematic Review and Meta-Analysis. doi:10.2105/AJPH.2005.083782
- [11].**Nanna Lien, Leslie A. Lytle, and Knut-Inge Klepp (2001)** Stability in Consumption of Fruit, Vegetables, and Sugary Foods in a Cohort from Age 14 to Age 21. doi:10.1006/pmed.2001.0874
- [12].**Niraj Kumar, Subhajyoti Ray (2007)** Attitude towards soft drinks and its consumption pattern: a study of Gen Y consumers of India. <https://doi.org/10.1108/BFJ-05-2017-0320>
- [13].**N.I. Tak , S.J. Te Velde , A. Oenema , K. Van der Horst c,b , A. Timperio , D. Crawford , J. Brug (2011)** The association between home environmental variables and soft drink consumption among adolescents. Exploration of mediation by individual cognitions and habit strength. doi: 10.1016/j.appet.2011.01.013.
- [14].**Russell S.J. Keast, Lynnette J. Riddell (2007)** Caffeine as a flavor additive in soft-drinks. doi: 10.1016/j.appet.2006.11.003