What Do Consumers Know About the Relationship Between Soft Drinks and Their Health?

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Abstract

The effects of soft drink consumption are a matter of public interest. Through their research, scientists are trying to establish a link between the consumption of these drinks and the health of consumers. The unprecedented rise in obesity among the population, especially children and adolescents, diabetes, cardiovascular disease and other conditions, has raised concerns and sparked suspicion that widely marketed soft drinks are harmful. This paper aims to identify the opinions and attitudes of consumers in Romania about the quality of soft drinks in relation to their health. The authors conducted quantitative marketing research - the data has been collected based on a questionnaire in electronic format and applied platforms present in the online environment. The research results show that although there are a large number of people who consume soft drinks, few know anything about the ingredients of these drinks and the influence they can have on their health.

Key words: soft drinks, synthetic sweeteners, acidity regulators, consummer health, marketing research
J.E.L. classification: I12, M31

1. Introduction

Madar and Neacșu (2011,p.51) point out in their paper that due to the changing environment in which people live and work, the concept of food has been revised, emphasizing its role in preventing consumer health.

The human body contains, at maturity, an average of 60% water (higher percentages are found in children and lower in the elderly and the percentage is higher in men than in women), of which about two thirds are in the cells of the body (in the intracellular space) and a third in the extracellular structures. If there is a change in the distribution of water in the two structures, then it leads to the installation of either hyper hydration or dehydration.

Soft drinks are considered important in human nutrition, primarily for hydrating the body, but also for the intake of vitamins and minerals that some of these drinks bring. As a number of substances with low nutritional value are also used (sugar, synthetic sweeteners, flavorings, acidifiers), the consumption of soft drinks is a potential factor with a major impact on consumer health. Over time, several studies have been conducted to highlight the connection between these two components. On the other hand, it also tries to highlight the positive action of the consumption of soft drinks on health, by industry and consumers.

This paper analyzes the soft drink market, reviewing both the theoretical aspects and some of the practical elements encountered in the production and marketing of this group of products, whose market share has increased dramatically in recent decades.

2. Literature review

Soft drinks are products made from flavored concentrates, fruit juices, vegetable juices, fruit or herbal syrups, flavoring substances (natural or synthetic), table water or mineral water, sweeteners (sugar, glucose, saccharin or other sweeteners), food acids, vitamins or other substances, with or without the addition of carbon dioxide (Fofiu, 2014). The most common fruits in the production of similar juices and drinks are: citrus fruits, apples, berries, pineapple, plums, grapes, bananas, pears, quinces, melons. The most common vegetables in the manufacture of similar juices and drinks are: carrots, cabbage, beets, tomatoes, celery, ginger, parsley, spinach, lettuce, garlic, etc. Other food resources for the preparation of "health drinks" make up a growing list: seeds, cereal flakes, sprouted cereals, etc.

Additions of flavorings, synthetic sweeteners (saccharin, acesulfame K, aspartame), synthetic dyes (tartrazine, Orange S, azorubin, Ponceau 4R, erythrosine, Blue Patent V), food acids (citric, tartaric, ascorbic, phosphoric), preservatives sodium benzoate) or other substances is obtained with the approval of the Ministry of Health and in the concentrations established by the hygiene norms. Sugar-free soft drinks are made from a mixture of water, flavorings, preservatives, tiny amounts of fruit juice and food additives. These products are devoid of nutrients, have no biological value, attracting through their sensory properties.

Soft drinks usually contain water, sweeteners / sweeteners (8, 12%; many types of soft drinks use as sugar substitutes) carbon dioxide (0.3-0.6%), acidifiers (0.05 - 0.3%), flavorings (0.1-0.5%), dyes, chemical preservatives (legal limits), antioxidants and / or foaming agents (eg saponins up to 200 mg / ml) (Banu, 2010).

The water used in soft drinks must meet the standards for drinking water, in accordance with European Directive EC 98/1983, the US Environmental Protection Agency (EPA) and the standards of the World Health Organization (WHO) (Serpen, 2012, p.1510).

Băuturile răcoritoare conțin între 1% și 12% zahăr sau fructoză, sub diferite forme, mai puțin cele cu zero zahar. These represent, the main source of energy. Excessive sugar consumption can cause different negative health effects, such as obesity, diabetes or non-alcoholic fatty liver disease. Natural sweeteners provide 1.5-4.0 calories per gram and bring an increased contribution to body weight.

To protect the health, alternative sweeteners are used, which are added to soft drinks, which are labeled as "no added sugar". These sweeteners are approved for use at acceptable levels of daily intake (ADI). The most used sweeteners (with the maximum dose allowed in the EU) are aspartame (600 mg / L), acesulfame K (350 mgL), sucralose (300 mg / L) and saccharin (80 mg / L) (Ionescu - Tirgoviste, 2020).

Fruits and fruit juices are known to be a rich source of nutrients such as carbohydrates, organic acids, minerals, vitamins, flavors and antioxidants. All fruit juices contain fructose sugar, but the sugar content varies depending on the fruit used.

Carbonation of soft drinks varies from 1.5 to 5 g / l. This process makes the drink more acidic, which serves to sharpen the aroma and taste.

To regulate the taste of soft drinks, acidity regulators are used, which balance their sweetness. Banu (2010) mentions that acidity regulators also play an important role in the natural preservation of soft drinks. Most soft drinks contain citric acid (E 330) as an acidity regulator, as it potentiates the action of beneficial antioxidants and adds flavor. Malic acid (E 296) is also used to enhance aromas, succinic acid (E 363) which has a wide range of uses, such as dairy and desserts. The regulations in force allow its use only in instant drinks. Citric acid, succinic acid and phosphoric acid are covered by EC Regulation 1333/2008 on food additives. Citric acid, succinic acid and phosphoric acid are subject to EC Regulation 1333/2008 on food additives (https://www.legislation.gov.uk/eur/2008/1333/contents).

The use of food coloring in soft drinks fulfills several important functions: a) makes the product more attractive from an aesthetic point of view; b) adds to the correction of natural color variations or to changes during processing or storage; c) maintains the qualities by which the drink is recognized. Soft drinks also contain dyes, which also have antioxidant properties. As consumers increasingly prefer naturally colored beverages, the trend in the EU and US markets is for

manufacturers and traders to reduce the use of artificial colors in their products. The use of dyes in EU countries must comply with Regulation (EC) No 1333/2008 on food additives.

Flavors are found in soft drinks in relatively small quantities, so the influence on the health of consumers is relatively low. European Union legislation defines different types of flavors: natural, natural-identical and artificial. Based on the work of the European Food Safety Authority (EFSA) in 2012, the European Commission has established a list of flavors that can be used in the EU. This authority has also developed a series of guidelines for assessing the safety of flavorings used.

Consumption of soft drinks per capita has increased significantly in the last 5 decades around the world. These drinks remain one of the important sources of added sugar in the diet of the population. Consumption of long-term sweetened soft drinks in large quantities is associated with an increased risk of cardio-metabolic disorders (obesity, metabolic syndrome, diabetes and cardiovascular disease), but also certain types of cancer. A study by (Ng M, Fleming T, Robinson M, et al. 2014, p.760) shows that in the last two decades, obesity has increased substantially worldwide and is estimated to be associated with over 3 million deaths per year. The WHO recognizes that, in this century, obesity has an equal or higher prevalence compared to malnutrition and infectious diseases. Therefore, in the absence of drastic prevention and treatment measures, it is estimated that in 2025 over 50% of the world's population will be obese (CNEPSS, 2015).

These statements are also supported by other studies which look at the link between the consumption of soft drinks and the weight gain of their consumers. The results of these studies show an increase in diabetes 2 cases, certain types of cancer, etc. (Greenwood, et al. 2014 p.729; Hung-Hao Chang et al. 2010, p.263; Bassett et al. 2020, p.3331; Katzmarzyk et al. 2016, p.2). The conclusion of these studies is that sugar-sweetened soft drinks have a stronger negative influence on the consumers' health than those containing synthetic sweeteners. Other authors have studied the habit of people to consume soft drinks while playing video games. These studies show that with the length of time people spend playing computer games the consumption of soft drinks consumed during this time has also increased, negatively influencing the health of consumers (Turel et al. 2017, p.196).

Based on existing evidence, several countries have sought to develop and implement strategies to reduce the consumption of sweetened beverages, either by increasing the marketing price, limiting its availability or by raising public awareness. These strategies include fiscal policies, public education through media and schools, restricting the size and availability of portions of sugar-sweetened beverages and customer friendly labeling. Therefore, a reduction of the ad valorem tax of 10% on caloric drinks was proposed, which would have a significant effect on consumption (between 2 and 10% decrease in caloric drinks). The same result was found by Katzmarzyk et al 2016, which shows a relationship between the level of economic development and the consumption of soft drinks.

In the UK, for example, Action on Sugar, a non-governmental organization, has developed an action plan to reduce free sugars added to food by 40% by 2020 (SACN, 2015). Similar, Yuan Ma, et al. (2016, p.111) propose a gradual reduction of the amount of sugar in soft drinks by 40%, without adding synthetic sweeteners. This would lead to an average reduction in energy intake of 38.4 kcal per day after 5 years. In Norway, The Norwegian Beer and Soft Drinks Producers association announced that in 2020, over 60% of soft drinks consumed in this country were sugar-free (UNESDA, 2020). The Dutch Association of Soft Drinks, Waters & Juices also announced that the industry has reached its intermediate goal of reducing calories by 25% of its products compared to 2012. This reduction was achieved in 2019, one year before the established deadline (UNESDA, 2020).

A study conducted at European level (EHIS) during 2013-2015, established that in Romania, 63.2% of men and 49% of women were overweight in 2014.

According to the WHO, in 2016, the prevalence of overweight in people over 18 in Romania was 57.7% in both sexes. In 2016, Romania had a prevalence of obesity in adults of both sexes between 20 - 29.9% (CNEPSS, 2015).

The Romanian Ministry of Health organized and financed national health programs (through Order 377/2017) that took place during 2017-2018. An example is the National Program for Health Assessment and Promotion and Health Education, containing the Subprogram for Health Assessment and Promotion and Health Education, which had as specific areas, interventions for a healthy lifestyle and health assessment of the general population. The Romanian Nutrition Society developed in 2006

"Guide for healthy eating". The Ministry of Health has concluded a collaboration protocol with the PRAIS foundation for the implementation since 2011 of the national movement And I live healthy! It aims to inform, educate and mobilize the young generation, primary school students and their families for a healthy lifestyle, based on balanced nutrition and exercise (CNEPSS, 2015).

3. The soft drink market

The soft drink market is expected to grow by $ 316 billion in 2019-2023. This increase will be largely due to continuous product innovations in this market. These changes take into account the ingredients, wording and packaging to increase sales. By relying on consumer demand for healthier products, suppliers are introducing products with additional benefits. For example, in April 2018, a redesigned Sprite product was launched on the UK market, which uses a combination of sugar, acesulfame K and aspartame. The manufacturer claims to reduce the sugar content of the product by approximately 50%. Such innovations will help grow the global soft drink market in the forecast period (Technavio 2018).

The top four producers in the global soft drink industry accounted for 39.10% of the industry's capacity in 2015, with production facilities located worldwide. The largest soft drink companies in the world are Coca-Cola Company, PepsiCo, Ting Hsin International Group and Jiaduobao Group (RFD-TV, 2020).

The consumption of soft drinks is popular in both Europe and the USA, with the consumption frequency and portion size increasing significantly in the last three decades. The average daily consumption is about 600 ml of soft drinks per person in the US, 240 ml in the UK (Greenwood, et al 2014, p.726). Another study shows that in the USA, there was a 123% increase in the consumption of soft drinks between the 70s and 90s, the estimate being the highest at 196% for boys between 14 and 17 years (Morgan, 2013, p.251). Other studies have similar results that indicate that the consumption of sugary drinks is common among children. The results of the study indicate that 12.8% of boys and 10.8% of girls (Table 1) reported daily consumption of regular soft drinks (Katzmarzyk et al. 2016, p.10).

The soft drink market in the EU has been on the rise over the last decade, as can be seen in Table 1.

Table no. 1. Evolution of the soft drinks market in the EU in the period 2013-2018

	2013	2014	2015	2016	2017	2018	2019
Millions of liters	121051.0	120836.8	124277.5	124937.3	126844.5	128853.6	128853,6
Liters per capita	235.3	234.3	240.1	240.6	243.6	246.9	243,9

Source: https://www.unesda.eu/consumption

In terms of calories contained, in 2018, unsweetened or low-calorie soft drinks had a share of 26%, while normal soft drinks, with added sugar, had a share of 74% (https://www. Unesda.eu/consumption /).

In Romania, the market for these beverages has been in line with the evolution of the EU market trend, but the growth has been higher, as can be seen in Table 2.

Table no. 2. The evolution of the soft drinks market in Romania during 2013-2018

	2013	2014	2015	2016	2017	2018	2019
Millions of liters	2963.2	2890.3	3254.0	3548.0	3738.2	3935.6	3997,0
Liters per capita	148.2	145.1	164.2	180.1	190.9	202.3	206,5

Source: https://www.unesda.eu/consumption/

From the point of view of the calories contained, in 2018, in Romania the share of dietary soft drinks (unsweetened or with synthetic sweeteners) is much lower (4%) compared to the share of those sweetened with sugar (96%) (https: //www.unesda.eu/consumption/).

The data in the two tables show that although in the EU sales per capita was relatively constant during the analyzed period, in Romania it increased significantly, tending to reach the average value of European consumption.

4. Research methodology

Taking into account the previous research, the authors of this paper conducted a quantitative marketing research to identify the opinions and attitudes of consumers in Romania regarding the quality of soft drinks in relation to consumer health.

The objectives of the research were:

- Knowing how often soft drinks are consumed;
- Determining consumers' preferences regarding the choice of soft drinks
- Determining the degree of subject's satisfaction with the soft drinks consumed;
- Establishing how much importance consumers attribute to the available information about soft drinks;
- Identifying the awareness of the negatively health effects of soft drink consumption;
- Establishing consumer desires to improve the quality of soft drinks;
- Gathering knowledge about the soft drinks consumers by categorizing them by age, sex and socio-profession.

A quantitative marketing research was carried out. The data was collected using a questionnaire in electronic format and applied to the platforms present in the online environment (using social networks such as Facebook and Whatsapp). The period in which this study was conducted is September - October 2021. Data collection was based on a questionnaire answered by 250 people. Data collected from respondents were processed with SPSS statistical processing software.

The questionnaire used open-ended questions, closed-ended questions and questions with a unique answer. The end includes questions to define the profile of the subjects. The resulting sample was 250 subjects, of which 137 (54.8%) female and 113 (45.2%) male.

From the age distribution, the sample was structured as following: under 18 years there were 23 respondents (9.2%), between 18-25 years there were 173 (69 , 2) respondents, between 26-45 years there were 41 (16.4%) respondents, and over 45 years, 13 (5.2%) respondents.

5. Results and discussions

Of the 250 respondents, only 245 answered affirmative to the question of whether they consume soft drinks, representing a percentage of 98% (Table 3).

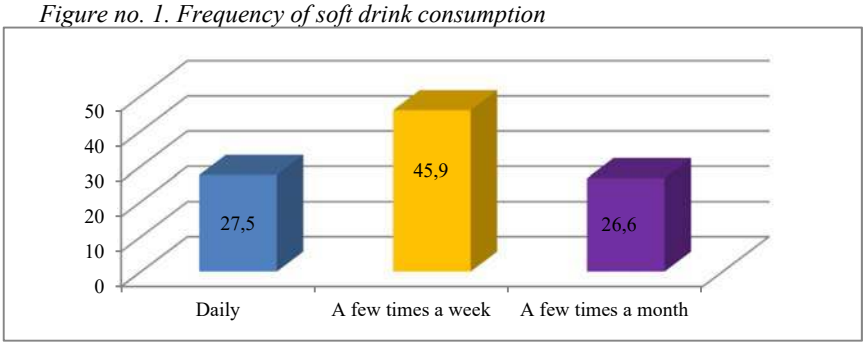
Table no. 3. Distribution of respondents consuming soft drinks

	Frequency	Percent (%)
Yes	245	98
No	5	2
Total	**250**	**100**

Source: Authors' own research

When asked how often they drink soft drinks, 244 people answered, out of 250. The most common answer was "several times a week" (45.9% of respondents), followed by "several times a month", (26.6%) (Figure 1).

Figure no. 1. Frequency of soft drink consumption

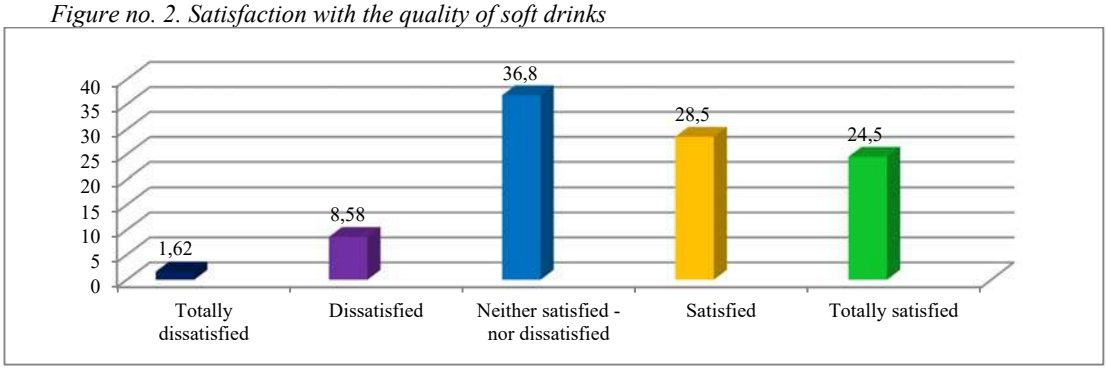


Source: Authors' own research

Respondents were asked what type of soft drinks they consume. This question was answered by 245 people out of a total of 250. The most common answer was "both" (natural and carbonated drinks), mentioned by 158 respondents (64.5%of the total valid answers). The less common answer was "carbonated", respectively 41 (16.7% of the total valid answers).

To the question "How satisfied are you with the quality of soft drinks in general", most (36.8%) said that they are neither dissatisfied - nor satisfied, 28.5% answered that they are satisfied, 24.5% are very satisfied, 8.58% are dissatisfied and only 1.62% are very dissatisfied. It can thus be seen that the vast majority of respondents are satisfied and very satisfied with the quality of the soft drinks they consume (53%) (Figure 2).

Figure no. 2. Satisfaction with the quality of soft drinks



Source: Authors' own research

The research aimed to identify the level of knowledge of respondents about the quality of soft drinks they consume. Thus, 49.39% of those surveyed said that they have quite a lot of general knowledge about the quality of soft drinks, and only 36.8% said that they have little knowledge about this (Table 4).

Table no. 4. General knowledge of respondents about soft drinks

	Frequency	**Percent (%)**
Few	92	37,55
Pretty much	121	49,39
I wasn't interested	32	13,06
Total	**245**	**100**

Source: Authors' own research

The interviewed subjects were asked if they thought that the consumption of these drinks can affect their health. It can be seen (Table 5) that the vast majority of 86.12% are aware of the negative effect of soft drinks on their health.

Table no. 5. Awareness that the consumption of soft drinks affects health

	Frequency	**Percent(%)**
No	34	13,88
Yes	211	86,12
Total	**245**	**100**

Source: Authors' own research

Respondents were asked to say what they believe are the most harmful substances in soft drinks that could affect their health. From the data presented in Table 6 it can be seen the most harmful substances contained in the soft drinks from the questioned consumers point of view, are synthetic flavors (28.8%), sugar and sweeteners content (24.8%) and synthetic dyes (21.6%). In the last two places are the acidity regulators (14.3%) and the carbon dioxide content (10.5%).

Table no. 6. The most harmful substances present in the composition of soft drinks

	Frequency	**Percent (%)**
Sugar / sweeteners content	61	24.8
The content of synthetic dyes	53	21.6
The content of synthetic flavors	70	28.8
Content of acidity regulators	35	14.3
The amount of carbon dioxide	26	10.5
Total	**245**	**100**

Source: Authors' own research

Another question referred to the opinions and knowledge of the interviewees about the diseases that are related to the excessive consumption of soft drinks, respectively sugar. Respondents believe that excessive consumption of soft drinks can harm the body's health and lead to various diseases (Table 7). Thus, the subjects consider that obesity (31%), type 2 diabetes mellitus (29%) and cardiovascular diseases (24.9%) are the most common diseases that can occur due to excessive consumption of soft drinks. Scoring a lower percentage are an increase in body mass index (5.3%) and an increase in waist circumference (9.8%).

Table no. 7. Diseases associated with the consumption of soft drinks

	Frequency	**Percent (%)**
Obesity	76	31
Type 2 diabetes	71	29
Cardiovascular diseases	61	24.9
Increased body mass index	13	5.3
Increasing the waist circumference	24	9.8
Total	245	100

Source: Authors' own research

The research wanted to identify possible measures to improve the quality of soft drinks on the market, from the consumer perspective. Thus, the members of the sample were asked (via an open-ended question) what they would like to improve about the soft drinks they consume most often. Of the 250 people surveyed, 105 expressed their opinion. The most frequent answers were:

- less / removal addition of dyes;
- smaller amount of added sugar
- better, more natural taste;
- more diversified assortment;
- clear labeling;
- more suggestive slogan;
- not to harm health;
- carbonated ones contain less acid;
- the price should be lower for natural drinks as well;
- not to contain preservatives.

Following the analysis and interpretation of the data obtained from the research, the following conclusions were drawn:

- There are very few people who do not consume soft drinks, most do;
- Most people consume both natural and carbonated drinks;
- A large number of people are satisfied and very satisfied with the quality of these drinks;
- A total cumulative percentage of 50.61% answered that they either have little knowledge and general information about the quality of soft drinks consumed or that they were not interested in knowing;
- Regarding the verification of the soft drinks label, consumers are most interested in the sugar content, respectively 103 respondents (42.2%). It's a good thing, because diabetes is starting to become the disease of the century because of the excess sugar used.

6. Conclusions

The soft drink industry, like any productive sector that offers consumer goods, must constantly adapt to changes in the consumption behavior. In the age of technological change, consumers are facing an increasingly complex environment, which leads to significant challenges in their decision-

making capacity and in their protection. This is increasingly influenced by aggressive advertising, internet, digitalization and globalization. In recent years, the consumer trend is to put more emphasis on health. As a result, their preferences are towards low-calorie products made from natural ingredients, and this trend continues due to the measures adopted both at European and local level.

Taking into account the results of the studies conducted on the relationship between the soft drinks consumption and consumers' health, both producers and the authorities should take a number of measures to prevent the negative health effect of these products on the population consuming them. Manufacturers may reduce the products' sugar content and other harmful ingredients and may label the content with correct and user friendly information. National authorities may require producers to introduce a certain amount of sugar in soft drinks and to write the quantity of sugar and other components on the product label.

The limit of the study is related to the size of the researched sample, which is not representative for the Romanian population. This research can be the starting point for further research to deepen this topic. The results of the research can be used by the authorities to carry out educational programs, especially among children and young people, so that they are aware of the effects of increased consumption of soft drinks.

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