Original Research

Statistical study of changes in motor quality (speed) following a moderate beer consumption

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Abstract

Background and objectives: Beer consumed in moderation (330 mL/day for women and 660 mL/day for men, up to 5% alcohol) may have certain benefits for the human body, due to natural ingredients, but especially due to important sources of protein, fiber and antioxidants. According to specialized studies, beer consumed in moderation can have beneficial effects on the body.

Materials and methods: The study was conducted on 50 subjects selected based on characteristics such as age, height, weight and not after exercising or doing physical activities. All research subjects benefited from two evaluations (initial and final), consisting of: physical examination, EKG examination, body hydration analysis, adipose tissue analysis, muscle tissue analysis, heart rate analysis and speed motor quality. These analyses were performed daily for a period of seven days, both for the initial and the final evaluation (a total of 14 days of assessments).

Results: Between the two evaluations, subjects consumed 660 mL of beer with up to 5% alcohol daily (WHO recommended dose) for 30 days. The results obtained (at the initial and final evaluation) were inventoried and statistically processed using statistical programs. It was found that moderate beer consumption (660 mL of beer with up to 5% alcohol) daily for a period of 30 days can lead to an increase in body hydration, a decrease in adipose tissue as well as an increase in muscle mass. In addition, a decrease in heart rate was observed after physical activity (short running on 100 m), which leads us to a better adaptation of the body after intense physical effort.

Discussion and conclusion: Moderate beer consumption (660 mL/day for men, up to 5% alcohol, WHO recommended dose) can have beneficial effects on body hydration, adipose and muscle tissue, and better adaptation of the body after intense physical effort.

Keywords
Motor quality; Speed; Statistical study; Moderate beer consumption

1. Introduction

When beer is consumed with moderation (330 mL/day for women and 660 mL/day for men, up to 5% alcohol), it can have certain benefits for the human body, due to the natural ingredients it contains. Beer cereals (especially barley) are an important source of protein, fiber and B vitamins. Beer hops are a source of antioxidants, and brewer’s yeast contains 17 vitamins, 14 minerals and 16 essential amino acids for the human body. Beer contains about 1-1.6 g of protein (2 beers of 330 mL contain 2-3.2 g of protein) but it does not replace a meal because the human body requires about 0.7 g of protein per kilogram body (sedentary people), respectively 2 grams of protein per kilogram of body weight (for athletes). The importance of beer composition lies not only in protein, but also in fibers and vitamins (thiamine b1, riboflavin b2, niacin b3, pantothenic acid b5, pyridoxine b6, folic acid, cobalamin b12). A 2014 study showed that
extracts of beer ingredients, especially hops, contain an abundance of polyphenols such as kaempferol, quercetin, tyrosol, ferulic acid, xanthohumol/isoxanthohumol/8-prenylnaringenin, bitter acids such as humulone acids and -biber, such as lupulone. 8-prenylnaringenin is the most potent phytoestrogen known to date [1]. It is not surprising that beer consumption ranks first in the preferences of many countries. Adequate beer consumption (the dose recommended by the World Health Organization) can prevent breast cancer, colon, prostate, liver, leukemia and symptoms of osteoporosis through phytoestrogens (lupulone 8-prenylnaringenin is the most potent phytoestrogen known to date). It is important to show the negative effects of alcohol, but at the same time we must not disregard the positive effects that moderate beer consumption can have on the human body.

Excessive alcohol consumption leads to a substantial increase in the number of hospitalization, an increase in social and economic costs and the increase in the prices of alcoholic beverages brings a positive contribution to public health [2,3]. However, a study conducted in 15 Latin American countries tried to make a comparison between the taxes levied on soft drinks and beer. It concluded that regardless of the tax applied, the accessibility to the population was not reduced [4]. This indicates that not raising alcohol taxes should be the number one priority but rather awareness of the negative effects of alcohol on the body such as: alcohol metabolism in the liver “steals” 80% of the oxygen needed for the operation of this organ, alcohol abuse and morning consumption “on an empty stomach” leads to malnutrition, ethanol in excess has the effect of progressively reducing the ability of the small intestine to absorb important substances (vitamin B1, folic acid, and later sodium and water, vitamins A and C, mineral salts), highly toxic products result from the decomposition of alcohol (e.g. acetaldehyde, which affects nerve cells), alcohol causes nerve disorders and disorders of somatic origin (inner restlessness, irritability, sleep disturbances, nightmares, depression, fear, inferiority complexes sometimes hidden behind a façade of grandiosity, lack of will, isolation and reduction of spheres of interest, lack of body hygiene, physical and mental decay), and is addictive.

The trend towards beer consumption was also observed in Nigeria, where a study aiming to raise awareness on alcohol consumption among high school students, released through a questionnaire that 55.2% of males prefer to drink beer and only 44.8% of females prefer beer as a first choice [5].

An experimental study was performed over a period of 10 weeks on 4 groups of patients, combining high-intensity training with an adequate diet and an intake of 330 mL of beer (group 1)/vodka (group 2)/beer without alcohol (group 3), mineral water (group 4). The results of the study showed a decrease in adipose tissue, along with an increase in muscle tissue for all groups. In addition to these results, the study concluded that not all positive results were influenced by beer or alcohol (vodka) consumption [6,7].

Also, a moderate intake of beer (traditional and alcohol-free) does not exert harmful vascular effects and does not increase body weight in healthy obese people. Moderate beer intake increases the antioxidant properties of high density lipoprotein (HDL) and facilitates cholesterol outflow, which can prevent lipid deposition in the vessel wall [8,9]. Also a moderate consumption of beer (with alcohol) can lead to an increase in bone density, but can also have effects on the cardiovascular and immune system through its anti-inflammatory and antioxidant benefits [10]. Moderate beer consumption (with alcohol-16 g alcohol/day) reduced blood insulin and glucose, thus reducing insulin resistance. The data from the study also suggested that a daily intake of 330 mL of beer with alcohol could statistically alter the lipid profile and insulin sensitivity of adult men [11]. After a 10-year incidence of diabetes, Koloverou E. concluded that a modest consumption of alcohol, especially wine and beer, has a protective effect against the long-term incidence of diabetes, possibly due to pleiotropic effects on health [12].

A study on athletes tried to observe the impact of fluids and electrolytes on physical performance and health. Its results suggested that alcohol-free beer before exercise could help maintain electrolyte homeostasis during exercise, also the intake of alcoholic beer reduced plasma Na+ and increased plasma K during exercise, which can negatively affect health and physical performance and, finally, water consumption before exercise could induce a decrease in plasma Na+ during exercise [13]. Kondo K. in 2004 wrote that moderate alcohol consumption improves lipoprotein metabolism and decreases the risk of cardiovascular mortality. In addition, he showed in various studies that used animal models that beer can prevent carcinogenesis and osteoporosis; beer gives the plasma significant protection against oxidative stress; and isobumulones, the bitter substances derived from hops, can prevent and improve obesity and type 2 diabetes, improve lipid metabolism and suppress atherosclerosis [14].

In 2016, Gaetano G. came to the following conclusion: although heavy and excessive beer consumption has harmful effects on the human body, with increased risk of disease on many organs and is associated with significant social problems such as addiction, accidents, violence and crime, the data reported in this document show evidence for no harm caused by moderate beer consumption for major chronic diseases, on the contrary, there are some benefits against cardiovascular disease [15].

2. Material and methods

In order to carry out the study, the following research methods were used: bibliographic study method and historical method, pedagogical observation method, measurement and evaluation method, case study method, statistical-mathematical method and graphic method.

This study started in November 2018 and ended in October 2019 (11 months that included collecting information, forming the group, evaluating the group, distributing the amount of beer, re-evaluating the group, determining the parameters, comparing and analyzing the parameters by direct work with study subjects 2 days ekg evaluation, 14 days of evaluations (before beer consumption and after beer consumption, 30
days beer quantity distribution = 46 days effective work with the study subjects).

The research was divided into:

- physical exam by the internal medicine doctor and performing the EKG exam - definitory for the inclusion or exclusion from the group;
- the initial evaluation was carried out over a period of 7 days;
- o each subject was initially evaluated;
- o each subject covered a distance of 100 m at maximum speed;
- o each subject was re-evaluated following the tests (100 m).
- distribution of the amount of beer (2 beers up to 5% alcohol = 660 mL for 30 days);
- physical exam by the internal medicine doctor and performing the EKG exam - definitory for continuing or exclusion from the group;
- final evaluation carried out over a period of 7 days;
- o each subject was initially evaluated;
- o each subject covered a distance of 100 m at maximum speed;
- o each subject was re-evaluated following the tests (100 m).

The two evaluations performed in this paper were performed with the following devices:

1. Bodymeter 206 SECA - intended to find out the waist of the study participants, used exclusively in the tie-breaking criteria. This Device was produced in Germany by SECA GMBH & CO, Mod. 206.

2. Scale Body Composition Monitor BF511 (HBF-511T-E/HBF-511B-E) - used to measure the following parameters: Body fat (adipose tissue), Body Mass Index (body mass index-BMI), Skeletal Muscle (muscle tissue), total weight.

3. Rossmax Scale Model WF260 - used to measure the parameters: Body hydration [degree of hydration (% water)], Bone Mass (bone mass), Basal metabolic rate/BMR (Basal metabolic rate).

4. Automatic arm tensiometer OMRON M7 Intelli IT (HEM-7322T-3) was used to be able to take the following parameters: heart rate/pulse and hypertension.

5. Pulse oximeter beurer PO 30-Art. - No.: 454.30- used to take arterial oxygen saturation and heart rate.

6. Stopwatch (on mobile devices) for recording the time obtained by each subject in the 100 m speed test.

The motor test (short running on 100 m) was performed on a horizontal plane, made of cement, the upper part covered with an adherent material, namely rubber. The entire running surface has a distance of 120 meters.

The two evaluations performed in the paper, both initial and final, which consisted of: body hydration analysis, adipose tissue analysis, muscle tissue analysis, heart rate analysis and speed, were performed over a period of 7 days, due to the need to create a reference value.

All data obtained were inventoried, statistically processed using the statistical programs SPSS and Statistics 7 and then compared with each other. Statistical Package for Social Sciences (SPSS) is a software package used for statistical analysis.

SPSS has the following statistics included in the basic software: descriptive statistics: cross-tabulation tables, frequencies, descriptive summaries; bivariate statistics: means, t-test, ANOVA, correlation (bivariate, partial, distances), non-parametric tests, Bayesian; prediction for numerical results: linear regression; prediction for identification groups: factor analysis, cluster analysis (two-step, K-means, hierarchical), discriminant; geospatial analysis and simulation.

**Table 1. Statistical parameters of the variable body hydration-initial/initial after beer consumption.**

<table>
<thead>
<tr>
<th></th>
<th>Body hydration initial (%)</th>
<th>Body hydration initial after beer (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>57.04171429</td>
<td>57.18400000</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>3.305537665</td>
<td>3.258129409</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.105</td>
<td>-0.052</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.337</td>
<td>0.337</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.085</td>
<td>-0.165</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.662</td>
<td>0.662</td>
</tr>
</tbody>
</table>

**Table 2. Statistical parameters of the body hydration variable-final/final after beer consumption.**

<table>
<thead>
<tr>
<th></th>
<th>Body hydration final (%)</th>
<th>Body hydration final after beer (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>56.98800000</td>
<td>57.20828571</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>3.298786722</td>
<td>3.279207767</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.165</td>
<td>-0.174</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.337</td>
<td>0.337</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.048</td>
<td>-0.176</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.662</td>
<td>0.662</td>
</tr>
</tbody>
</table>

In the statistical realization were used: 1. the correlation is a statistical method used to determine the relationships between two or more variables; 2. The correlation coefficient is a quantitative value that describes the relationship between two or more variables and varies between -1 and +1, where the extreme values assume a perfect relationship between variables. A more appropriate interpretation of the values obtained is made by comparing the result with certain default values in correlation tables depending on the number of subjects, the type of connection and the desired significance threshold; 3. the level (threshold) of significance is the maximum probability with which we can risk an error. In practice, a significance level of 0.05 (5%) is sufficiently precise, with the probability (confidence level) of 95% showing that the decision is fair; 4. The average values are indicators of the essential qualitative acquisition of the phenomena of the studied community, the measure of the central tendency of the frequency distributions of the variable; 5. The median is the average value that is used in large series of values, with close levels, in homogeneous communities. The median divides the series of values into two equal halves; 6 The
standard error helps to determine the range of variation of the average for a certain confidence (e.g. 95%); 7. The standard deviation shows how far the data is around the mean; 8. The Skewness asymmetry index shows the extent to which the average moves away from the median and, implicitly, the extent to which the normal data distribution curve moves away from the middle, moving to the left or to the right; 9. Kurtosis refers to the height of the curve, compared to normal. There is talk of leptocurtic (high hump) and platycurtic (more flattened) distributions.

3. Results

The tables below (Table 1 and Table 2) show the variation of the body hydration parameter both before and after beer consumption. The variation before beer consumption of this parameter indicates an average of 57.041% initially, respectively 56.988% after performing the physical effort. After consuming a quantity of 660 mL of beer for 30 days, the same parameter showed the following values 57.184% initially and 57.208% final respectively.

At the level of the whole lot, the variation is argued by the Skewness coefficient of 0.105, respectively (-0.052) after beer consumption, which indicates a left asymmetry of the data. This can also be confirmed by the fact that drinking beer can lead to an improvement in body hydration (as shown in the Table 1 and 2). The Kurtosis coefficient of 0.048 and (-0.176) shows a change in the distribution from leptokurtic to platykurtic (after drinking beer). This aspect strengthens our belief with $P = 0.5945$ that hydration of the body leads to a possible improvement of oxygen which can lead to increased caloric burning in Fig. 1. The role of body hydration is to maintain an adequate blood volume (plasma has a water content of 90%), dehydration causing a decrease in blood volume with effects on oxygen uptake and transport to cells. Adequate body hydration makes neurons feed nutrients and oxygenated blood, and makes the brain along with all its activity operate within normal parameters. Dehydration causes 1. deficiency in the thirst threshold and the thermoregulation threshold, leads to a decrease in the capacity of physical effort; 2. vague discomfort and loss of appetite; 3. dry mouth increases hemoconcentration and low diuresis; 4. decrease in the effort capacity by 20-30%; 5. difficulty concentrating, drowsiness, agitation, headache; 6. severe impairment of thermoregulation, decreased respiratory rate, occurrence of paresthesias in the extremities; 7. collapse, if associated with heat and exercise; 8. risk of death. Thus, the connection between body hydration, blood volume and automatically
with body oxygenation can be observed.

**TABLE 3. Statistical parameters of the body fat variable-initial/initial after beer consumption.**

<table>
<thead>
<tr>
<th>Body fat initial (%)</th>
<th>Body fat initial after beer (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>50</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>19.54942857</td>
</tr>
<tr>
<td>Mean</td>
<td>19.39537143</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.135</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.337</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.790</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.662</td>
</tr>
</tbody>
</table>

**TABLE 4. Statistical parameters of the variable body fat-final/final after beer consumption.**

<table>
<thead>
<tr>
<th>Body fat final (%)</th>
<th>Body fat final after beer (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>50</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>19.47028571</td>
</tr>
<tr>
<td>Mean</td>
<td>19.21317143</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.147</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.337</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.770</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.662</td>
</tr>
</tbody>
</table>

According to Fig. 1, we observe a frequency peak in the range of 56-58% with significant deviations in the range of 52-54% and 60-62%, respectively. We hoped that these values could be regularized through an optimal diet that included a quantity of 660 mL of beer. Major deviations of the study group were observed in the range of 50-52% in the initial measurements, respectively 64-66% in the measurement after physical activity.

Table 3 and Table 4 show us a difference in the body fat parameter both before and after beer consumption. This variation before drinking beer indicates an average of 19.549 and 19.470, respectively, after physical activity. After consuming the amount of beer for 30 days, the same parameter changed indicating 19.395 and 19.213 respectively at the end.

This variation is explained by the Skewness coefficient which initially, before the consumption of beer, is positive of 0.135, respectively 0.147 which indicates an asymmetry to the right of the data, compared to a negative Skewness index of (-0.022) and (-0.004) after the consumption of 660 mL of beer. This negative skewness of (-0.022) and (-0.004), respectively, with an asymmetry to the left of the data, tends towards a normal distribution, indicating a decrease in adipose tissue of 0.07914286%. In addition to this improvement in adipose tissue, we also observed a decrease in the same parameter following physical exertion from 0.07914286% to 0.1822%.
This indicates that moderate beer consumption can lower body fat, but at the same time can intensify its burning during exercise.

The Kurtosis coefficient indicated in both situations a platycurtic distribution, but with a tendency of the values towards a mesokurtic distribution after beer consumption. This aspect confirms the above with $P = 0.2458$ that hydration of the body leads to a possible improvement of oxygen which would lead to increased calorie burning in Fig. 2.

According to Fig. 2, we observe a peak frequency in the range of 15-20% with significant deviations in the range of 10-15% and 25-30%, respectively. We hoped that these values could be regularized through an optimal diet that included a quantity of 660 mL of beer. Major deviations of the study group were observed in the case of the range of 5-10% in the initial measurements, respectively 30-35% in the measurement after physical activity.

The tables above (5 and 6) show the skeletal muscle parameter that has been obtained using Scale Body Composition Monitor BF511 (HBF-511T-E / HBF-511B-E, where the subject had to climb barefoot on the scales, giving us the...
necessary information about the skeletal muscle parameter both before and after beer consumption. Looking at the two tables we can see an average of 40.727% at the beginning, respectively 41.564% after beer consumption. This indicates an increase in muscle mass by 0.83685714% following the consumption of the recommended dose of 660 mL of beer. This is possible due to hops, also called green gold being a source of antioxidants, and brewer’s yeast containing 17 vitamins, 14 minerals and 16 essential amino acids that are directly connected to the growth of the skeletal muscle (mentioned in the introduction).

The Skewness coefficient of 2.139 and 4.823 respectively after beer consumption, indicates an asymmetry to the right of the data. This can also be confirmed by the fact that drinking beer can lead to an increase in muscle mass. The Kurtosis coefficient of 9.614 and 29.753 shows a leptokurtic distribution, and after the physical effort we notice a change of this distribution from leptokurtic to platykurtic.

Analyzing the values at the level of the whole group we observe a peak frequency of 44% of the Skeletal Muscle variable after beer consumption, indicates an asymmetry to the right of the data. This can also be confirmed by the fact that drinking beer can lead to an increase in muscle mass. The Kurtosis coefficient of 9.614 and 29.753 shows a leptokurtic distribution, and after the physical effort we notice a change of this distribution from leptokurtic to platykurtic.

Table 7. Statistical parameters of the heart rate variable-initial/initial after beer consumption.

<table>
<thead>
<tr>
<th></th>
<th>Heart rate initial</th>
<th>Heart rate initial after beer consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(beats per minute)</td>
<td>(beats per minute)</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Valid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>85.29428571</td>
<td>86.15714286</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>9.844285776</td>
<td>10.090273501</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.609</td>
<td>0.562</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.337</td>
<td>0.337</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.119</td>
<td>-0.078</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.662</td>
<td>0.662</td>
</tr>
</tbody>
</table>

According to Fig. 3, we observe a frequency concentration in the range of 40-45% with significant deviations in the range of 30-35%. We hoped that these values could be regularized through an optimal diet that included a quantity of 660 mL of beer. Major deviations of the study group were observed in the case of the interval 30-35% in the initial measurements, respectively 45-50% in the measurement after
FIG. 5. Variation of the speed parameter relative to the Gaussian distribution.

TABLE 8. Statistical parameters of the heart rate variable-final/final after beer consumption.

<table>
<thead>
<tr>
<th></th>
<th>Heart rate final (beats per minute)</th>
<th>Heart rate final after beer (beats per minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>135.9728572</td>
<td>134.28000000</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>14.057527137</td>
<td>14.146404122</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.504</td>
<td>-1.266</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.337</td>
<td>0.337</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.448</td>
<td>1.690</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.662</td>
<td>0.662</td>
</tr>
</tbody>
</table>

TABLE 9. Statistical parameters of the variable speed-initial/final after beer consumption.

<table>
<thead>
<tr>
<th></th>
<th>speed initial for 100 m</th>
<th>speed final for 100 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>14.69234286</td>
<td>14.83428571</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.913864733</td>
<td>0.956398083</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.086</td>
<td>0.311</td>
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<tr>
<td>Std. Error of Skewness</td>
<td>0.337</td>
<td>0.337</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.606</td>
<td>0.233</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.662</td>
<td>0.662</td>
</tr>
</tbody>
</table>

physical exertion.

Table 7 and Table 8 indicate a better adaptation to exercise following physical activity after beer consumption from 135.972 to 134.280, a difference of 1.69428572.

The Skewness coefficient of (-0.504) and (-1.266) respectively after beer consumption, indicates a left asymmetry of the data. This can also be confirmed by the fact that beer consumption can lead to an adaptation to effort. The Kurtosis coefficient of 1.448 and 1.690 has a leptokurtic distribution. Analyzing the values at the level of the whole group we observe a maximum frequency of 42% of the initial Heart Rate variable, respectively of 32% Heart Rate after physical effort (after beer consumption) (Fig. 4). This aspect strengthens our conviction with $P = 0.0001$ as moderate beer consumption (according to the 660 mL study for 30 days) together with a proper diet can lead to an increased adaptation to effort.

From Fig. 4, we observe a concentration of frequency in the interval 80-90 before the effort, respectively 135-150 after the physical activity, with significant deviations in the interval 70-80.
The speed achieved by the group on a short running distance of 100 m showed insignificant variations from 14.69234286 (m/s) to 14.83428571 (m/s), meaning a difference of 0.14194285 (m/s) at a standard deviation
FIG. 8. Histogram of the heart rate variable and speed-initially after drinking beer.

FIG. 9. History of the heart rate variable and speed-final after drinking beer.
Beer is a food that is consumed in moderation and can benefit the body through the nutrients, vitamins and minerals it possesses. This study was conducted on a group of 50 subjects showing that consuming a quantity of 660 mL of beer for 30 days can have beneficial effects on the body by increasing the body water index, muscle mass and by decreasing adipose tissue. Also a moderate consumption of beer can help the body (heart rate) to adapt faster after physical activity, such as short running on 100 m. Following the results obtained and the statistical processing performed, we can say that the effects of beer consumption on motor quality, such as speed, help the body to adapt more easily to physical activity by decreasing heart rate after the exercise.

4. Conclusions

Beer is a food that is consumed in moderation and can benefit the body through the nutrients, vitamins and minerals it possesses. The research was carried out through "Research scholarships 7th edition" offered by the Center for Studies on Beer, Health and Nutrition from Bucharest.

Conflict of interest

The authors declare no conflict of interest.

References