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Research Article

Comparative Analysis of Risk Factors for Noncommunicable Chronic Diseases with the Use of High Doses of Wine and Strong Alcoholic Beverages

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Abstract

Objective: To study the effect of maximum daily consumption of alcoholic beverages (wine or spirits, alcohol) on the burden of alcoholism, cardiovascular disease, stomach and liver cancer, liver cirrhosis, diabetes mellitus and suicide.

Results: In Group 1 countries, daily wine consumption was 5.3 times higher than Group 2 ($p \leq 0.001$). However, strong alcohol consumption in group 1 of countries was 3.2 times lower than in group 2 of countries ($p \leq 0.001$). Beer consumption levels in groups 1 and 2 did not differ statistically. The total daily consumption of alcoholic beverages in group 1 was 1.6 times higher than in group 2 ($p = 0.003$). In the 1st group of countries, the total daily level of food consumption was 1.3 times higher ($p \leq 0.001$), and the level of consumption of red meat and animal fat was 2 times higher ($p \leq 0.013$). In group 1, there were 1.5 more men in countries with overweight ($p \leq 0.04$) and obesity ($p \leq 0.001$). Thus, the risk factors for NCDs in the 1st group of countries exceeded the 2nd group of countries. However, the burden of stomach and liver cancer, cirrhosis of the liver, cardiovascular diseases, diabetes mellitus, alcoholism and suicide was statistically significantly lower in group 1 of countries than in group 2 of countries. We noticed that the ratio of the level of strong alcohol consumption to wine consumption, to the total consumption of alcoholic beverages, as well as to the general level of food consumption was statistically significantly higher in group 2 of countries. The burden of alcoholism, cardiovascular diseases, cirrhosis of the liver and stomach cancer increased with an increase of 1 g daily consumption of strong alcohol ($p \leq 0.001$).

Conclusion: The NCDs studied appear to have the greatest and unidirectional effect of the daily consumption of strong alcohol.

The consumption of wine, beer and total drinks has different impacts on the main NCDs. Further research is needed.

Keywords: *Wine; Beer; Strong Alcohol; Doses, The Burden of Alcoholism; Cardiovascular Disease; Stomach Cancer; Liver Cancer; Liver Cirrhosis; Diabetes Mellitus and Suicide*

Abbreviations

AB: Alcoholic Beverage; AP: Animal Products; BMI: Body Mass Index; BP: Blood Pressure; CAB: Alcoholic Beverage Consumption; CD: Communicable Maternal, Perinatal Diseases; CHO: Blood Cholesterol; CL: Consumption Level of Selected Foods; CHD: Coronary Heart Disease; CV: Cereals and Vegetables; CVD: Cardiovascular Diseases; COPD: Chronic Obstructive Pulmonary Disease; D: Disease; DALY: The Disability-Adjusted Life Year; DRD2 and DRD3: Genes Encode Type 2 and 3 Dopamine Receptors; EEI: Ecological Efficiency Index; FAO: Food and Agriculture Organization of the United Nations; FS: Fruits and Sweeteners; ICD-10: Codes - Is the 10th Revision of the International Statistical Classification of Diseases; GBD: Global Burden Diseases; GDP: Domestic Gross Product; Glu: Blood Glucose; HPI: Happiness Index; IHD: Index of Human Development; LE: Life Expectancy for Men and Women; LPA: Low Physical Activity, LMA: Linear Multiple Regression Analysis; M: Male; NS: Nutritional Structure; MSP: Metabolic Syndrome Predictors; NCD: Non-Communicable Diseases; P: Person; QOL: Quality of Life; QR: Quartile Range; R1: Multiple Correlation Coefficient; R2: Coefficient of Determination; RE: Rating Educations; SNP: SNP Market - Online Store of Electronics and Equipment; SLC6A4: Encodes a Sodium-Dependent Transmembrane Transporter a Neurotransmitter Serotonin Reuptake Protein; TDC: Total Daily Consumption; UN: United Nations; UV: Ultraviolet Level; WHO: World Health Organization

Introduction

Alcohol is the third largest risk factor for 60 types of diseases. Ethanol and its metabolites - acetaldehyde-acetate, ethanol esters of fatty acids, ethanol and protein adducts have a toxic effect on the liver [1]. The burden of hepatocellular carcinoma is growing steadily. Obesity, type 2 diabetes and non-alcoholic liver disease are replacing viral and alcoholic liver diseases [2]. New mechanisms have been identified in the human genome [3]. Alcohol is a major contributor to liver cirrhosis. However, little is known about the regimen of toxic alcohol use. Wine is associated with a lower risk of alcoholic liver damage [4]. Metabolic syndrome and alcohol use are the main causes of liver disease [5]. Bioactive ethanol products are considered hepatotoxins [6]. Alcoholic and non-alcoholic liver disease have similar pathological characteristics and are one of the most common indications for liver transplantation [7,8]. Disorders, associated with alcohol consumption are often accompanied by mental disorders [9]. Dangerous drinking practices remain poorly understood [10]. There are no FDA-approved drugs for the prevention and treatment of alcoholic liver disease [11]. Alcohol is the cause of malignant tumors of the oral cavity, esophagus, and large intestine. Alcohol metabolism leads to the production of reactive oxygen species and a decrease in antioxidant levels [12]. Revealed positive links between alcoholism and suicide with the level of alcohol consumption [13]. Risk factors for liver carcinoma include alcohol consumption and viral hepatitis B and C [14-16]. Mortality from liver cirrhosis has increased 1.5 times since 1990 [17]. Hepatologists in Europe are uniquely placed to reduce alcohol use, obesity and hepatitis virus infections [18]. DALY - an overall indicator of the burden of risk factors for NCDs [19].

Objective

To study the effect of maximum daily consumption of alcoholic beverages (wine or spirits, alcohol) on the burden of alcoholism, cardiovascular disease, stomach and liver cancer, liver cirrhosis, diabetes mellitus and suicide.

Materials and Methods

Study design: statistical analysis of observations. For the purposes of this study, a database on the overall burden of NCDs, cardiovascular disease, stomach and liver cancers, alcoholism and cirrhosis of the liver (ICD-10 codes - is 10- m revision of the International Statistical Classification of Diseases) was developed for 21 countries with maximum daily intake of wine 2003-05 l (CW) - Group 1 and for 21 countries with maximum daily intake of Beverages, Alcoholic 2003-05 (CBA) - Group 2 (Table 1 - List of countries). Disease burden (DALY) data for men in 21 countries, standardized by sex and age were selected from the GBD 2004 database [20].

countries	IPC 2000	lat°	UV rad J/m2 2004	Beverages, Alcoholic2003-05	Wine2003-05	BA/W	Beer2003-05	AB amount	% AB	TDC g / person / day
1 group of countries										
France	26193	48,5	1907	7	148	0,05	78	233	10	2244
Italy	27006	45,3	2444	3	133	0,02	80	216	9	2323
Switzerland	35675	46,7	2158	9	105	0,09	156	270	14	1966
Croatia	10747	45,3	1976	8	99	0,08	219	326	17	1972
Spain	21517	40,4	2705	7	98	0,07	215	320	13	2399
Denmark	28640	55,7	1691	13	83	0,16	246	342	15	2271
Austria	29301	47,1	1888	16	82	0,20	299	397	19	2121
Argentina	11810	34,2	3476	4	82	0,01	93	179	10	1763
Uruguay	10205	34,5	3235	3	80	0,04	97	180	10	1807
Belgium	27967	50,8	1645	4	77	0,05	277	358	15	2365
Greece	19504	37,9	2753	12	68	0,18	89	169	6	2607
Australia	26406	34	3206	5	60	0,08	240	305	14	2129
Romania	5873	43,5	2071	9	58	0,16	170	237	9	2736

Malta	19411	35,9	3091	8	57	0,14	104	169	7	2434
The Netherlands	31573	52,2	1662	11	53	0,21	227	291	13	2282
United Kingdom	26031	51,3	1576	7	53	0,13	278	338	14	2360
Cyprus	21696	35,2	3439	9	51	0,18	119	179	8	2170
Norway	36928	59,6	1439	7	43	0,16	152	202	10	2109
Sweden	29258	59,2	1587	10	40	0,25	143	193	9	2185
Chile	9608	33,3	3982	5	40	0,13	73	118	7	1696
Slovenia	18036	46,1	2256	7	35	0,20	221	263	12	2147
mean 1	22542	44,60	2 389,86	7,81	73,57	0,12	170,29	251,67	12	2195
2 group of countries										
R Moldova	1840	46,8	1910	65	15	4,33	35	115	7	1762
Congo DR	419	4,3	5100	49	1	49,00	6	55	22	249
Bosnia and Herzegovina	4526	43,5	2205	40	6	6,67	99	145	7	2054
Estonia	9414	59,2	1781	37	21	1,76	235	293	13	2182
Thailand	7284	15,9	4862	29	1	29,00	69	98	10	1022
Russian F	6825	55,5	1795	29	17	1,71	158	204	10	2114
Lithuania	8451	54,4	1801	26	18	1,44	225	269	11	2455
Haiti	1379	18,1	5016	25	1	25,00	1	25	5	519
Japan	26795	35,3	2521	25	5	5,00	83	113	8	1465
Ukraine	3803	50,2	1843	23	12	1,92	110	145	7	2095
Bulgaria	6371	42,4	2331	22	26	0,85	147	195	11	1726
Barbados	11445	13,1	5787	22	17	1,29	87	126	8	1549
Belarus	5995	53,5	1795	22	15	1,47	67	104	5	2185
Serbia and M	5722	44,5	2257	19	28	0,68	140	187	10	1797
Lao PDR	1860	18	4735	18	1	18,00	34	52	5	1155
Costa Rica	7830	9,6	4884	18	3	6,00	31	52	4	1416
Finland	26732	60,8	1494	18	27	0,67	249	294	14	2170
Czech Republic	16132	50,1	1707	18	34	0,53	440	492	22	2199
Guyana	3577	6,5	5203	17	1	17,00	50	67	5	1334
South Africa	7701	25,5	4111	16	28	0,57	145	189	14	1365
Slovakia	11348	48,4	1795	16	22	0,73	230	268	16	1656
mean 2	8355	35,98	3 092,05	26,38	14,24	8,27	125,76	166,10	10	1641
countries	IPC 2000	lat°	UV rad J/m2 2004	Beverages, Alcoholic2003-05	Wine2003-05	BA/W	Beer2003-05	AB amount	% AB	TDC g / person / day
1 group of countries	22542	45	2 390	8	74	0	170	252	12	2195
2 group of countries	8355	36	3 092	26	14	8	126	166	10	1641

Table 1: *Country Groups 1 and 2 - Lists.*

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To characterize the "quality of life" (QOL) in the countries a number of indicators were used: income per capita or gross domestic product (GDP) in 2000 - 2016 (US dollars per person per year) [21]; the geographical position of the countries by latitude and the level of ultraviolet radiation in the capital (UV) (J/m2 2004) [22]; life expectancy for men and women (LE) [23]; access to good health care, clean water, and clean air [24]; Happiness Index (IH) in 2016 [25]. Body mass index (BMI) ≥ 25 kg/m2 and ≥ 30 kg/m2 have been studied as predictors of metabolic syndrome (MSP) - the percentage of men and women in the country who are overweight and obese; the % of population with blood cholesterol (Chol ≥ 5.0 mmol/L and ≥ 6.2 mmol/L); blood glucose level (Glu ≥ 7.0 mmol/L); blood pressure (BP ≥ 140/90 mm Hg); low physical activity (LPA) ≤ 60 min/day walking [26]. The daily level of food consumption (TDC) (g/person/day) (50 types of products) for each country was selected from the FAO database for 1992 - 2005 [27]. The nutritional structure (NS) of the countries is presented in the form of 4 blocks in absolute and percentage terms (TDC): 1 - products of animal origin (AP); 2 - cereals and vegetables (CV); 3 - fruits and sweeteners (FS); 4 - alcoholic beverages (AB) [27]. Statistical analysis of the study results was performed using Mann-Whitney-Wilcoxon U-criterion. U is the numerical value of the Mann-Whitney test. The central tendency in the sample data distribution was represented by the median with a quartile range and a mean with a standard deviation. The variance of the data in the samples was estimated using a quartile range (QR) between the first and third quartiles, that is, between the 25th and 75th percentiles. The level of statistical significance, reflecting the degree of confidence in the conclusion about the differences in the indicators of groups 1 and 2 countries: two levels of accuracy were estimated: (1) $p \leq 0.01$, 1% error probability; (2) $p \leq 0.05$, 5% error probability. The Bonferoni correction was also used to assess the significance of the study results, taking into account the two hypotheses $p \leq 0.025$ for multiple comparisons. Analysis of the Burden of Cardiovascular Diseases, Prostate and Breast Cancer and Alcoholism in Countries with High and Low Daily Alcohol Consumption 14 Citation: Ludmila Alexandrovna Radkevich and Dariya Andreyevna Radkevich. "Analysis of the Burden of Cardiovascular Diseases, Prostate and Breast Cancer and Alcoholism in Countries with High and Low Daily Alcohol Consumption". EC Pharmacology and Toxicology 9.10 (2021): 12-25. NCD burden and MSP dependence on TDC products, including CAB, were analyzed using Multiple Linear Regression Analysis for independent variables (LMA). Standardized NCD burden of disease indicators: cardiovascular, prostate cancer, breast cancer, and alcoholism from 2004 for 158 countries [20] and MSP predictors [26] were used as the dependent variable, LMA. Daily blocks of TDC: AP (animal products), CV (cereals and vegetables), FS (fruits and sweeteners) and AB (alcoholic beverages) for 158 countries (2003 - 2005) were used as predictors (independent variables) [27]. A stepwise procedure of inclusion of independent variables was applied to obtain the best regression equations containing the minimum number of predictors statistically significantly associated with the dependent variable. The quality of the regression model was assessed using multiple correlation coefficient (R1), coefficient of determination (R2), Fdistribution, t-criteria for regression coefficients, and residuals analysis. The residuals in all models had a normal distribution. Analysis of the values and signs of the coefficients of β^* and β regression equations allowed us to estimate the contribution of UP of different products to the values of the specified types of NCD and MS predictors. All calculations were performed using the program STATISTICA (version 13).

Results

Alcohol consumption levels in groups 1 and 2

It was found that in the 1st group of countries in comparison with the 2nd group of countries they consumed 3 times less strong alcohol ($p \leq 0,001$); 5 times more wine ($p \leq 0.001$); 1.3 times more beer ($p = 0.05$) *, but not statistically significant; 1.7 times more than the total amount of alcoholic beverages (AB) ($p \leq 0.003$); 1.3 times more food (TDC) ($p \leq 0,01$) (Table 2).

In the 1st group of countries, the% AB of the total level of consumption of products (TDC) was 1.2 times higher than in the 2nd group of countries. But this difference was not statistically significant between group 1 and group 2 of countries ($p = 0.2$) (Table 2).

In the 1st group of countries, the ratio of the consumption of strong alcohol to the consumption of wine was 18 times lower by the median than in the 2nd group of countries ($p \leq 0.001$). The ratio of hard alcohol consumption to total food consumption (TDC) in the 1st group of countries was 8 times lower than in the 2nd group of countries ($p \leq 0.001$). In 1 group of countries was higher than 1, 3 times the total daily level of food consumption ($p \leq 0.001$) and 2 times higher the level of consumption of red meat and animal fat ($p \leq 0.013$).

In group 1, the consumption of animal products and total energy was 1.5 times higher ($p \leq 0.001$). Thus, in the 1st group of countries the consumption of wine was 5 times higher. But the ratio of strong alcohol to wine was 18 times higher in group 2 of countries.

Burden of alcoholism, diabetes mellitus, cirrhosis of the liver, cardiovascular disease, liver and stomach cancer, and hepatitis B and C in country groups 1 and 2

As a result of the research, it was found that in group 1 of countries in comparison with group 2 of countries, the burden of infectious diseases was 12.8 times lower ($p \leq 0.002$) and 1.4 times lower in the burden of NCD ($p \leq 0.001$).

In the 1st group of countries in comparison with the 2nd group of countries, the burden of alcoholism and diabetes mellitus was 1.3 times lower, but not statistically significant ($p = 0.1$), 2 times lower the burden of liver cirrhosis ($p \leq 0.002$); cardiovascular diseases ($p \leq 0.001$); liver cancer ($p \leq 0.013$) and stomach cancer ($p \leq 0.003$).

The burden of hepatitis B (g) and C (g) was not statistically significant between groups 1 and 2 ($p = 0.7$) (Table 2). Thus, in group 1 countries, the burden of total infectious and non-infectious diseases was statistically significantly lower and the burden of cardiovascular diseases, cirrhosis, and liver and stomach cancer was lower.

Predictors of Metabolic Syndrome in Groups 1 and 2

In the 1st group of countries, in comparison with the 2nd group of countries, the proportion (%) of men with overweight (BMI ≥ 25) ($p \leq 0.012$) and obesity (BMI ≥ 30) ($p \leq 0.036$) * was 1.3 times higher. In addition, the proportion (%) of men with hyperlipidemia (ch. ≥ 6.2) ($p \leq 0.001$) was 2 times higher in group 1 of countries. Thus, predictors of Metabolic Syndrome were higher in group 1 of countries compared to group 2 of countries (Table 2)

Quality of life in 1 and 2 groups of countries

In the 1st group of countries, the per capita income was 3 times higher than in the 2nd group of countries ($p \leq 0,001$). But the geographic coordinates (latitude and UV) between group 1 and group 2 were not statistically different ($p = 0.3$). Men of the 1st group of countries were more successful and happier than the 2nd group of countries ($p \leq 0.002$), had more developed healthcare in the countries ($p \leq 0.015$) and better environmental conditions ($p \leq 0, 002$). Life expectancy (LE) of men in group 1 of countries was 10 years higher than men in group 2 of countries ($p \leq 0.001$). The gender difference LE in the 1st group of countries was 2 years lower than the 2nd group of countries ($p \leq 0.005$) (Table 2).

variable	U	Z	P - value	Mean1	Median1	Quartile1	Mean2	Median2	Quartile2
The quality of life									
IPC 2000	47,00	4,35	0,0000	22542	26031	10604	8355	6825	5611
IPC 2016	53,00	4,20	0,0000	38888	38161	22392	18570	16816	21093
Gini Index 2021	214,00	-0,15	0,8800	0,726	0,705	0,142	0,724	0,734	0,135
lat°	182,00	0,96	0,3391	45	45	15	36	44	32
UV rad J/m2 2004	174,00	-1,16	0,2472	2390	2158	1400	3092	2257	3067

Prosperity Rating	63,00	-3,95	0,0001	24	23	29	63	63	40
HPI 2016	84,00	3,11	0,0018	7	7	1	6	6	2
index of human development	57,50	4,09	0,0000	0,929	0,951	0,058	0,790	0,826	0,151
EEI Ecological efficiency index	90,00	3,12	0,0018	70	74	12	55	53	23
Access to the street. medicine1990	109,50	2,42	0,0154	98	100	2	87	95	19
Access to clean water1990	78,00	2,97	0,0030	96	100	3	77	86	25
Air pollution for children under 5 years old 2004	144,50	-1,70	0,0900	7	0	2	32	2	15
Female life expectancy	49,50	3,92	0,0001	83	83	2	76	78	8
Male life expectancy	36,00	4,30	0,0000	78	79	2	68	68	8
Gender difference 2019	89,00	-2,80	0,0051	5	5	2	7	7	3
Burden of death and morbidity from DALYs									
male Death	78,00	-3,57	0,0004	734	646	334	1236	1152	577
male All Causes	48,00	-4,33	0,0000	12314	11496	2837	24437	21408	11090
Hepatitis B (g)	153,50	-1,67	0,0944	5	4	5	32	9	14
Hepatitis C (g)	209,00	0,28	0,7820	6	3	5	8	2	6
Infectious and parasitic diseases	98,00	-3,07	0,0021	305	189	143	3894	936	3620
Noncommunicable diseases	46,00	-4,38	0,0000	9837	9260	1847	14038	14319	2910
Stomach cancer	103,00	-2,94	0,0032	97	77	62	173	160	132
Liver cancer	121,00	-2,49	0,0128	55	46	42	131	68	80
Diabetes mellitus	162,00	-1,46	0,1446	255	240	111	344	261	214
Alcohol use disorders	142,00	-1,96	0,0497	744	836	340	1085	1119	587
Cardiovascular diseases	66,00	-3,87	0,0001	1872	1662	800	4143	4120	2119
Cirrhosis of the liver	95,00	-3,14	0,0017	229	175	191	449	359	324
Metabolic syndrome									
Male BMI>25 (kg / m2)	120,50	2,50	0,0123	63	63	7	49	59	28

Male BMI>30(kg / m2)	136,50	2,10	0,0357	23	23	6	17	20	15
Male ch > 6.2(mmol / L)	64,50	3,91	0,0001	18	18	8	11	12	7
Alcohol consumption levels									
Beverages, Alc	1,00	-5,51	0,0000	8	7	4	26	22	11
Wine	-	5,53	0,0000	74	68	30	14	15	19
Beer	142,00	1,96	0,0497	170	156	130	126	99	108
AB amount	103,00	2,94	0,0032	252	237	140	166	145	106
% AB	164,00	1,41	0,1589	12	10	5	10	10	7
TCL	80,00	3,52	0,0004	2195	2185	251	1641	1726	749
Alcohol indices									
BA/W	-	-5,53	0,0000	0,1	0,1	0,1	8,3	1,8	5,8
BA/B	23,00	-4,96	0,0000	0,1	0,0	0,0	1,9	0,3	0,3
BA/AB	11,00	-5,26	0,0000	0,0	0,0	0,0	0,3	0,2	0,2
BA/TCL	-	-5,53	0,0000	0,003	0,003	0,002	0,025	0,013	0,006
Food consumption levels									
AP amount	96,00	3,12	0,0018	740	752	166	529	583	236
GV amount	171,50	1,22	0,2224	902	846	194	784	770	339
FD amount	29,00	4,80	0,0000	283	273	71	155	151	59
AB amount	103,00	2,94	0,0032	252	237	140	166	145	106
Common nutrients									
Energy (kcal / person / day)1990-92	19,00	3,57	0,0004	3199	3230	350	2546	2770	760
Energy (kcal / person / day)2003-05	45,00	4,40	0,0000	3333	3400	420	2790	2840	340
Carboh%E 2003-05	63,00	-3,95	0,0001	53	51	9	64	63	11
Proteins%E 2003-05	94,00	3,17	0,0015	12	12	1	11	11	2
Fats%E 2003-05	56,50	4,11	0,0000	35	36	9	25	26	10
Animal Nutrients									
AP Energy%1990-92	92,00	2,74	0,0062	30	31	8	21	21	17
AP Energy%2003-05	73,00	3,70	0,0002	29	30	6	20	20	10
IPC	Gdp								
UV	Ultraviolet								
HPI	Happiness index								
BMI	Body mass index								
ch	Blood cholesterol								
AP	Animal products								
GV	Cereals, vegetables								
FD	Fruit, sweeteners								
AB	Alcoholic drinks								

Table 2: *Comparative analysis of the levels of alcohol consumption, the burden of NCDs and the quality of life of the 1st and 2nd groups of countries (Mann-Whitney U-test).*

Multiple linear regression analysis

The dependent variables were: Alcohol use disorders, Cardiovascular diseases, Cirrhosis of the liver, Stomach cancer, Liver cancer and Diabetes mellitus (Table 3). Consumption levels were used as independent variables - Beverages, Alcoholic, Wine, Beer, AB amount,% AB, TDC.

The independent variables were most influenced by the dependent variable Alcohol use disorders. R1 was = 0.642, R2 = 0.4124, F (4.152) = 26.6 (p = 0.001). Based on the coefficient of determination, R2, it can be assumed that more than 40% of the variability in the burden of Alcohol use disorders is alcoholic beverages.

A 1 g increase in daily consumption of Beverages, Alcoholic can increase the burden of Alcohol use disorders by 3%, from 572 DALYs to 593 DALYs (p = 0.001). A 10 g increase in daily Wine consumption can reduce the burden of Alcohol use disorders by 5%, from 572 DALYs to 543 DALYs (p = 0.021).

A 10 g increase in daily Beer consumption may increase the burden of Alcohol use disorders by 2%, from 572 DALYs to 583 DALYs (p = 0.022). A 100 g increase in daily TDC intake may increase the burden of Alcohol use disorders by 3%, from 572 DALYs to 588 DALYs (p = 0.012). Further, see Thus, an increase in the consumption of strong alcohol by 1 year, beer per 10 g and food products per 100 g per day increases the burden of alcoholism by 3%, 2% m 3%, respectively. But an increase in wine consumption by 10 g per day is accompanied by a 5% decrease in the burden of alcoholism (Table 3).

Discussion and Results

According to WHO, 80% of the NCD burden is cardiovascular, cancer, neuropsychiatric, respiratory diseases, and diabetes mellitus. Risk factors for NCD include tobacco use, physical inactivity, harmful use of alcohol and unhealthy diet [28].

DV	IV	R1	R2	b*	b	t(154)	p-value	F	DV1 DALY	DV2 DALY
Alcohol use disorders		0,642	0,412					F(4,152)=26,6		
	Beverages, Alcoholic2003-05			0,46	20,76	6,61	0,00		572	593
	TDC g / person / day			0,23	0,16	2,54	0,01		572	588
	Wine2003-05			- 0,19	-2,85	- 2,33	0,02		572	543
	Beer2003-05			0,21	1,08	2,31	0,02		572	583
Cardiovascular diseases		0,479	0,229					F(4,152)=11,3		
	Wine2003-05	Wine2003-05		-0,27	-13,26	- 2,66	0,01		3 294	3 161
	Beverages, Alcoholic2003-05	Beverages, Alcoholic2003-05		0,31	45,97	3,56	0,00		3 294	3 340
	% AB	% AB		-0,38	-109,29	- 3,85	0,00		3 294	3 185
	TDC g / person / day	TCL g / person / day		0,11	0,25	1,15	0,25			
Cirrhosis of the liver		0,391	0,1532					F(2,154)=13		
	Beverages, Alcoholic2003-05			0,45	10,65	5,18	0,00		304	315
	% AB			-0,31	-14,09	-3,55	0,00		304	290
Stomach cancer		0,443	0,196					F(4,152)=9,2		

	Beverages, Alcoholic2003-05			0,41	3,59	4,75	0,00		123	127
	% AB			0,16	2,72	0,84	0,40		123	126
	TDC g / person / day			0,35	0,05	2,74	0,01		123	172
	AB amount			-0,62	- 0,48	- 2,61	0,01		123	119
Liver cancer		0,516	0,267					F(5,151)=10,9		
	TDC g / person / day			-0,67	-0,20	- 5,47	0,00		148	99
	Beverages, Alcoholic2003-05			0,17	3,20	2,05	0,04		148	151
	Wine2003-05			0,11	0,68	1,01	0,31			
	% AB			-0,29	-10,35	- 1,55	0,12			
	AB amount			0,25	0,42	1,01	0,31			
Diabetes mellitus		0,428	0,1832					F(4,152)=8,5		
	TDC g / person / day			-0,13	-0,04	- 1,06	0,29			
	Wine2003-05			-0,09	-0,56	-0,82	0,41			
	AB amount			-0,41	-0,67	-1,56	0,12			
	% AB			0,23	8,17	1,22	0,22			
Legend										
DV	Dependent variable									
IV	Independent variable									
R1	Correlation coefficient									
R2	Determination coefficient									
b*,b,F	Regression coefficients									
DALY	Disability-adjusted life years									

Table 3: *Examine the effect of alcoholic beverages (independent variables) on the burden of alcoholism, cardiovascular disease, cirrhosis and liver and stomach cancer (dependent variables) using predictive multiple linear regression analysis.*

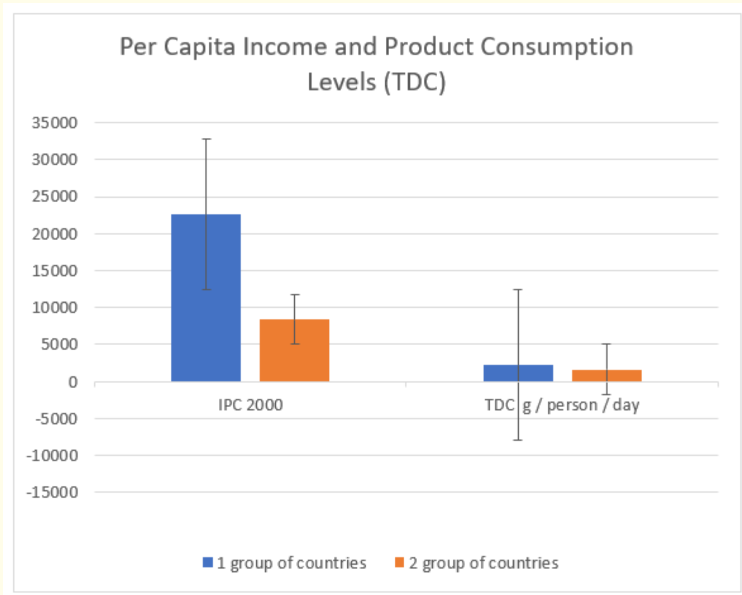

Figure 1: *Per capita income and the general level of food consumption in the 1st and 2nd group of countries.*

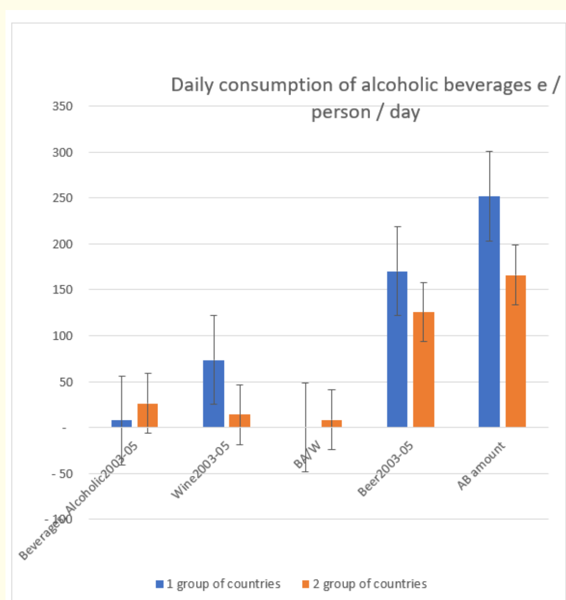

Figure 2: *Daily levels of alcohol consumption in the 1st and 2nd group of countries.*

As a result of our research, differences in the levels of consumption of alcoholic beverages (wine, beer and spirits) between countries of groups 1 and 2 have been established. Moreover, wine was consumed 5 times higher in group 1, strong alcohol was 3 times higher in group 2. Beer consumption was not statistically different between the 1st and 2nd group of countries. In the countries of group 1, there were 1.5 - 2 times more than group 2 of men with overweight ($p \leq 0.04$) *, obesity ($p \leq 0.001$) and hyperlipidemia ($p \leq 0.001$). Thus, virtually all risk factors for NCDs in Group 1 were clearly superior to Group 2, with the exception of a higher level of strong alcohol consumption in Group 2. However, group 1 of countries had a statistically significantly lower burden of infectious and NCD, including cancer of the stomach, liver, cirrhosis of the liver and cardiovascular diseases.

We noticed that the ratio of the ratio of the level of strong alcohol consumption to the consumption of wine, as well as to the amount of alcoholic beverages, and to the total level of food consumption was statistically significantly higher in group 2 of countries. Gronback M., at al shows a direct relationship between liver damage and daily alcohol intake.

The authors note that the type of drink does not matter. the amount of alcohol is important [29]. In our studies, an increase in hard alcohol consumption by 1 g per day was accompanied by a statistically significant increase in the burden of alcoholism and cardiovascular diseases, liver cirrhosis, stomach cancer, and liver cancer (Table 3).

An increase in wine consumption by 10 g per laziness was accompanied by a statistically significant decrease in the burden of alcoholism and cardiovascular diseases. But the reduction in the burden of diabetes and the increase in the burden of liver cancer were not statistically significant (Table 3).

We have previously shown that in countries with the highest burden of cardiovascular disease, the level of hard alcohol consumption is 1.5 times higher than in countries with the lowest burden of cardiovascular disease. This is consistent with our results in this work [13,30,31]. Thus, multiple linear regression analysis in 158 countries established the same type of influence of strong alcohol on the studied NCDs, except for diabetes mellitus. It should be noted that the overall level of consumption of alcoholic beverages in the 2nd group of countries was 37% lower than in the 1st group of countries.

But the burden of infectious, non-infectious, including cardiovascular diseases, cirrhosis of the liver, stomach and liver cancer was statistically higher in group 2 of countries. The burden of diabetes and alcoholism was also 30% higher in group 2 countries, but not statistically significant. Apparently, quality of life is of equal importance to the burden of noncommunicable diseases. In group 2 of countries, all indicators of quality of life: per capita income, well-being, health care, clean water and air, life expectancy, human development index and happiness index were statistically significantly lower.

The burden of alcoholism, cardiovascular diseases, liver cirrhosis, and stomach cancer increased with an increase of 1 g in the daily consumption of strong alcohol ($p \leq 0.001$) (Table 3). However, a 10 g increase in daily wine consumption was accompanied by a decrease in the burden of alcoholism and cardiovascular diseases only ($p \leq 0.022$) and ($p \leq 0.009$), respectively.The burden of alcoholism and stomach cancer increased with a 100 g increase in daily consumption of TDC products ($p \leq 0.012$) and ($p \leq 0.006$), respectively. The burden of diabetes did not provide a statistically significant response to the independent variables (Table 3).

In previous studies, we have shown that the burden of diabetes mellitus significantly depends only on the geographic coordinates of countries [32, 33]. However, in the present study, the geographic coordinates between groups 1 and 2 did not differ. And this confirms that diabetes is more associated with latitude and independent of income.

The positive aspect of our research is the ability to operate with large numbers. A flaw in our studies is the use of country averages of food and alcohol consumption levels, excluding age and gender.

Conclusion

The research carried out and the results obtained turned out to be much more interesting than expected. We selected 2 groups of 21 countries in each group, with the highest wine consumption (country group 1) and the highest spirits consumption (country group 2).

We proposed to assess in a "pure form" the impact of wine and spirits consumption on the burden of NCDs. But it turned out that the selected groups differ in all characteristics of NCDs: quality of life, predictors of metabolic syndrome, the burden of cardiovascular and oncological diseases, cirrhosis of the liver, alcoholism and diabetes mellitus.

However, the differences in alcoholism and diabetes were not statistically significant. 1 group of countries differed from group 2 countries by a three-fold difference in the consumption of strong alcohol and a five-fold difference in wine consumption. But the differences between countries did not stop there. The total consumption of alcoholic beverages was 40% higher in the 1st group of countries.

The share of alcoholic beverages in group 1 of countries in total food consumption was 2% higher in group 1 of countries. The overall level of food consumption in the 1st group of countries was 40% higher than the 2nd group of countries. The quality of life was 2 times higher in 1 group of countries. Obesity and hyperlipidemia were higher in group 1 countries. But the burden of infectious non-infectious, including cardiovascular, liver cirrhosis, liver and stomach cancer, alcoholism and diabetes were higher in group 2 countries.

Therefore, we have no evidence to suggest that higher metabolic syndrome disorders, higher consumption of alcoholic beverages, higher consumption of foods, including red meat and animal fat, are associated with a higher burden of NCDs. However, we have identified. What is the ratio of strong alcohol consumption to wine, and overall food consumption has a strong impact on the burden of NCDs. The results obtained indicate the need to continue research.

Conflict of Interest

The authors have no conflict of interest.

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