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MANAGEMENT OF PATIENTS WITH ALCOHOL DEPENDENCE IN GENERAL MEDICAL PRACTICE

ABSTRACT
of the dissertation for the award of the educational and scientific degree "DOCTOR"

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Contents

I. Abbreviations used

DMS-IV - Diagnostic and Statistical Manual of Mental Disorders
CAGE – Survey for alcohol use screening
AUDIT – Alcohol Use Disorders Identification Test
MAST - Michigan Alcohol Use Screening Test
MCV – Mean erythrocyte volume
AA – Absolute alcohol
ICD-10 – International Classification of Diseases 10th Edition
CNS – Central Nervous System
AST – Aspartate aminotransferase
ALT – Alanine aminotransferase
GGT - Gamma-glutamyltransferase
GIT - Gastrointestinal tract
CVS – Cardiovascular System
IHD – Ischemic Heart Disease
WHO – World Health Organization
RTA – Road traffic accident
NSI – National Statistical Institute
MV – Motor vehicle
GP – General Practitioner
NCPHA – National Center for Public Health and Analysis

II. Introduction

Alcohol and nicotine use are the most widespread substances that are widely used, voluntarily consumed, and readily available for purchase compared to other narcotic substances. In all countries and among all peoples, both before and now, alcohol is accepted as a source of pleasure, a means of facilitating social contacts and achieving mental comfort. With systematic use, it can cause pathological dependence and a strong urge to consume alcohol. The key step in the transition from alcohol abuse to alcoholism is the development of addiction, which is characterized by a constant increase in the amount of alcohol consumed, due to the body's increased tolerance.

Hazardous alcohol consumption refers to a level of consumption or pattern of alcohol use that would lead to harm if the drinking habits were maintained. According to the amount consumed per week, this is 280-350 ml AA for men and 140-210 ml AA for women. Alcohol abuse is defined as a weekly amount consumed above 350 ml AA for men and 210 ml AA for women.

Alcohol dependence is a disorder related to alcohol use leading to clinically significant impairment, manifested by three of the following seven symptoms occurring within the past 12 months: tolerance, withdrawal, use of increasingly larger doses, inability to stop use, time-consuming activities related to use, social and occupational dysfunction, and continued use despite knowledge of physical or psychological problems.

Chronic alcoholism can be defined as prolonged, intermittent or constant use of alcoholic beverages, associated with an irresistible attraction to alcohol and intolerance to it, as well as with frequent occurrence of withdrawal symptoms, and leads to physical, mental and social degradation of the personality.

There are no organs and systems in the human body on which alcohol does not have a harmful effect. In alcoholism, the changes are serious, severe and occur quickly. But even with moderate and constant use of alcohol, small functional disorders gradually add up. Changes in tissues and

organs gradually increase and turn into somatic disorders. Accompanying diseases are aggravated.

In recent decades, there has been insufficient clinical experience with alcohol abuse. Knowledge of the clinical course has expanded, but although the diagnosis and management of alcohol abuse seem familiar, in practice they remain some of the most controversial clinical issues in primary care.
The general practitioner is a key unit in implementing screening programs for risk factors and socially significant diseases. This also determines his primary role in the early detection and diagnosis of alcohol dependence.

The subject of the dissertation is the examination of the alcohol problem in its comprehensiveness and the development of an algorithm for the detection, diagnosis and monitoring of patients with risky alcohol use and abuse. To achieve this goal, the present clinical study analyzes the results of combining a screening questionnaire, biological tests, and imaging studies in general medical practice.

When performing a static analysis of the collected data, the need for a screening program to detect alcohol abusers and addicts and their subsequent dispensary monitoring was confirmed.

III. Goal, tasks and working hypotheses

1. Purpose

Establishing the frequency of risky alcohol consumption among the studied population, the physical and mental damage from alcohol dependence and the development of a model for monitoring and medical examination of identified at-risk and dependent individuals within the framework of general medical practice.

2. Tasks

To achieve the goal of this dissertation, we set ourselves the following main tasks:

1. To determine the frequency of consumption and the amount of alcohol consumed in the study population;

2. To find out if there is a relationship between age, gender and alcohol use;
3. To establish the extent of psychosomatic complications and social harm from alcohol abuse;
4. Group the patients according to the score of the screening survey;
5. To trace the relationship between the data established by the survey and the biochemical and ultrasound parameters studied;
6. To create model for monitoring and dispensary care of newly diagnosed patients with alcohol dependence.

3. Thesis

The risky patterns of alcohol consumption among the Bulgarian population and the identification of alcohol as a major risk factor for the development of socially significant diseases lead to the need to create a combined methodology for the management of patients with alcohol dependence in general medical practice.

4. Working hypothesis

After analyzing the data obtained, the main thesis of the dissertation will be verified, concerning the need to introduce a combined screening method for detecting, classifying and monitoring patients with regard to the alcohol factor.

The hypothesis we formulated suggests that there will be high efficiency in the application of a combined screening method for detecting risky alcohol consumption, dependence and the chronic damage caused by them in pre-hospital care .

III. Materials, Design and Methods of the Study

1. Materials and design of the study

Clinical material

The subject of the clinical study are outpatients. The observation included 610 individuals over 18 years of age, divided into 7 age groups – 18-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, 65-74 years and over 75 years. The recruitment of patients is carried out during a visit to the primary care outpatient clinic in connection with their annual preventive examination.

After signing an informed consent for the provision of personal data to all participants in the study, the parameters of the scientific study were explained. The inclusion and exclusion criteria were assessed and the approved protocol was implemented: survey, venipuncture and ultrasound diagnostics .

The study was initiated after receiving approval from the Research Ethics Committee at the Medical University "Prof. Dr. Paraskev Stoyanov" in Varna with Decision No. 135 from the Meeting held on 28.09.2023.

The studies were performed in accordance with the requirements of good clinical practice and compliance with the Declaration of Helsinki on the rights of the subjects.

Criteria for inclusion in the study

Inclusion criteria are: Persons who have reached the age of majority at the time of the study, are part of the patient list of the general practitioner Dr. Daniela Krasimirova, have visited the practice during the study period and do not belong to the risk and endangered populations. A mandatory condition is that they have signed an informed consent after being familiar with the conditions of the scientific study.

Study exclusion criteria: The exclusion criteria are age under 18, persons falling into an at-risk group /pregnant women, prisoners and socially disadvantaged people/, acute and chronic viral hepatitis, hereditary liver diseases, primary and secondary malignant liver diseases, as well as persons who have not signed informed consent.

Study design

Subject of the study - adults who do not fall into an at-risk population and who, upon visiting the primary care outpatient clinic, were informed by the principal investigator about the parameters of the study and signed an informed consent to participate in it.
Signs of surveillance:
- Socio - demographic characteristics – gender, age;
- Characteristics of alcohol consumption of the respondents;
- Values of liver parameters ASAT, ALAT and GGT of the individuals included in the clinical study;
- Echographic diagnosis of the liver in the screened population.
Logical units of observation – Persons over 18 years of age;
Time scope of the study – The clinical study covers the period from October 2023 to August 2024.
Territorial scope of the study – Clinical observations and examinations were conducted at the primary care outpatient clinic "Daniela Medica – APMP – IP", which is located in the city of Razgrad, Republic of Bulgaria.

Methods

In order to fulfill the tasks set in this dissertation, data collection methods were used, including information on demographic indicators - gender and age, a survey with closed questions, sampling for blood tests and an instrumental method for echographic diagnostics of the liver. All data were processed using a statistical method.

Documentary method

An analytical-systematic processing and critical analysis of primary and secondary documentary sources of scientific information on the topic for the last 50 years has been carried out. The problem of alcohol consumption has been examined from the period of its emergence through the accumulated experience on a global and national scale to the current state of the topic and trends for future development.

Sociological method

For the purposes of this dissertation, a specialized anonymous questionnaire was developed, consisting of 14 closed questions (Appendix 1). In its development, the main principles were followed: principles of alcohol dependence screening questionnaires. Some of the questions correspond to those from the AUDIT questionnaire, and additional questions adapted for the Bulgarian population are included. The purpose of the amendment to the basic framework of AUDIT is to collect more information about alcohol use in the screening questionnaire. The answers to the questions in the test refer to the last year.

An explanatory section has been added at the beginning of the questionnaire for a standard drink (10 grams of AA), which is assumed to meet the following measures:

50 ml concentrate (with high alcohol content - 40% and above) - vodka, brandy, whiskey, cognac, gin, ouzo, mastic and others.

140 ml of wine (with an average alcohol content of about 12%)

330 ml beer (with a low alcohol content of about 5%)

All three listed options correspond to approximately 13 grams of ethanol.

Before starting to fill out the survey, the person must indicate their biological gender and the age group they fall into.

Each of the questions from 1 to 9 has five possible answers, so for each answer you get from 0 to 4 points. Questions from 10 to 14 have 3 possible answers, and the points are 0, 2 or 4 points. The total score can be from 0 to 56 points.

When calculating the final score from the questionnaire, the following groups are identified:

Score below 8 points – abstainers or individuals with low-risk alcohol consumption

Score from 8 to 15 points – individuals with risky alcohol consumption

Score of 16 to 19 points – individuals with harmful alcohol use

Score of 20 to 40 points – individuals with probable alcohol dependence

Score above 41 points – individuals with alcohol dependence and physical, mental and social complications.

Reporting test results is useful for conducting screening with subsequent referral of identified individuals for further diagnosis of the

condition, as well as the allocation of individuals into groups suitable for subsequent monitoring and dispensary care.

Laboratory evaluation method

After completing the anonymous questionnaire, the subjects were venipunctured. 3 ml of venous blood was collected using a closed vacuum system for blood sampling. BD Vacutainer SST II Advance sterile tubes with EDTA were used to extract serum from blood samples. After separating the blood plasma, the serum was tested for liver parameters ASAT, ALAT, GGT.

The peripheral venous blood samples are tested in a pre-hospital laboratory. After storage for a period of 2 to 4 hours in a refrigerator at a temperature of +4 to +6 degrees, the anonymized blood samples are sent to the "Ramus" Ltd. branch in Razgrad. The laboratory is in the immediate vicinity of the Primary Care Clinic. A contract has been concluded with the laboratory with entry No. 71/02.11.2017. The specified laboratory tests collected for the purpose of this study are financed by the health insurance fund. The specified laboratory tests ASAT, ALAT and GGT are part of the minimum required package of the NHIF for the once-a-year preventive examination.

On a table Table 1 presents the reference values of the studied indicators.

Table 1. Laboratory referent values of the researched indicators

Biochemical indicators	Lower limit	Upper limit
ASAT	0	44 U/l
ALAT	0	44 U/l
GGT	5 5	50 U/l for men 38 U/l for women

The clinical card (Appendix 2) is an integral part of the last page of the questionnaire for each participant in this study. It contains the values of the studied biochemical indicators, as well as the result of the conducted ultrasound examination. The clinical card number is unique for each

participant. It is formed from the sequence of inclusion of the participant in the study and his initials (the first letter of the name and surname). For example, the first participant with the initials I.I. will be coded with the number No. 1I.I., the number is entered on the clinical card and on the test tubes with samples of the respective participant.

Instrumental (figurative) method

After completing the questionnaire and venipuncture, the patient also undergoes an ultrasound examination of the liver. The ultrasound diagnosis will be performed in the primary care outpatient clinic with a Sonofine EUS B ultrasound device. Dr. Daniela Krasimirova has completed postgraduate training at the Medical University of Varna with the acquired right to perform "Ultrasound of abdominal organs" - Certificate No. 106-1570/30.08.2016.

For the purposes of scientific research, the ultrasound diagnosis of the liver in relation to the clinical finding is classified as follows:

- Normal ultrasound image of the liver
- Hepatic steatosis
- Alcoholic hepatitis
- Liver cirrhosis

The diagnosis of hepatic steatosis is made in the presence of the following criteria from the performed ultrasound diagnostics: diffusely expressed echogenicity of the liver with obliteration of the image of the walls of the portal branches in the parenchyma. For hepatic alcoholic hepatitis, certain clinical signs of hepatomegaly, lobulated liver surface and diffuse hyperechogenicity must be present . In liver cirrhosis, ultrasound detects diffuse fibrosis with the formation of micro- or macronodules, hepatomegaly with or without disproportion between the segments, signs of portal hypertension and stagnation in the bloodstream.

Statistical analysis

Statistical data processing was performed using the IBM SPSS Statistics ver.19 software product.

In the development of the dissertation, a statistical analysis of the data from the answers to the survey questions, the values of the liver indicators and the data from the ultrasound examination and the relationships between them was performed.

The following statistical methods are used to analyze and interpret the obtained data:

- Descriptive methods – measuring frequencies, averages, standard errors, average deviations, minimum and maximum values;
- Cross-tabulations for comparing two or more parameters, determining Lambda and Eta – coefficients when comparing nominal dependent variables and nominal and ordinal variables;
- Testing statistical hypotheses about the difference between two means in independent and dependent samples;
- Correlation analysis to determine the dependence between the studied parameters, attempting to build models of the relationship;
- Reliability and validity testing – Cronbach's Alpha and factor analysis;
- Graphical analysis – used to visualize the data obtained during the examination of patients.

V. Own results

1. Descriptive analysis of the results obtained

1.1. Analysis and presentation of survey data

The clinical study included 610 adults , of which 47.9 % (n=292) men and 52.1% (n=318) women , who are divided into 7 age groups: 18-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, 65-74 years and over 75 years of age.

The age distribution presented in Table 2 is by groups, with 72.4% of respondents aged 25 to 65, that is, of active working age.

Table 2. Distribution of persons by age groups

Age groups	Frequency	Percent	Validated percent	Cumulative percent
18-24	22	3,6	3,6	3,6
25-34	59	9,7	9,7	13,3
35-44	113	18,5	18,5	31,8
45-54	135	22,1	22,1	53,9
55-64	135	22,1	22,1	76,1
65-74	99	16,2	16,2	92,3
над 75	47	7,7	7,7	100,0
Total	610	100,0	100,0	

The first question in the survey is "How often do you drink alcohol?", with which we wish to establish the frequency of alcohol use in the studied population, distributed by age group and gender.

The highest percentage of responses – 46.4% were given by those who consume alcohol 4 or more times a week. The lowest percentage was reported in the group of abstainers – 7.5% of all respondents.

An analysis was also performed with a graphical presentation through Figure 1. and Figure 2. of the frequency of alcohol consumption by gender and age. Of all 292 surveyed men, 230 consume alcohol 4 or more times a week. Among women, 53 individuals fall into this group, and the largest number of all women - 152 consume alcohol 2-3 times a week. Among men, 4 individuals are abstainers, and among women, 42 individuals.

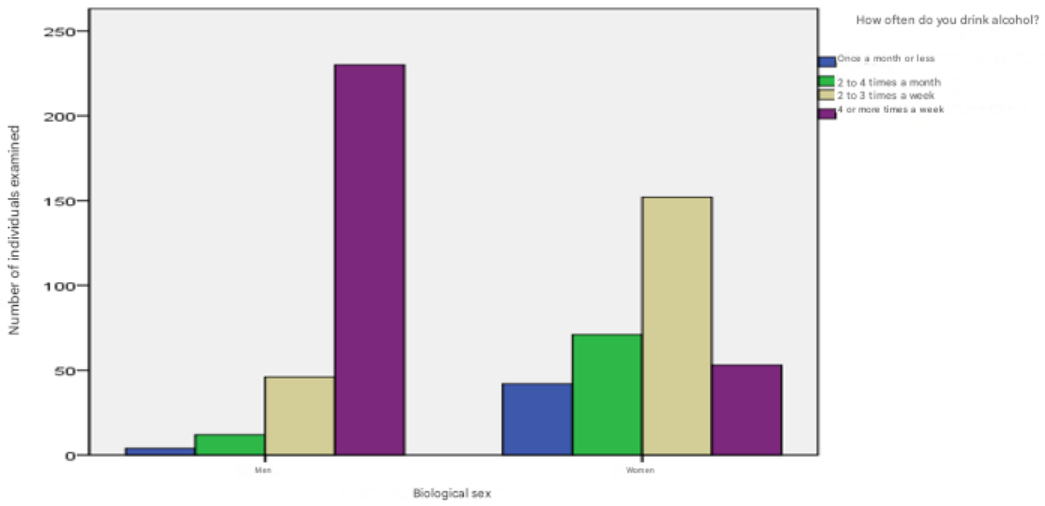


Figure 1. Relationship between frequency of alcohol consumption and gender

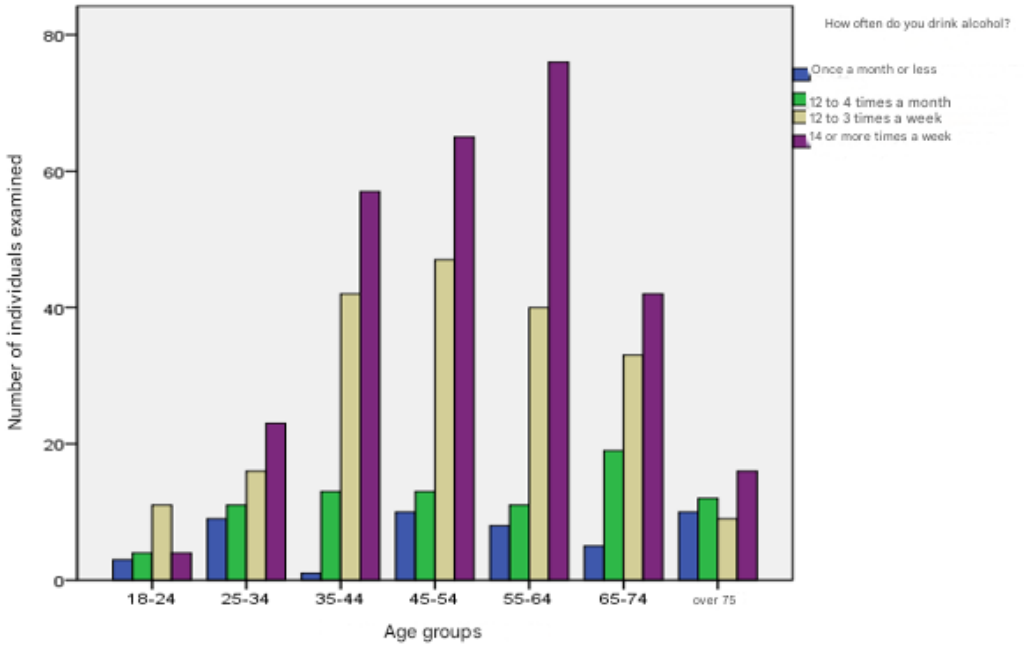


Figure 2. Relationship between frequency of alcohol consumption and age group

The distribution of alcohol consumption frequency by age group is similar. In all age groups except the youngest 18-24 years, the highest frequency of alcohol consumption is for those who drink 4 or more times a week, while in the 55-64 year old group it is 76 people out of all 135 people falling into that group. In the age group from 25 to 75 years, consumption is in second place 2 to 3 times a week, followed by consumption 2 to 4 times a month, and the smallest share is those who drink alcohol less than once a month.

Analyzing the data on question №2 of the screening survey "How many drinks containing alcohol do you drink in a day?" we obtained the following data presented in Table 3 .

Table 3. Distribution of the answers on question №2

Number of drinks	Frequency	Percent	Cumulative percent
1 or 2	463	75,9	75,7
3 or 4	117	19,2	94,9
5 or 6	30	4,9	99,8
Total	610	100,0	

The answers to the question indicate the amount of alcohol consumed by the patients in one day. The highest number of respondents 75.9 % consume from 1 to 2 drinks containing alcohol in one day. 19.2% consume from 2 to 4, and 4.9% more than 5 drinks. Answer from 7 to 9 drinks and over 10 drinks was not noted by the participants in the questionnaire.

In the female patient group, the consumption of 1 or 2 drinks prevails. In the male group, the same group prevails, but the risky consumption of 3 or 4 drinks is also indicated by over 100 individuals. In the male group, there are also 28 individuals who noted the amount of 5 or 6 drinks in one day, correlating with high tolerance and potentially addictive behavior.

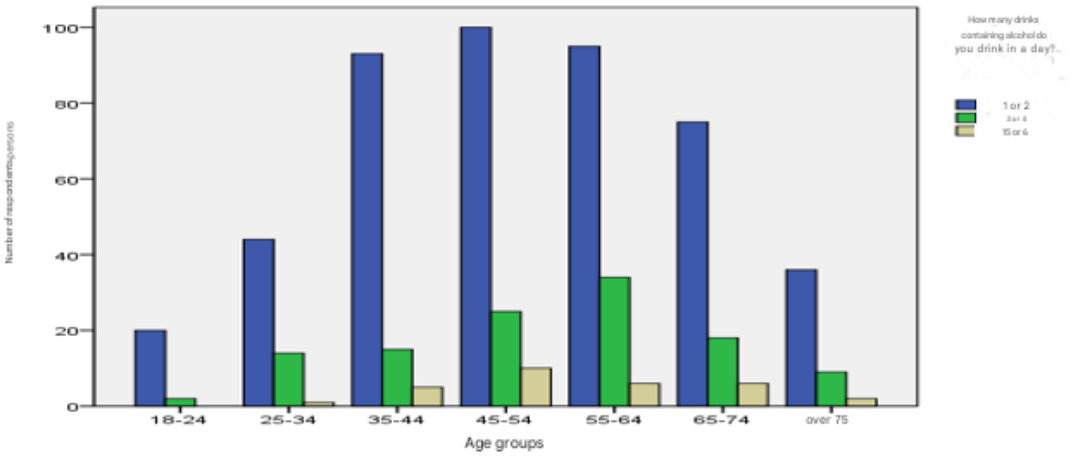


Figure 3. Distribution of the amount of alcohol consumed by age group

The highest number of alcoholic drinks consumed, 3 or 4 and 5 or 6, are in the age groups 45-54 and 55-64. These age groups also have the highest frequency of alcohol consumption, more than 4 times a week.

Question 3 of the questionnaire was designed to determine the frequency of consuming an amount of alcohol equivalent to more than 5 drinks on one occasion. The results presented in Figure 4 directly indicate the group of alcohol abusers.

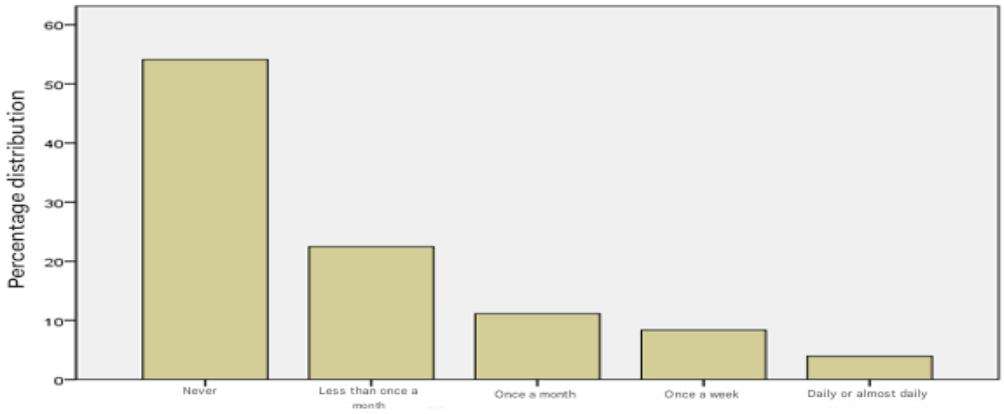


Figure 4. Distribution of answers to question №3

The percentage distribution of the answers shows that 54.1% of the respondents do not consume more than 5 drinks on one occasion, and 22.5 % less than once a month. Individuals with risky alcohol consumption, characterized by consuming more than 5 drinks at least once a month, are 11.1%. Individuals who abuse alcohol once a week or daily are 8.4% and 3.9%, respectively.

Tables 4 and 5 present the distribution by gender and age groups in relation to the answers to question No. 3.

Table 4. Distribution of the answers on question №3 by gender

Biological gender	How often is it happened when you drink 5 or more drinks at once / one after another/?					Total
	Never	Less than once a month	Once a month	Once a week	Daily or almost daily	
Men	57	102	64	46	23	292

Women	273	35	4	5	1	318
Total	330	137	68	51	24	610

Table 5. Distribution of the answers on question №3 by age groups

Age groups	How often is it happened when you drink 5 or more drinks at once / one after another/?					total
	Never	Less than once a month	Once a month	Once a week	Daily or almost daily	
18-24	14	5	1	2	0	22
25-34	31	17	9	1	1	59
35-44	56	29	13	11	4	113
45-54	68	34	10	15	8	135
55-64	70	27	18	16	4	135
65-74	58	18	13	5	5	99
over 75	33	7	4	1	2	47
Total	330	137	68	51	24	610

The statistical review of the data from the last two tables reveals that the group of alcohol abusers mainly includes men from the age groups 45-54 and 55-64.

Question No. 4 "How often have you felt helpless in the last year after drinking alcohol?" from the questionnaire determines whether respondents are in a state of mental and physical dependence on alcohol. The data are visualized in Figure 5.

Figure 5. Distribution of respondents according to answers to Question No. 4

Those who answered that they reach a state of helplessness after drinking alcohol once a week are 0.66%. Those who answered once a month are 2.46%, and those who gave the statement less than once a month are 7.87%. The remaining individuals answered Never.

The answers to the next three questions from the questionnaire, namely No. 5, 6 and 7, show the frequency of patients with clinical signs of physical and mental alcohol dependence.

Question №5 “How often in the last year have you had any of the following symptoms – tremor, headache, nervous tension, dizziness or lack of concentration after drinking alcohol?” includes the signs that the doctor looks for to diagnose physical dependence. The proportions of the marked answers are presented in Figure 6.

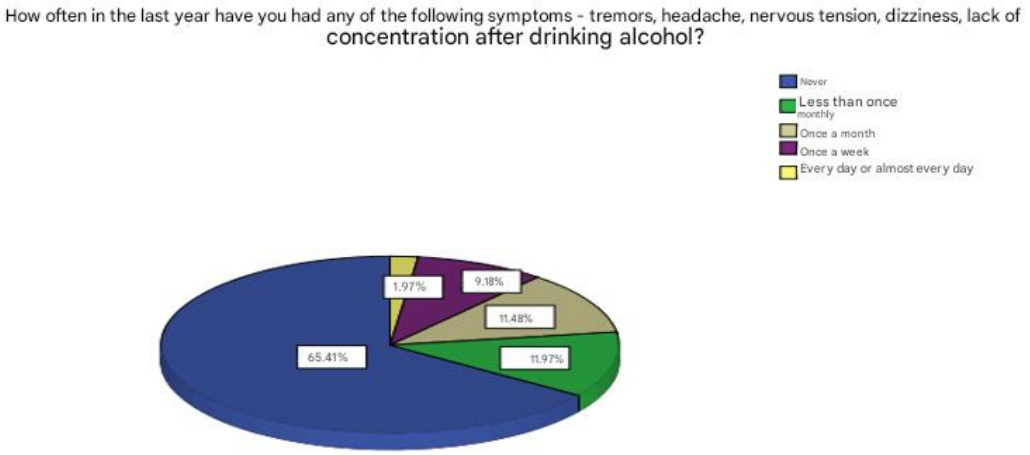


Figure 6. Distribution of answers to question No. 5

The data show that a total of 22.63% of respondents experience symptoms of physical alcohol dependence from once a month to daily. Almost 12% fall into the risk group for developing alcohol dependence due to the onset of the listed symptoms.

In the statistical processing of the data from question No. 6 "How often in the last year have you failed to do what is expected of you (personally or professionally) because of alcohol use?" the results obtained are similar to those from question No. 5. The content of the question points to the discovery of reduced work capacity and social engagement as a result of physical dependence on alcohol.

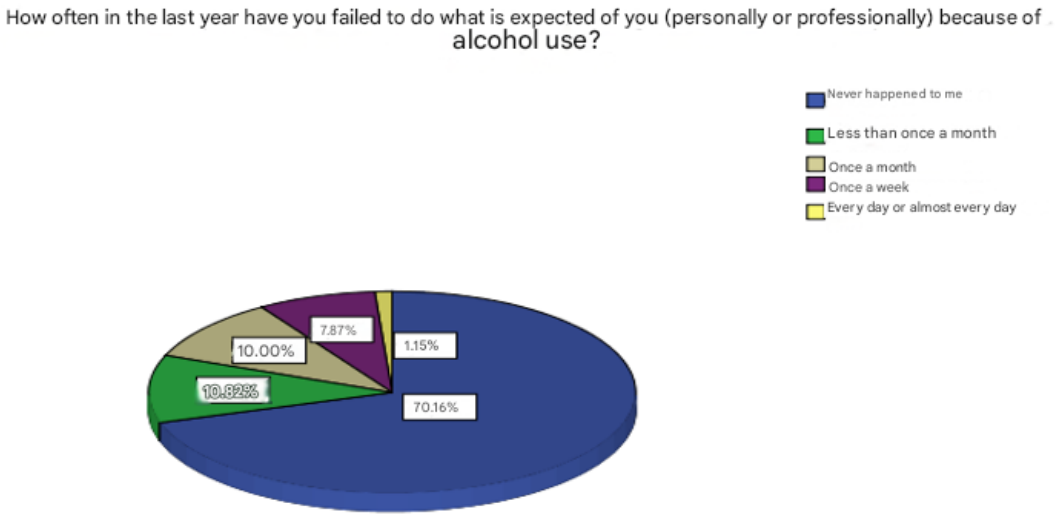


Figure 7. Results of the answers to question №6

19.02% of respondents were diagnosed with signs of abuse and dependence on alcoholic beverages. The risk group is 10.82%, and individuals without symptoms of physical dependence are 70.16%.

When using cross-tabulation between question No. 5 and question No. 6. The aim is to compare whether there is any overlap in the answers given to the two questions regarding symptoms of physical dependence.

Table 6. Cross -table comparison of answers to questions №5 and №6

How often during the last year have you had any of the following symptoms…?	How often haven't you had to do that what is expected from you because of the alcohol use?					
	Never	Less than once a month	Once a month	Once a week	Every day	Total
Never	399	0	0	0	0	399

	Less than once a month	23	48	2	0	0	73
	Once a month	5	18	46	1	0	70
	Once a week	0	0	13	42	1	56
	Every day or almost every day	1	0	0	5	6	12
Total		428	66	61	48	7	610

The applied statistical analysis established that the respondents with the manifestation of the symptom complex indicated in question No. 5 with answers once a week or more often are 47, while the same answers to question No. 6 are 43 people. This proves the high sensitivity and specificity of the questions from the group for detecting clinical signs of alcohol dependence.

Question No. 7 of the screening questionnaire contains information not only about the occurrence of physical dependence, but is also directly aimed at establishing the occurrence of morning abstinence. It is a definite sign of alcohol dependence. The answers of the subjects are presented in Figure 8.

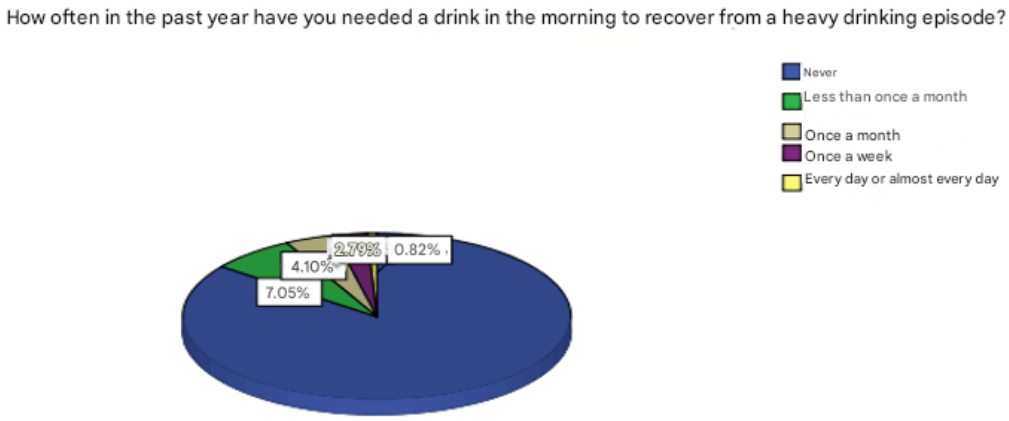


Figure 8. Distribution of answers to question No. 7

Our analysis shows that a total of 14.76% of respondents have morning withdrawal symptoms, with almost 4% of them needing to drink

alcohol in the morning once a week or more. These patients are classified as alcohol dependent.

Questions №8 and №9 included in the screening questionnaire of this clinical study aim to identify the trigger for alcohol consumption and the person's level of awareness of the consequences of this. The data obtained from question №8 are presented in Figure 9.

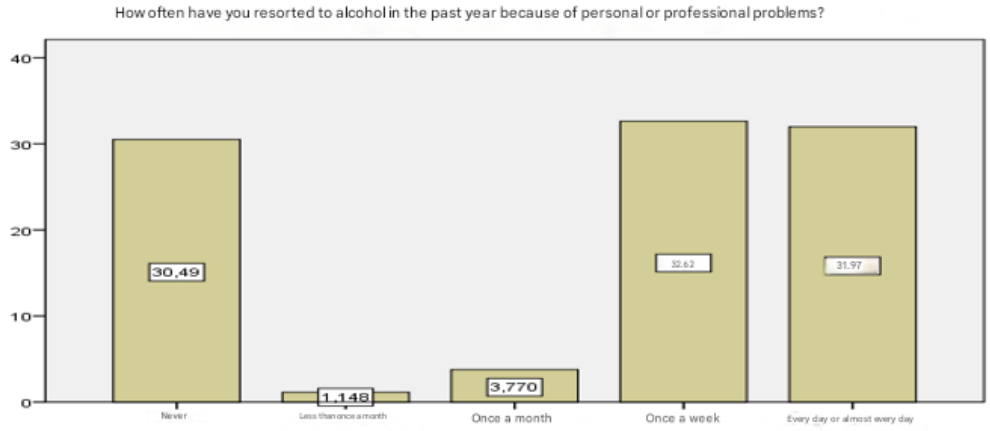


Figure 9. Distribution of answers to question No. 8

In this clinical study, we have assumed that the social environment may play a major role as a trigger for alcohol abuse and dependence. Nearly 2/3 of the surveyed individuals consume alcohol once a week or more due to personal and professional problems. These individuals can be categorized as at risk for developing alcohol dependence.

The content of question No. 9 aims to establish from the answers of the respondents whether they are aware of the consequences of their alcohol use and the impact it has on their entire social environment. The data from the statistical processing are presented in Figure 10.

Figure 10. Distribution of answers to question No. 9

The results obtained show a very high percentage of over 80 for the group of individuals who have never felt remorse or guilt after drinking alcohol. Less than 1% are individuals who are aware of the damage caused by their alcohol use.

The last group of questions from No. 10 to 14 are included for the purpose of screening regarding the impact that the developed addiction has on the health, family and social environment.

Question #10 " Have you ever been physically injured yourself or someone else as a result of your drinking? " is intended to determine the frequency of patients with aggression. or auto-aggression after using alcoholic beverages or already developed addiction to them.

Table 7. Distribution of answers to question No. 10

Have you or any other have ever been hurt as a result of your drinking?	Frequency	Percent	Validated percent	Cumulative percent
Never	572	93,8	93,8	93,8
Yes, but not during the last year	31	5,1	5,1	98,9
Yes, once or more during the last year	7	1,1	1,1	100,0
Total	610	100,0	100,0	

At 1.1% (n=7) of the respondents stated that they had exhibited abnormal behavior towards themselves or their surroundings in the last 12 months, and for 5.1% (n= 31) this had happened, but in previous periods.

Question No. 12 " Have you ever broken off relationships with a friend or relative because of your drinking? " is in the logical sequence of question No. 10 and aims to establish how alcohol use affects relationships in the person's personal (family) environment.

Table 8. Distribution of answers to question No. 12

Have you ever interrupted the relationships with a friend or relative because of your drinking?	Frequency	Percent	Validated percent	Cumulative percent
Never	548	89,8	89,8	89,8
Yes, but not during the last year	48	7,9	7,9	97,7
Yes, once or more during the last year	14	2,3	2,3	100,0
Total	610	100,0	100,0	

2.3% (n= 14) of the respondents stated that they had broken off relationships with their loved ones in the last 12 months, and 7.9% (n= 48) said this had happened in previous years.

When performing a statistical cross-tabulation when comparing the answers to questions No. 10 and No. 12, the following data is obtained:

Table 11. Cross-table comparison between answers to questions №10 and №12

Have you or another person had ever been hurt as a result of your drinking?	Have you ever interrupted the relationships with friends or relatives because of your drinking?			
	Never	Yes, but not during the last year	Yes, once or more during the last year	Total
Never	542	25	5	572
Yes, but not during the last year	4	23	4	31
Yes, once or more during the last year	2	0	5	7
Total	548	48	14	610

The comparison presented in tabular form proves that the number of respondents with data on an aggressive episode under the influence of alcohol consumption is statistically comparable to those who broke off relationships with their loved ones. In this analysis, it can also be noted that the number of people breaking off relationships with people from their personal environment is higher in absolute number (n48>n31; n14>n7) .

The answers to question No. 11 " Has your GP or other health professional ever been concerned about your drinking and offered to refer you to a psychologist or psychiatrist? " presented in Table 9 reveal the number and proportion of individuals covered by their GP and referred for specialized diagnosis and treatment regarding the manifestations of alcohol dependence.

Table 9. Distribution of answers to question No. 11

Has your general practitioner or another health specialist been concerned because of your drinking or have they offered you to guide you to psychologist or psychiatrist?“	Frequency	Percent	Validated percent	Cumulative percent
Never	422	69,2	69,2	69,2
Yes, but not during the last year	2	0,3	0,3	69,5
Yes, once or more during the last year	186	30,5	30,5	100,0
Total	610	100,0	100,0	

When examining the data obtained, a high frequency of over 30% (n=186) patients covered by a medical specialist for the last calendar year with manifestations of alcohol dependence and the need for specialized diagnostic and treatment activities was established.

The analyses of questions No. 13 “ Have you ever been hospitalized because of alcohol use? ” and No. 14 “ Have you ever been arrested because of alcohol use or drunk driving? ” divide the studied patients into groups according to signs related to antisocial behavior in the social environment and their need for high-level diagnostic and treatment activities in hospital settings because of the underlying alcohol dependence. The obtained statistical information is presented in Figures 11 and 12.

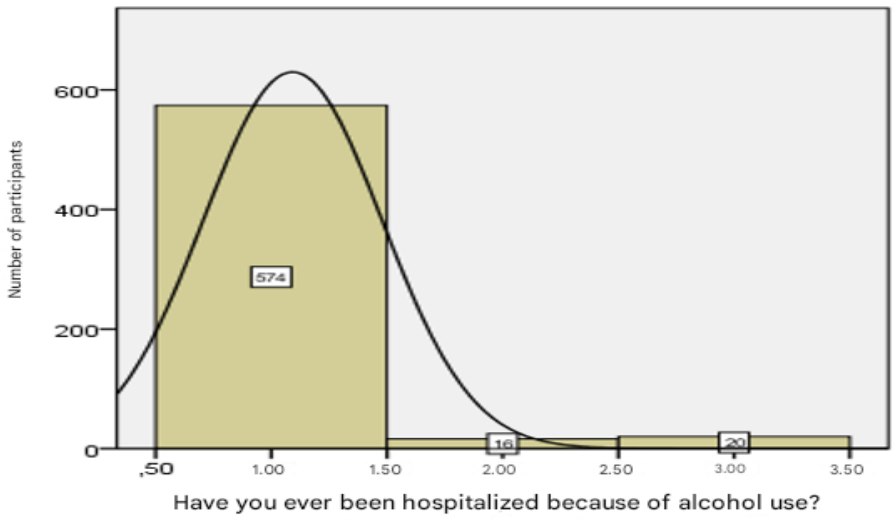


Figure 11. Distribution of answers to question No. 13

Of the patients surveyed, 5.9% (n =36) responded that they had been admitted to a medical facility in the previous year or earlier due to alcohol use .

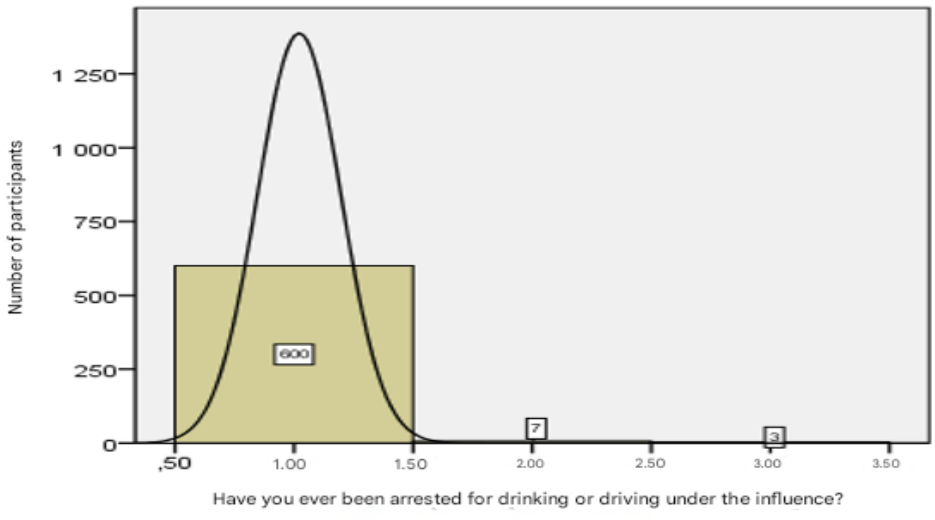


Figure 12. Distribution of answers to question №14

Of the patients surveyed, 1.6% (n = 10) responded that in the previous year or before that they had committed antisocial acts or traffic accidents due to alcohol use .

In this analysis, we will also present a summary table and graphic representation in which we have divided the patients into groups according to the number of points received after answering all the questions in the survey. The scoring system is described in the clinical study methodology.

Table 10. Distribution of respondents by groups according to the total number of points from the survey

Total number of points from the survey	Frequency	Percent	Validated percent	Cumulative percent
0-8p. Abstainers	336	55,1	55,1	55,1
9-15p. Persons with risky alcohol consumption	117	19,2	19,2	74,3
16-19p. Persons with harmful alcohol consumption	59	9,7	9,7	83,9
20-40p. Persons with probable alcohol dependence	86	14,1	14,1	98,0
over 40p. Persons with alcohol abuse and occurred complications	12	2,0	2,0	100,0
Total	610	100,0	100,0	

From the data we have identified 19.2% (n=117) individuals with risky alcohol consumption, 9.7% (n= 59) with harmful alcohol consumption, 14.1% (n= 86) with probable alcohol dependence and 2% (n= 12) with alcohol dependence with psychosomatic damage. The total frequency of individuals outside the group of abstainers is 44.9% (n= 274) .

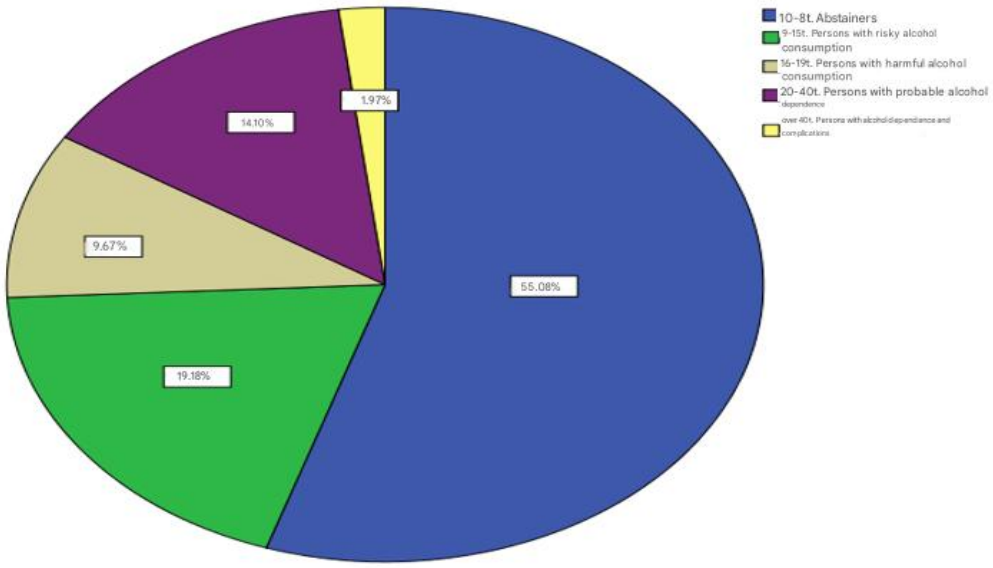


Figure 13. Distribution of respondents by groups according to the total number of points from the survey

Individuals who fall into the risk groups and groups of developed addiction are almost half of the studied population.

1.2. Analysis and presentation of data from biochemical studies

In this clinical study, peripheral venous blood was taken from the respondents for the examination of the biochemical markers ASAT, ALT and GGT. For the purposes of statistical analysis, the results of the indicated indicators were measured in two ways. The first is by entering and distributing the markers relative to the upper limit set by the laboratory, that is, for ASAT and ALT 44 U/I for men and women, and for GGT 38 U/I for women and 50 U/I for men. The second is by entering the absolute values obtained as a laboratory result for each patient.

For the transaminase enzyme AST, the results are presented in figure 14.

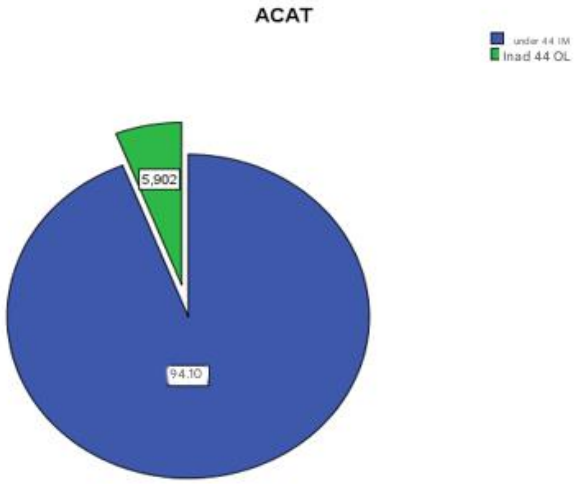


Figure 14. Distribution of respondents by ASAT values

From the analysis performed, we found that 5.9% (n=36) of the respondents had elevated ASAT values.

For the transaminase enzyme ALT, the results are presented in Figure 15.

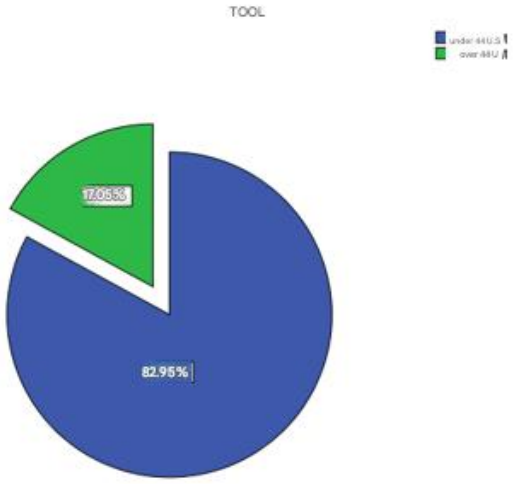


Figure 15. Distribution of patients according to ALT values

From the analysis performed, we found that 17.0% (n= 104) of the respondents had elevated ALAT values.

The distribution of individuals by groups according to the tested GGT indicator is also consistent with the different value of the upper limit in the two sexes according to the reference norms given to us by the laboratory.
In 10.8% (n=66) of the female sex and 22.3% (n=136) of the male sex, GGT values were above the upper reference limit of the norm.

The average value of the biochemical marker GGT is 47.80 U/I with a standard deviation of 58.19 U/I, with the minimum measured value being 10 U/I and the maximum being 594 U/I.

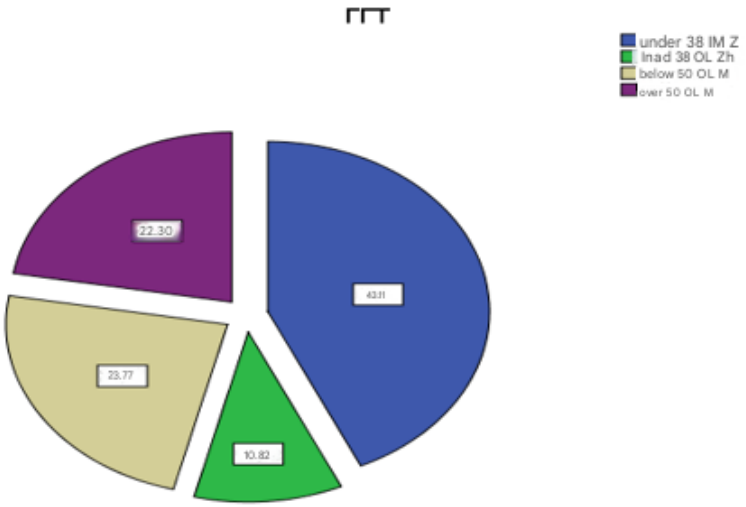


Figure 16. Distribution of GGT versus measured values

An analysis of the obtained values was also performed by biological sex and age groups.

Table 15. Presentation of the average values of laboratory indicators by gender

Biological gender		Laboratory value ASAT	Laboratory value ALAT	Laboratory value GGT
Man	Average value	29,27055	39,5377	64,8664
	Statistic deviation	18,525883	28,73236	73,82313
Woman	Average value	22,31447	24,3553	32,1352
	Statistic deviation	10,376592	25,86588	31,44025
Total	Average value	25,64426	31,6230	47,8033
	Statistic deviation	15,236063	28,29035	58,19310

An average value of GGT above the upper limit of the norm for men was found, namely 64.86 U/I. The remaining indicators by gender have an average value below the upper reference norm.

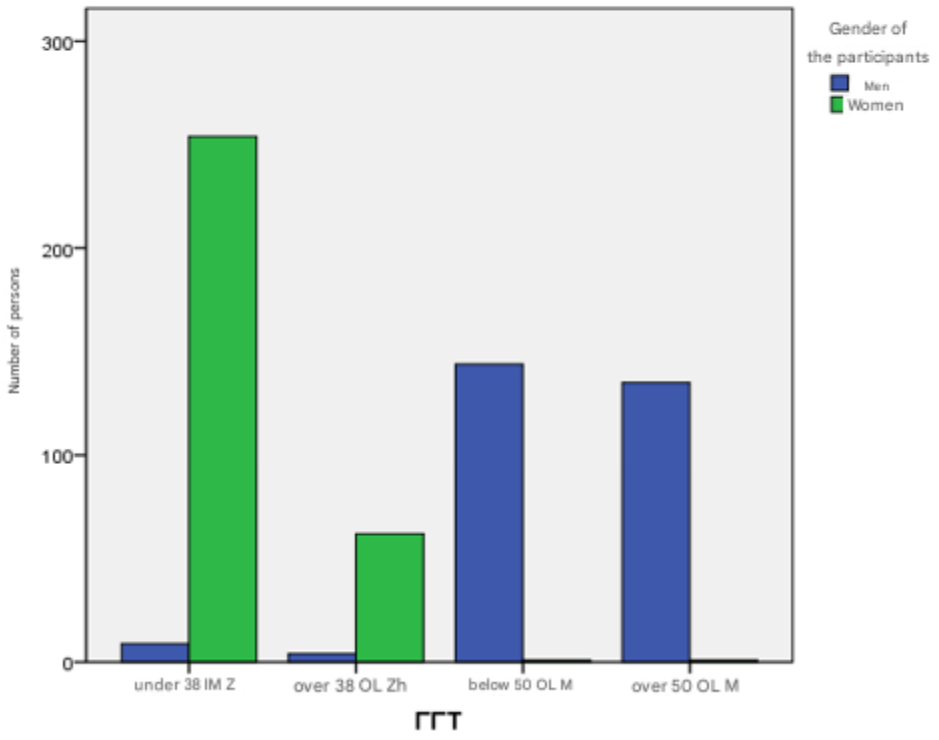


Figure 17. Distribution of GGT values by gender

The analysis of the obtained values revealed values for the GGT marker above the norm in the age groups 45-54 years, 55-64 years and 65-74

years. In the remaining groups, no tendency towards abnormality of the laboratory indicators was found.

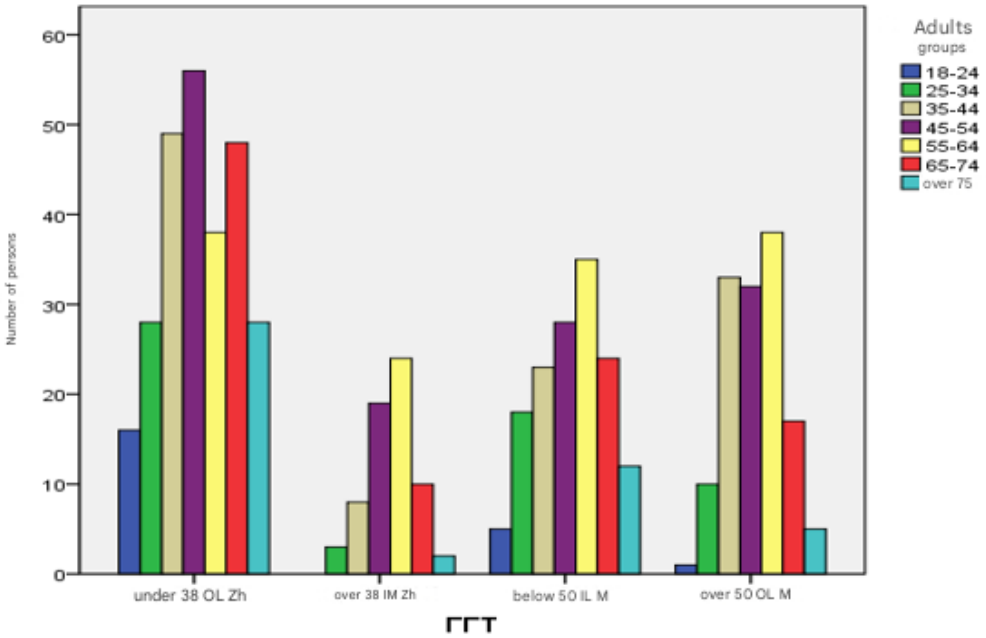


Figure 18. Distribution of GGT values by age groups

In connection with the proven elevated GGT values for males in three of the age groups, we conducted a more in-depth statistical analysis of this marker in relation to certain questions from the screening survey.

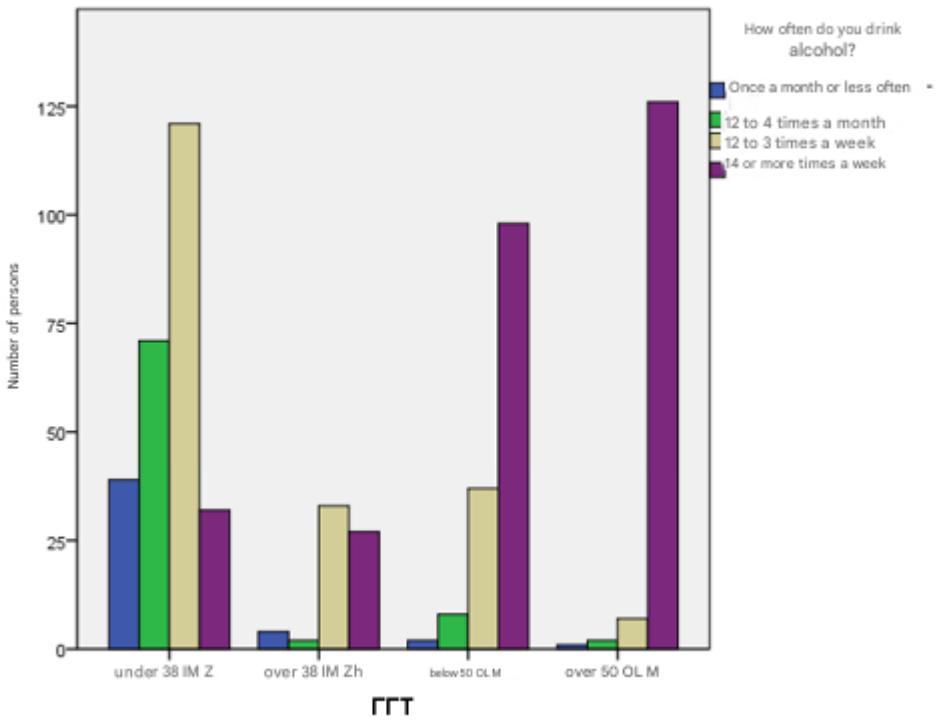


Figure 19. Distribution of individuals by GGT indicator in relation to question No. 1

Respondents who indicated that they consume alcohol more than 4 times a week in an amount exceeding 3 standard drinks had elevated values of the GGT indicator above the upper limits accepted for both sexes.

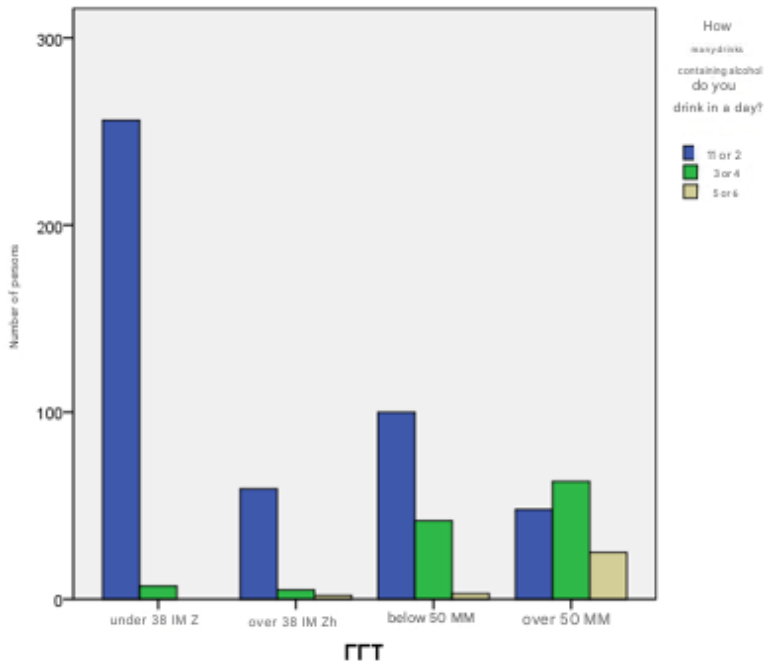


Figure 20. Distribution of individuals by GGT indicator in relation to question No. 2

A statistical comparison and analysis of GGT values was also performed in patients who answered positively to questions №11 and №13 of the questionnaire.

Table 10. Distribution of the average GGT value according to the answers to questions No. 11 and No. 13

Has your general practitioner or another health specialist ever been concerned because of your drinking or have they offered you to guide you to psychologist or psychiatrist?	Have you ever been in a hospital because of alcohol usage?	Average value of GGT	Statistic deviation for GGT
Never	Never	31,8860	24,40943
	Yes, but not during the last year	40,0000	.
	Total	31,9052	24,38362

Yes, but not during the last year	Never	58,5000	2,12132
	Total	58,5000	2,12132
Yes, once or more than once during the last year	Never	74,7086	78,07583
	Yes, but not during the last year	143,6000	151,85745
	Yes, once or more than once during the last year	107,2000	88,96753
	Total	83,7581	88,97877

Respondents who were diagnosed and referred by their doctor for specialized help and treatment were found to have also visited a medical facility in connection with their alcohol abuse in the same period or a previous one. This group also includes the individuals with the highest average GGT values from their laboratory tests.

1.3. Analysis and presentation of data from the performed ultrasound diagnostics

In connection with the statistical processing of the data, the results of the ultrasound diagnosis were divided into 4 groups: normal ultrasound image, hepatic steatosis, alcoholic hepatitis and hepatic cirrhosis. The criteria by which the conclusion was drawn for each patient are described in the methodology of the scientific paper.

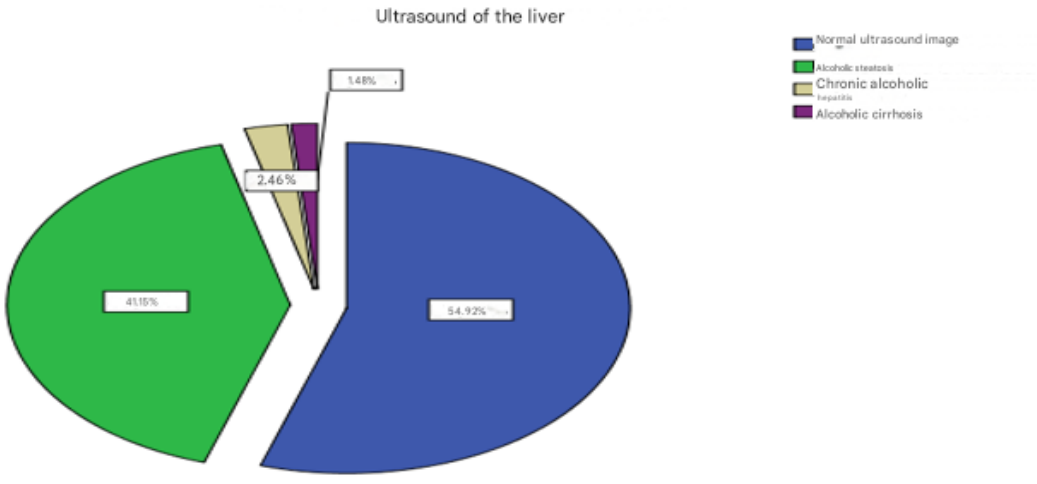


Figure 21. Frequency distribution of findings from liver ultrasound diagnosis

From the imaging diagnostics performed, 54.9% (n=335) of individuals had a normal echographic image, 41.15% (n=251) had hepatic steatosis, 2.46% (n=15) met the criteria for alcoholic hepatitis, and 1.48% (n=9) had liver cirrhosis.

2. Correlation analysis and testing dependencies and hypotheses

2.1. Determining the relationship between gender, age and alcohol consumption

A statistical analysis was performed on the data obtained on the frequency of alcohol consumption and the amount of alcohol consumed by the respondents according to their gender and age group. When conducting it, the dependence and the existence of a relationship between the indicated indicators were sought.

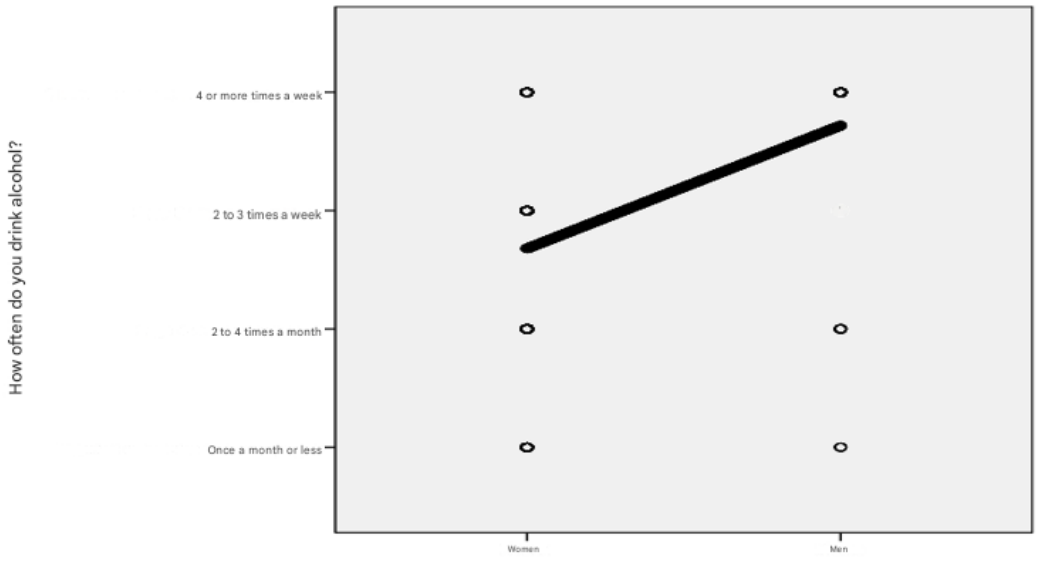


Figure 22. Relationship between gender and frequency of alcohol consumption

In calculating the presented data, the Lambda coefficient of Goodman and Krushal is used to compare two random variables on a nominal scale. Lambda takes values from 0 to 1. Positive values indicate a relationship between two compared groups of values. Therefore, we have a proven relationship between the frequency of alcohol consumption and gender. The correlation relationship is expressed in the fact that the male biological sex consumes ethyl beverages more often compared to the female in the present clinical study.

Table 11. Lambda coefficient for proving a relationship between the frequency of alcohol consumption and gender

Coefficient Lambda			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	,446	,032	12,743	,000
		„How often do you drink alcohol“	,303	,037	7,202	,000
		Gender	,606	,036	11,630	,000
	Goodman and Kruskal tau	„How often do you drink alcohol“	,204	,022		,000[c]
		Gender	,394	,039		,000[c]

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on chi-square approximation

We also compared the number of drinks consumed that respondents indicated in response to Question 2 of the screening survey against their gender.

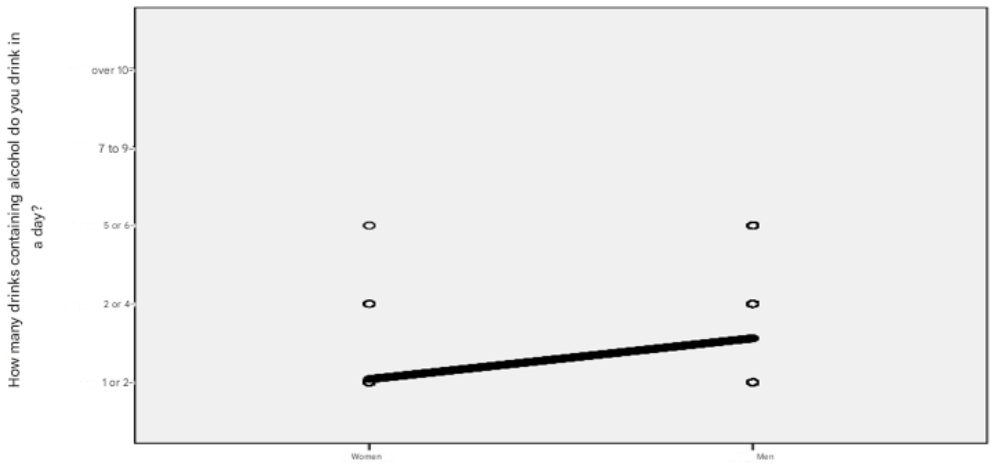


Figure 23. Relationship between gender and number of drinks consumed

We found similar results to those in the previous graph. There is a relationship between the amount of alcohol consumed and the gender of the subjects. Men consume a larger amount of alcohol measured in absolute number of drinks compared to women. We also received confirmation when measuring the Lambda coefficient for the two nominal variables. The resulting value is 0.285 and shows a relationship between the answers to question №2 and gender.

For the same two survey questions, we also measured their relationship with the age group in which the respondents were distributed.

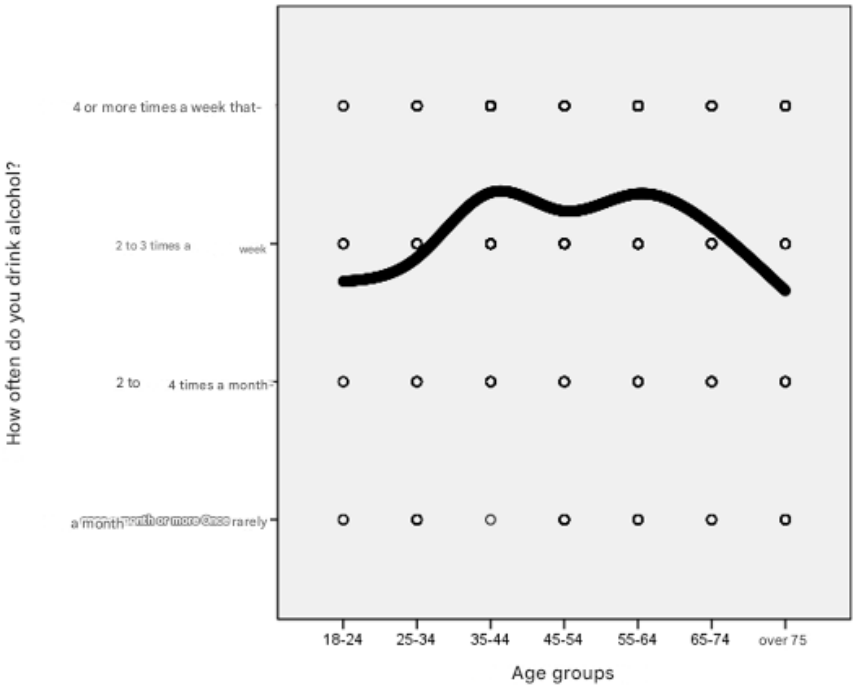


Figure 24. Relationship between age group and frequency of alcohol consumption

The presented graph shows peaks in the average age groups from 35 to 65 years and again a decline in the frequency of alcohol consumption after 65 years of age. For confirmation, we measured the value of the Lambda coefficient, because we are comparing two nominal variables and we obtained a positive value of 0.030. There is an established relationship, but it is of a weak nature, because the value is close to 0.

Table 12. Lambda coefficient for proving a relationship between frequency of alcohol consumption and age group

Lambda – coefficient			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	,030	,017	1,755	,079
		Age group	,036	,027	1,294	,196
		„How often do you drink alcohol?“	,021	,012	1,812	,070
	Goodman and Kruskal tau	Age group	,013	,004		,000[c]
		„How often do you drink alcohol?“	,026	,008		,000[c]

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on chi-square approximation

An analysis was conducted to establish a relationship between the number of drinks consumed per day and the age group of the subjects studied.

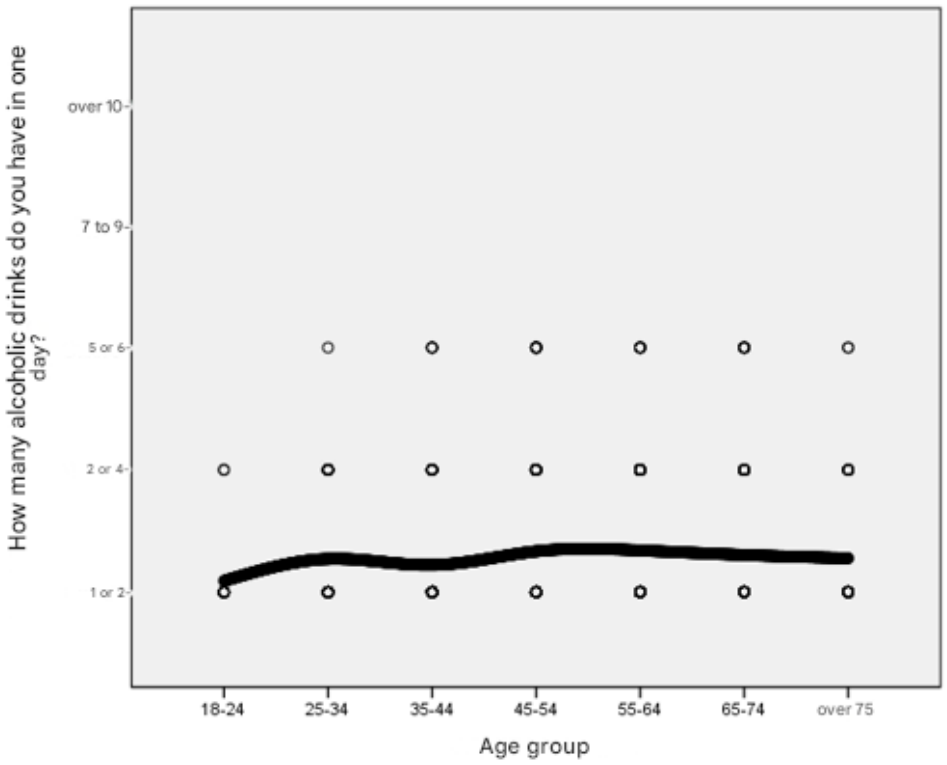


Figure 25. Relationship between age group and number of drinks consumed

The presented graph shows establishes a sloping curve without significant peaks in the individual age groups. For confirmation, we measured the value of the Lambda coefficient, because we are comparing two nominal variables, and we obtained a positive value of 0.014. There is an established relationship, but it is of a weak nature, because the value is close to 0.

2.2. Determining the relationship between the frequency of alcohol consumption, the number of drinks consumed and biochemical indicators and the results of ultrasound diagnostics

To check for an existing relationship between the indicated indicators, we used the Lambda coefficient and created graphical representations of the correlation relationships. For the comparisons, the values of ASAT, ALT and GGT were used in terms of whether they were below or above the reference limits, and not as an absolute measured value.

When determining the Lambda coefficient, we did not find a relationship between ASAT and the frequency of alcohol consumption. The Lambda value is 0.000. A relationship was reported between the number of alcoholic drinks and the ASAT indicator. As the amount of alcohol consumed increases, the ASAT value also increases. The relationship was also reported with the positive Lambda value of 0.049 .

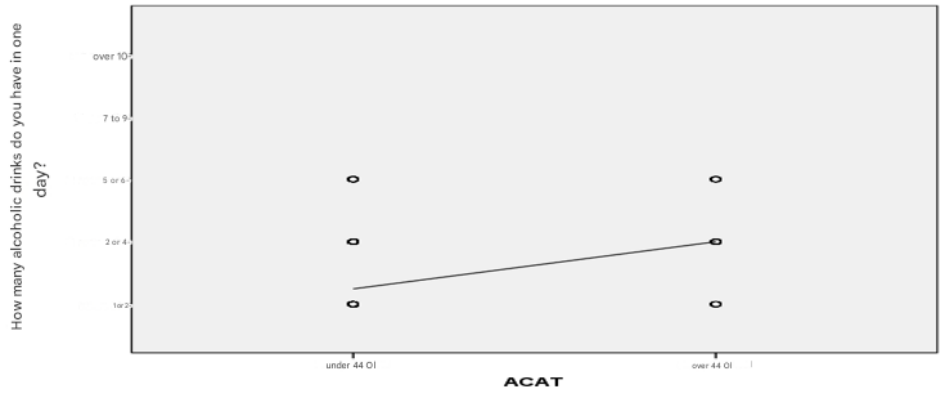


Figure 26. Relationship between ASAT and number of alcoholic drinks

When determining the Lambda coefficient, we found no correlation between ALAT and the frequency of alcohol consumption and the number of alcoholic drinks consumed in a day. The Lambda value is 0.000.

After statistical processing of the data, we found a significant correlation between the GGT value and the frequency of alcohol consumption and the amount of alcohol consumed. The Lambda values are 0.280 and 0.194, respectively.

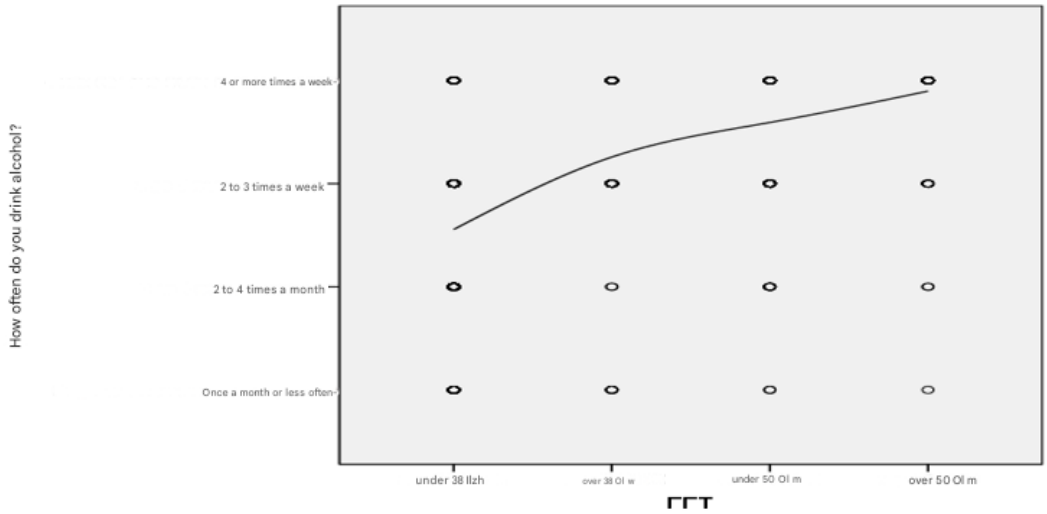


Figure 27. Relationship between GGT and frequency of alcohol consumption

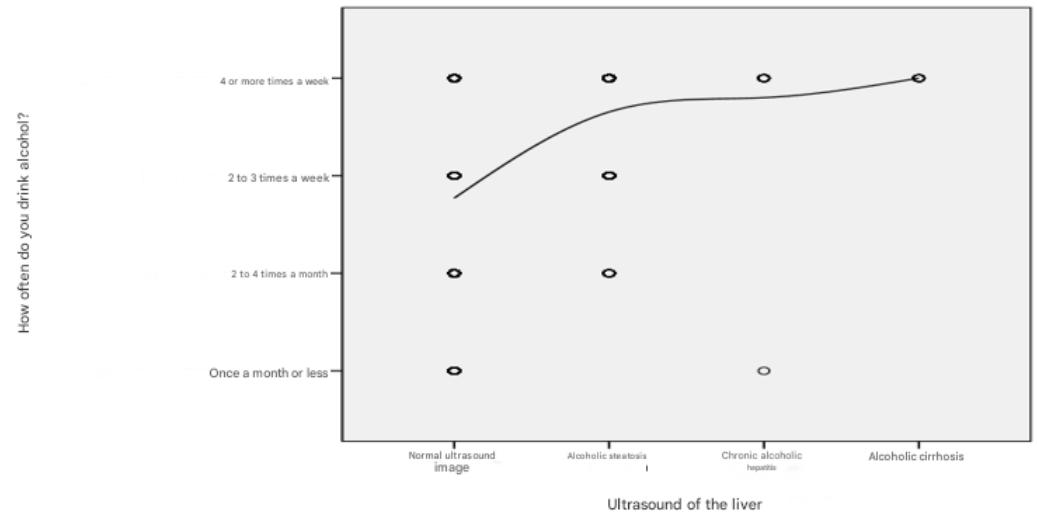


Figure 28. Relationship between GGT and number of alcoholic drinks

When determining the Lambda coefficient, we found a correlation between the results of the ultrasound diagnostics and the frequency of alcohol consumption. The Lambda value is 0.238. A correlation was reported between the number of alcoholic drinks and liver ultrasound. As the

amount of alcohol consumed increases, the pathophysiological changes in the liver also increase. We also report the dependence with the positive value of Lambda 0. 209.

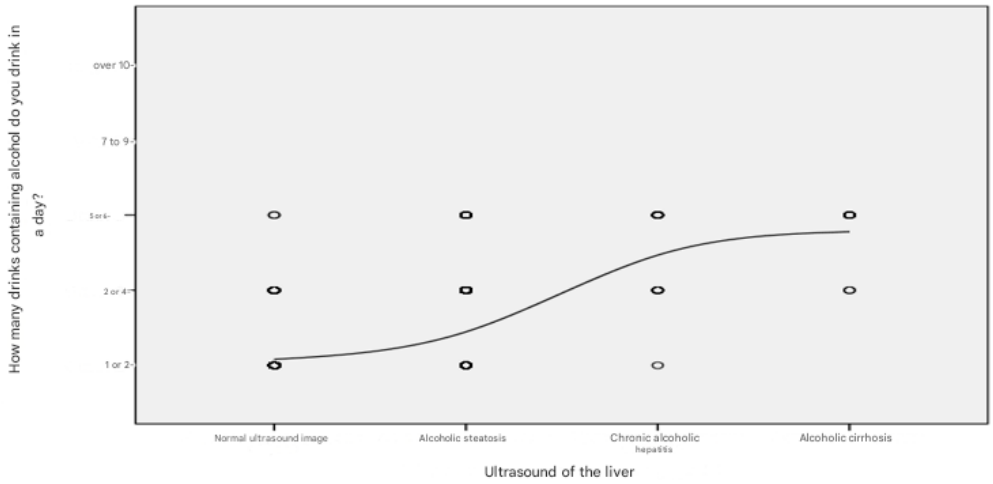


Figure 29. Relationship between ultrasound diagnostic results and frequency of alcohol consumption

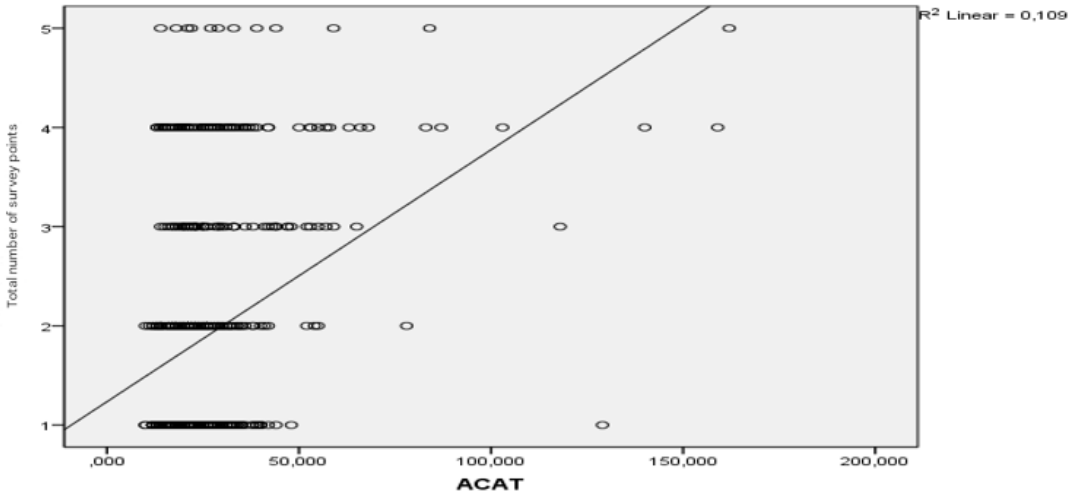


Figure 30. Relationship between ultrasound diagnostic results and number of alcoholic drinks

2.3. Determining the relationship between the total number of points from the questionnaire, biochemical indicators and the results of ultrasound diagnostics

After summing the points obtained from the responses to the screening survey, we conducted a comparative analysis to establish the relationship with the other parameters studied - biochemical markers and ultrasound diagnostics.

According to the overall results of the questions, the respondents were grouped into 5 categories. We investigated the presence of a relationship between the group in which the individuals fall and the measured values of the enzymes ASAT, ALT and GGT. For this analysis, we used the absolute measured values of each individual patient's liver parameters.

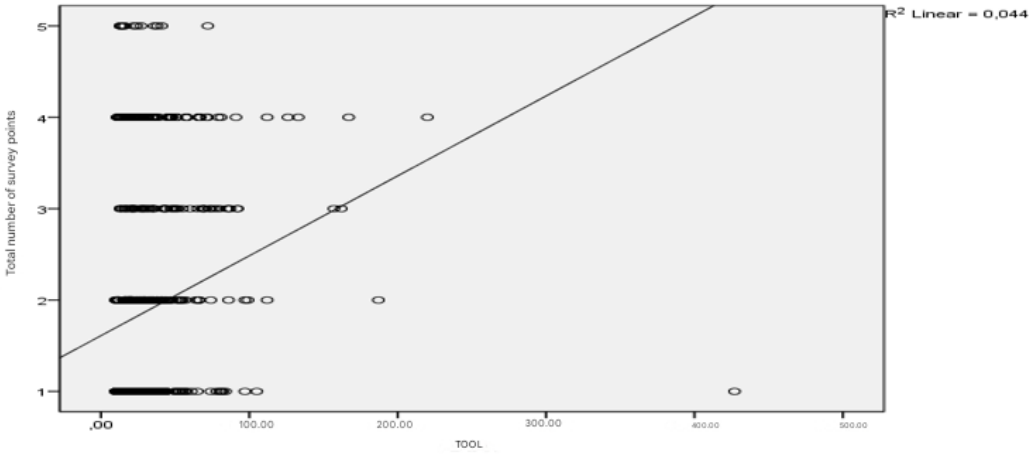
For statistical processing of the data, we used the Eta coefficient to compare and establish a relationship between a nominal and an ordinal variable. The Eta coefficient takes values from 0 to 1, and the closer the numerical expression is to 1, the stronger the relationship between the two variables.

When analyzing the data from the total number of points and the ASAT, we found an association between the two dependencies. As the value of the obtained result increases, the value of the ASAT also increases, or the more advanced the stage of addiction the patient falls into, the greater the probability that the ASAT is above the reference limit.

Table 13. Eta coefficient for correlation between total survey scores and ASAT

Eta coefficient			Value
Nominal by Interval	Eta	Total number of points from the survey Dependent	,479
		Laboratory value Dependent	,344

Figure 31. Relationship between the total number of points from the survey and the ASAT



R-squared is a measure of goodness of fit for linear regression models. This statistic shows the percentage of variance in the dependent variable that the independent variables collectively explain. R-squared measures the strength of the relationship between the model and the dependent variable on a convenient scale from 0 to 100%. The resulting R-squared in the graph is 10.9%.

When analyzing the data from the total number of points and ALT, we found an association between the two dependencies. As the value of the obtained result increases, the value of ALT also increases, or the more advanced the stage of dependency the patient is in, the greater the probability that ALT is above the reference limit.

Table 14. Eta coefficient measured for the relationship between the total number of points and ALT values

Eta coefficient			Value
Nominal by Interval	Eta	Total number of points from the survey Dependent	,488
		Laboratory value Dependent	,264

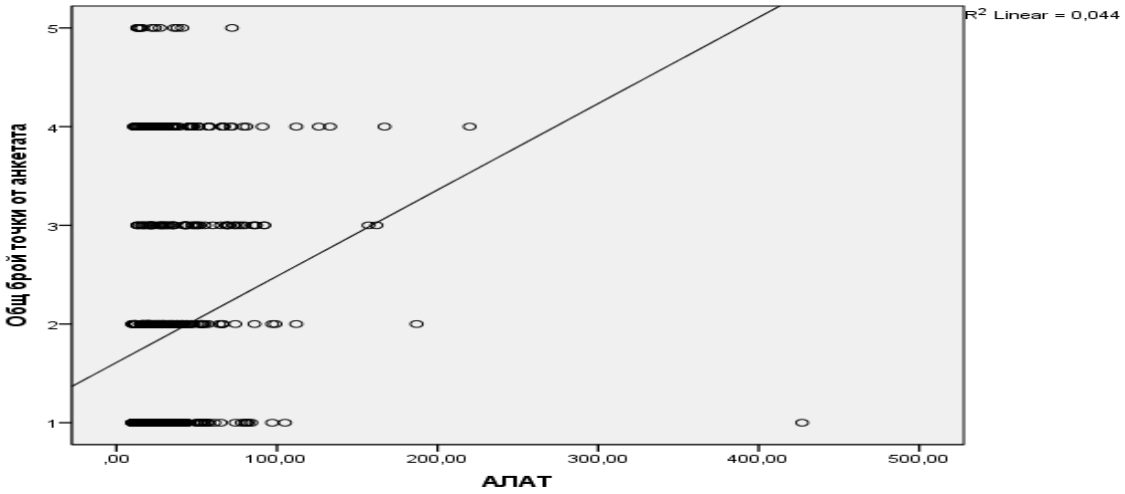


Figure 32. Relationship between the total number of survey points and ALAT

The resulting R-squared indicated on the graph is 4.4 % .

When analyzing the data from the total number of points and the GGT value, we found a strong correlation between the two variables. As the value of the obtained result increases, the GGT value also increases, or the more advanced the stage of addiction the patient is in, the greater the probability that the GGT is above the reference limit.

Table 15. Eta coefficient measured for the relationship between the total number of points and GGT values

Eta coefficient			Value
Nominal by Interval	Eta	Total number of points from the survey Dependent	,715
		Laboratory value Dependent	,499

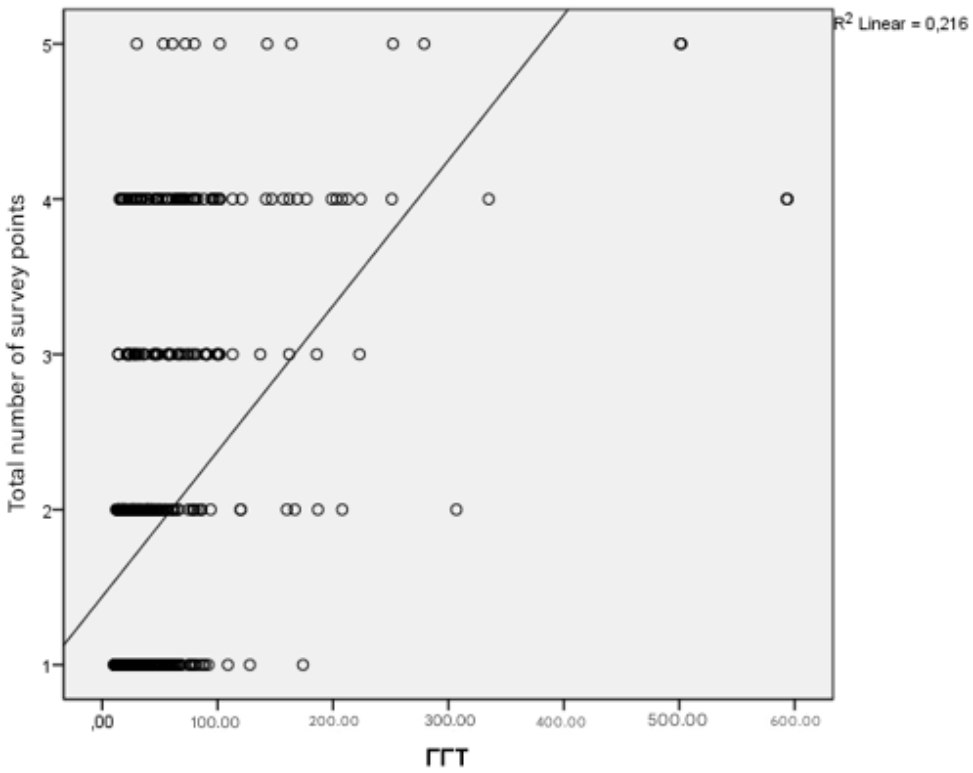


Figure 33. Relationship between total survey score and GGT

The resulting R-squared indicated on the graph is 21.6 %.

When analyzing the data from the total number of points against the results of the ultrasound diagnostics, a correlation was found between the two variables. As the value of the obtained result increases, the number of patients with liver damage from alcohol consumption also increases.

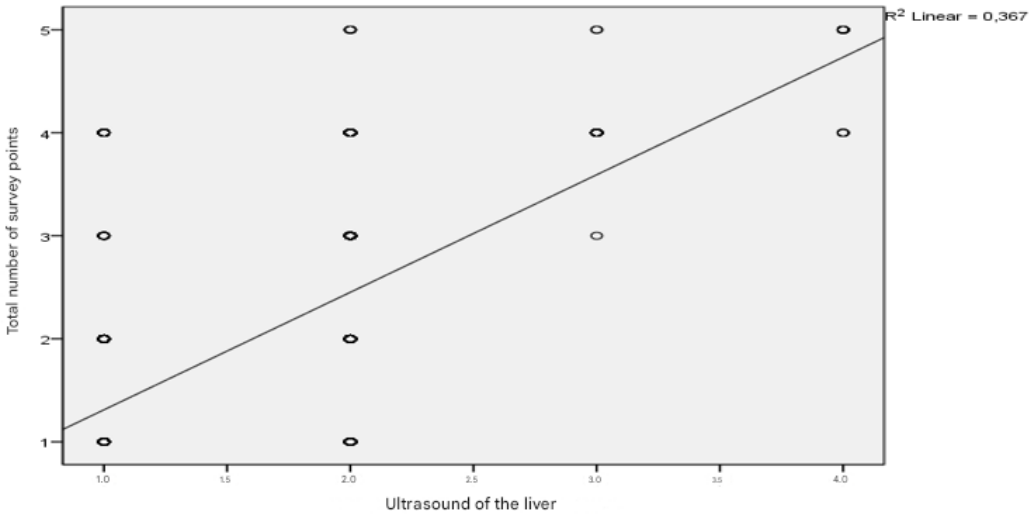


Figure 34. Relationship between the total number of points from the survey and the results of the liver ultrasound

The resulting R-squared indicated on the graph is 36.7%.

2.4. Determining the relationship between the total number of points on the questionnaire and the frequency of mental and somatic impairments

For the purposes of this research paper, we tested a null and alternative hypothesis. Is there a statistically significant relationship between the increase in the total number of points from the survey and the increase in the frequency of individuals reporting manifestations of mental and somatic impairments?

In the hypothesis testing performed, we assumed that the risk of making an error by accepting the alternative hypothesis as true is a significance level (a). The level of significance should be less than or equal to the accepted ($a \leq 0.05$) . This means that the null hypothesis (H o) is rejected in favor of the alternative.

From the analysis of the data obtained, it can be concluded that there is a positive correlation between the category in which the patient falls and the appearance of addiction symptoms. This pattern is graphically presented in Figures 35, 36 and 37.

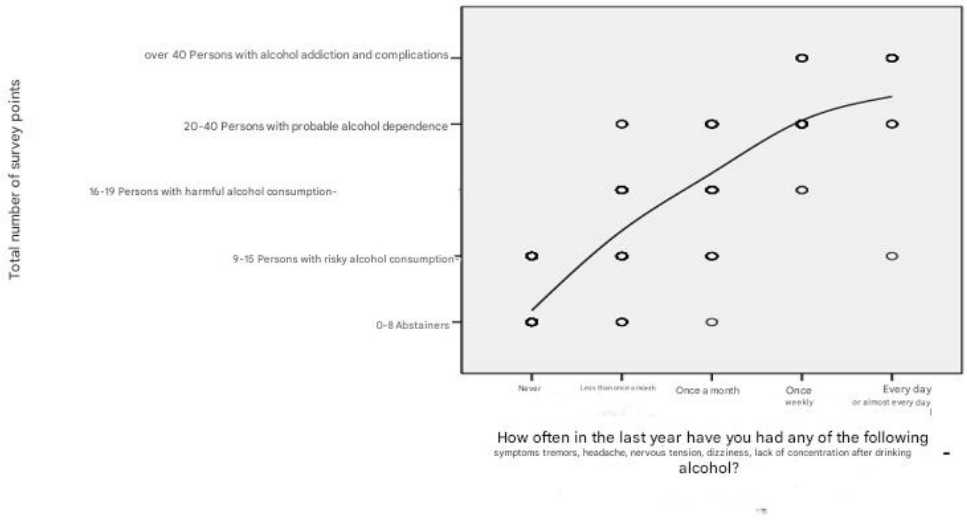


Figure 35. Dependence between the number of points from the survey and the frequency of psychosomatic complications

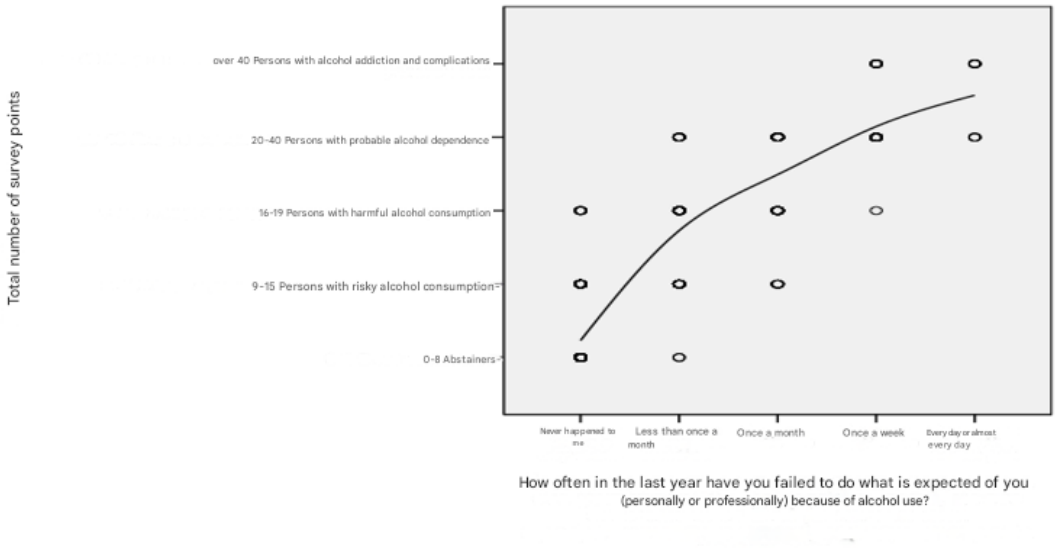


Figure 36. Relationship between the number of survey points and the frequency of psychosomatic complications

Figure 36 shows that respondents categorized as having harmful alcohol consumption and dependence have a high proportion of responses that they were unable to do what was expected of them once a week or more in the last year.

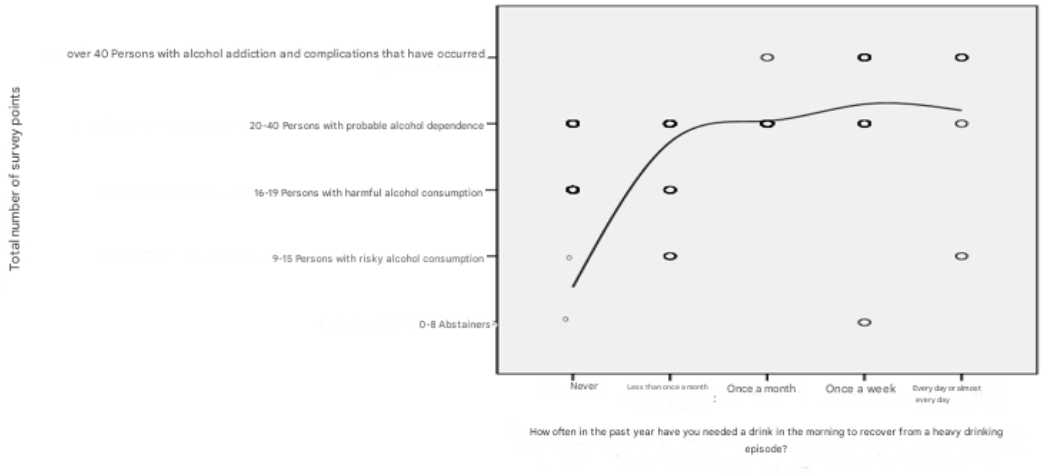


Figure 37. Relationship between the number of survey points and the frequency of withdrawal episodes

From Figure 37 it can be seen that patients classified in the group of individuals with probable alcohol dependence also have the highest frequency of withdrawal symptoms with a frequency of at least once a week. For the three measured relationships, we found a p-value of 0.0001 . Therefore, a ≤ 0.05 rejects the null hypothesis and confirms the alternative one.

The results obtained during data processing show the following general patterns: as the total number of points from the survey increases, the number of people with psycho-physiological manifestations of alcohol dependence also increases, i.e. the higher the number of points a given patient has from the survey, the greater the likelihood that he will have physical and mental manifestations of alcoholism.

The study made it possible to confirm the relationship between the progression of alcohol dependence and the increase in mental and physical disorders associated with it.

3. Verification of the reliability and validity of the methodology used for screening for alcohol dependence

3.1. Reliability of the methodology

For the purposes of the present study, we tested the reliability of our proposed screening questionnaire with two methods of internal consistency: dividing the measurement scale into two halves and Cronbach's alpha coefficient. (Ganeva Z., 2016)

The internal consistency of a scale assesses the reliability of the consistency of the questions that form it or the stability available within the scale, rather than between several different measurement scales.

When calculating the reliability coefficient using the split-test method (in this case for an even number of questions), the Spearman-Brown prediction formula is used. It calculates the adjusted value of the Pearson correlation coefficient.

Table 16. Reliability check using the split-test method

Cronbach's Alpha	Part 1	Value	,915
		N of Items	7
	Part 2	Value	,675
		N of Items	7
	Total N of Items		14
Correlation Between Forms			,857
Spearman-Brown Coefficient	Equal Length		,923
	Unequal Length		,923

From the table presented, it follows that the correlation between the two variables is highly positive r =0.923. Therefore, we consider the test (scale) to be reliable.

The other method we used to measure the internal consistency of the scale is Cronbach's alpha. In most cases, it is assumed that if alpha values are above 0.70, it is acceptable to assume that the scale is reliable.

Table 17. Reliability check using Cronbach's alpha

Alpha of Chronbach

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,910	,933	14

After the analysis, it was found that Cronbach's alpha is 0.910 with N = 14 survey questions. We assume that the scale is reliable with the studied sample.

A key point in the presented statistical analysis is to consider the correlations between each of the questions with the total sum of the other questions. If the correlation is greater than 0.40, then the question is well correlated with the other questions and is a good component of the scale. Cronbach's alpha was also measured if each question from the survey was removed. The scale is considered to be constructed correctly and that each question contributes to its reliability if in the last column of the table there is no value greater than the calculated total Cronbach's alpha - 0.910.

For all questions except Question 14, we found a very good correlation. For the same question, we also have a Cronbach's alpha value greater than the total value. Therefore, if Question 14 were removed, a better constructability of the scale would be achieved. We assumed that, nevertheless, the data from the answers to this question have important value for practice.

The reliability of the alcohol dependence screening scale was Alpha = 0.91 for the entire sample N = 610.

3.2. Validity of the methodology

When conducting the factor analysis, we used a group of statistical methods and followed a strictly defined algorithm. First, we determined the Kaiser-Meyer-Olkin (KMO) sample adequacy measure and Bartlett's test of sphericity, which gives the results of the factor analysis assumption tests. (Ganeva Z., 2016)

Table 18. KMO goodness- of -fit measure and Bartlett test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,923
Bartlett's Test of Sphericity	Approx. Chi-Square	7316,121
	Df	91
	Sig.	,000

The adequacy measure of the KMO must be greater than 0.60 . The value we obtained is 0.923. It shows whether the number of variables for each factor is sufficient. Bartlett's test must be significant, that is, have values less than or equal to 0.05. Our measurements showed a value of .000 (< 0.001). It follows that the studied variables N=14 (the number of questions in the survey) are sufficiently strongly correlated with each other and the factor analysis can be carried out.

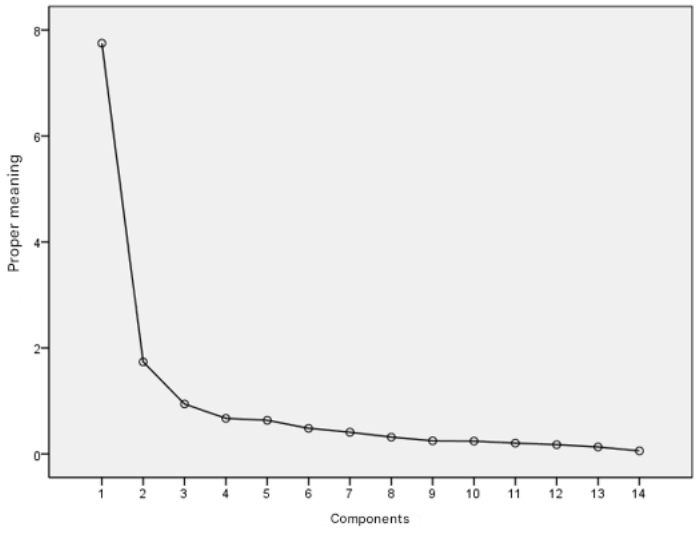


Figure 38. Scatter plot of eigenvalues

In the graphic image we have presented the eigenvalues for each component. The figure, as well as the table, show that after the first component the difference between the eigenvalues decreases, they are smaller than 1.0 and the graph becomes flatter. This means that the 14 questions form one scale, have one latent variable, which is the purpose of the factor analysis.

The results obtained show that the applied screening questionnaire is highly reliable and construct valid for the given sample. This allowed to conduct the described statistical analysis of the results of the clinical study and to propose our own method for screening for alcohol dependence.

5. Own model with algorithm for tracking and medical examination of individuals with risky alcohol behavior and alcohol dependence

In this scientific paper, we will present our own model for monitoring and dispensary examination of individuals examined with the proposed combined screening method for diagnosing alcohol dependence in general medical practice. (Appendix 3)

Based on the responses from the survey , the results of the biochemical parameters studied and the ultrasound diagnostics performed, we propose a model for dividing patients into groups. The aim of the proposed method of dispensary examination is to better monitor and control alcohol use and its complications.

The first dispensary group includes individuals who are defined as abstainers. For them, we recommend monitoring including the application of the combined screening method once every 12 months.

The second group includes patients with established risky and high-risk alcohol use with abnormalities in enzyme parameters and liver ultrasound diagnostics. The medical examination includes observation and clinical examination by the general practitioner, as well as examination of biochemical parameters and liver ultrasound with a frequency of 6 months. Consultation with a psychiatrist is recommended at 12 months.

The third group includes patients with alcohol abuse with abnormalities in enzyme indicators and ultrasound diagnostics of the liver. The medical examination includes observation and clinical examination by the general

practitioner, as well as examination of biochemical indicators and ultrasound of the liver with a frequency of 6 months. Consultation with a psychiatrist is recommended at 6 months, as well as with a gastroenterologist at 12 months.

The fourth group includes patients with chronic alcoholism and physical and mental complications. The medical check-up includes observation and clinical examination by the general practitioner, as well as biochemical parameters and liver ultrasound every 6 months. Consultation with a psychiatrist and gastroenterologist is recommended every 6 months, as well as, at the discretion of a cardiologist and/or endocrinologist every 12 months.

VI. Discussion

1. Age-gender distribution and alcohol consumption

Our results revealed a high number of men (n= 230) who consume alcohol more than 4 times a week, while this group is significantly smaller for women (n= 53). We found a statistically significant correlation between the frequency and amount of alcohol consumption and gender. In the female group, 1-2 drinks are consumed per day, while in the male population, 3-4 drinks per day are predominant. In terms of high-risk alcohol consumption with the intake of more than 5 alcoholic drinks per day with a frequency of at least once a week, males are more than 8 times more likely than females (n=46>n=5) . The same distribution is for the intake of more than 5 alcoholic drinks daily (n= 23 >n= 1) . The analysis of the results shows that these men are from the age groups 45-54 and 55-64.

Alcohol use affects not only the drinker , but also the family and the entire society in a negative way. 43% of the world's population aged 15 and over are risky alcohol consumers and men drink about 2 times more often than women (53.6%/32.3%). According to WHO, with information from 2018 , total alcohol consumption per capita in the world aged 15 years and more than 5.7 liters in 2000 increased to 6.4 liters in 2016 (Ilham M., 2020)

The consumption of alcoholic beverages in Bulgaria remains high compared to most countries in the region. The National Survey on Risk Factors for the Health of the Population in Bulgaria 2020 aimed to

investigate the prevalence of alcohol consumption in the country. The results show that 65.5% of the respondents consume alcoholic beverages and highlight gender differences in the population. (Strandzheva M., 2023)

According to data from the National Center for Public Health and Analysis in 2014, out of 2979 people over 20 years old, 65.7% consume alcohol, with a quarter of them (25.4%) consuming it regularly. Of those who consume alcohol regularly, men are approximately 4 times more than women, respectively 40.8% of men and 10.9% of women. Every sixth man consumes concentrates daily, and these are mainly people over 55 years old. (Milcheva S., 2023)

In the Czech Republic, a 2009 multi-level survey on the frequency of alcohol consumption showed that the percentage of people who drink alcohol 4 or more times a week was on average 18.9%. (Dzurova D., 2010) A population-based survey of 4,409 people in Ukraine using a screening questionnaire for alcohol dependence in 2019 found that the rate of people consuming alcohol more than 4 times a week was 9.8%. (Dumcheva A., 2020) In the Republic of Ireland in 2021, the rate of people consuming more than 5 drinks containing alcohol in a row more than once in the past year was 37%. (O'Dwyer C., 2021) According to data from 2012, two-thirds of Americans consume alcohol more than 5 times a week, and about 14 million have chronic alcohol disease. (Mohammad K. ,2012)

It has been shown that gender differences in alcohol consumption behavior are related to many aspects of biological differences between them. (Holmila R., 2005)

Several risk factors have been found to be strong and consistent predictors of abuse and dependence in men – divorce, separation, lack of a relationship, antisocial history in early life, and use of other drugs. (Grant B., 2001)

The stress and reward systems in the brain are influenced by sex hormones, therefore the tendency and development of alcohol dependence is influenced by gender. (Ceylan-Isik A., 2010)

Wilsnack et al. conducted a study of men and women in the age groups 18-34, 35-49, and 50-65 using a standardized questionnaire. They found that alcohol consumption did not decrease with age, but rather increased. In the

older age groups, more frequent consumption of more than 5 alcoholic drinks per day was also reported. (Wilsnack R., 2009)

A 2015 study reported similar mortality rates for men and women due to alcohol consumption, 7.6% and 4%, respectively. (Erol A., 2015)

Alcoholism in women is a difficult problem to solve. The difficulties are multifaceted and complex, starting from the epidemiological study, features of the clinical course, serious difficulties in treatment and ending with the great social significance of the problem. Women have a much higher risk of developing liver cirrhosis, cardiovascular and neurological damage compared to men when consuming the same amounts of alcohol. Alcohol dependence leads to an increase in estrogen levels, which is a major risk factor for the development of breast cancer. It is the cancer in first place among alcohol-dependent women. (Tello J., 2023)

The present clinical study made it possible to determine the relationship between the frequency of alcohol consumption and the age group. We found that the highest alcohol consumption is in the age group 55-64 years, in which out of 135 individuals with ethanol consumption more than 4 times a week there are 76 respondents, which is more than ½ of the group.

In the age group 55-64 years. the incidence of socially significant chronic diseases is also highest. Alcohol is a major risk factor for their more severe course and makes their treatment more difficult. Figure №39 shows the age distribution worldwide of people who die prematurely from alcohol complications over a period of 30 years.

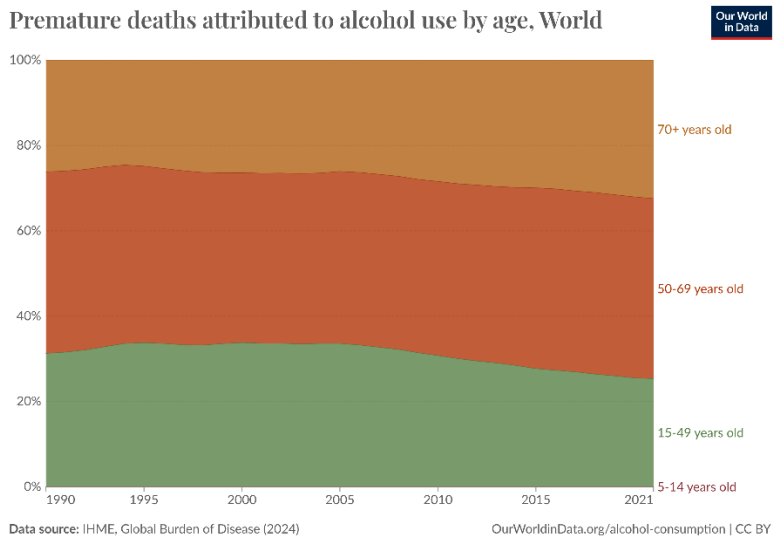


Figure 39. Premature death due to alcohol use by age group

In people aged 50-69, a very high rate of premature mortality due to alcohol abuse is formed, which remains almost stable over the years and shows no tendency to decrease. (Ritchie H., 2024)
When compared with other clinical analyses looking for a relationship between age and alcohol consumption, no clear risk group for initiating alcohol abuse could be identified. (Pitkanen T., 2005)

It has been established that the earlier alcohol use begins, the earlier dependence develops. This necessitates the need for screening and counseling young age groups about alcohol use and the implementation of policies and programs that delay alcohol consumption. (Hingson R., 2006)

The qualitative characteristic of the noted trend of continuous growth in the number of alcoholic beverage consumers in Bulgaria is reinforced by two particularly worrying circumstances - an increasingly higher number of drinks consumed in one day and a decrease in the number of abstainers.

2. Mental and somatic damage from alcohol consumption

All international statistical studies report a significant increase in the number of physical and mental illnesses that are directly causally related to the abuse of alcoholic beverages.

In the questionnaire presented in this study, the segment from question #4 to question №9 aims to measure the frequency of reasons for alcohol consumption and the level of mental and somatic impairments.

The distribution of respondents in relation to the answers to Question No. 4 showed that 2.46% of patients reached a state of helplessness at least once a month after drinking alcohol and 7.87% indicated less than once a month. Therefore, over 10% of respondents have high-risk alcohol consumption and periodically exceed their alcohol tolerance limit.

The frequency of binge drinking and helplessness episodes after alcohol consumption has been shown to be a better indicator of alcohol-related social problems than the amount consumed daily. (Kraus L., 2009)

Data from the 2013 International Alcohol Control Survey show that the heaviest drinkers are 10% of the population. They consume 54.4% of all alcohol consumed. (Livingston M., 2019)

Compared to other drinkers, heavy drinkers consume alcohol relatively more often on weekdays and relatively more often alone, and they also more often reach a state of helplessness due to excessive use. (Bye E., 2021)

From the analyses conducted regarding question №5, it is striking that a very high percentage of respondents, approximately 23%, noted that from once a month to almost daily they experience physical dependence. Symptoms are expressed in tremors, headaches, nervous tension, dizziness and lack of concentration after drinking alcohol.

Part of the aim of this study was to examine the presence and severity of alcohol dependence symptoms and to determine their interrelationship. From the analysis of the data on question №6, it can be concluded that almost 20% of the respondents have manifestations of alcohol dependence, expressed in the inability to perform their daily personal and professional duties. The statistical test we performed for the significance of the need for questions №5 and №6 in the survey proved to be highly sensitive for detecting individuals with physical symptoms of alcohol abuse.

In another clinical study, the most commonly reported and most severe symptoms were fatigue (95.5%) and thirst (89.1%). The most important factor "sleepiness" (28.8%) includes symptoms such as drowsiness, fatigue and weakness. The second factor “cognitive problems” (5.9%) includes symptoms such as decreased alertness, memory problems, and concentration. (Penning R. , 2012)

When analyzing the data from the screening survey, it is striking that on question №7, about 15% of the respondents have morning withdrawal symptoms, characterized by taking one drink in the morning after a heavy drinking episode. In 4% of the individuals, this is necessary more than 4 times a week.

The likelihood of experiencing tolerance or withdrawal symptoms may vary depending on the individual's developmental stage and drinking history. (O’Neill S., 2000)

In this clinical study, questions 8 and 9 were used to determine to what extent respondents are provoked to drink alcohol in their daily lives due to

personal and professional problems, and whether they are aware of the harm of this use. We found that nearly 2/3 of the people who answered question 8 indicated that they drink alcohol at least once a week due to social problems. In contrast to this result, the group of people who understand the consequences of their alcohol consumption and feel remorse for it is less than 1%.

Psychological distress directly leads to increased alcohol consumption. There is also evidence of increased alcohol consumption during economic crises. Increased levels of anxiety and fear also favor increased alcohol consumption. (Milcheva S., 2023)

Risk factors associated with the relationship between social anxiety disorder and alcohol use are female gender, age, peer approval and affective problems with alcohol use, confrontational situations and/or reasons for conformity, frequency of alcohol use, and secondary comorbidities, such as depression and generalized anxiety. (Cruz E., 2017)

A study conducted in Finland on the types of factors leading to risky drinking shows that it is associated with education and income, marital status and a sense of belonging to the social environment. (Hautamäki S., 2025)

When determining alcohol dependence by general practitioners, the most appropriate tests to use are liver enzyme tests and ultrasound diagnostics of the liver.

The liver tests most often used in daily clinical practice, together or separately, are serum ASAT, ALAT and GGT. They are an extremely important “first step” through which the presence of a problem is initially detected, the range of clinical hypotheses in the diagnostic process is narrowed, and in some cases even a final diagnosis is made. This makes the knowledge, understanding, clinically adapted use and interpretation of these liver tests particularly important in the daily practice of the general practitioner. (Kirov L., 2023)

After conducting a descriptive analysis of the data, the average values we obtained for ASAT were 25,644+/-15.23 U/I , for ALT 31,623+/-28.29 U/I and for GGT 47.80+/- 58.19. U/I. 5.9% of respondents had elevated ASAT values, 17% had ALT values, and 10.8% of females and 22.3% of males had GGT values. The distribution and assessment of the indicators by

gender and age groups was carried out, and it was found that GGT was elevated above the norm for males, namely an average value of 64.86+/-73.82 U/I . The same marker is above the norm for age groups 45-54 years, 55-64 years and 65-74 years. High values above the upper reference limit for GGT were found in the groups of people who responded that they consume alcohol more than 4 times a week in the amount of 3 standard drinks per day. The respondents with the highest GGT values also fall into the group that sought medical help due to alcohol use.

In the correlation analysis, the strongest correlation was found between the frequency of alcohol consumption and GGT.

After statistical processing of the data, we proved a correlation between the total number of points from the survey and the studied biochemical indicators. And the association between the dependents is characterized by the fact that the more the value of the number of points obtained from the survey increases, the greater the probability that the values of ASAT, ALT and GGT are above the upper limit ($\alpha \leq 005$).

The validity of GGT, ASAT and MCV as markers is based on largely on correlations with recent intake at a point in time and on reducing elevated values when heavy drinkers abstain from alcohol. These readily available laboratory tests provides important prognostic information and should be an integral part of the assessment of individuals with risky alcohol consumption. (Das S., 2003)

Prasad P. et al. in a study with 150 patients divided into three groups, concluded that patients with alcoholic steatohepatitis can be distinguished from those with non-alcoholic and acute viral hepatitis with certainty by measuring the serum AST/ALT ratio and GGT index. (Prasad P. , 2014)

In a clinical study from Finland conducted in 2008, results showed that in severe drinkers, the serum indices examined were significantly higher than in moderate drinkers or abstainers ($P < 0.001$ for all comparisons). The highest incidence of elevated values was found for GGT (62%), followed by AST (53%) and ALT (39%). Serum GGT ($P < 0.001$) and ALT ($P < 0.01$) were also higher in moderate drinkers than the levels observed in abstainers. (Alatalo P., 2008)

The results of a study conducted in Bulgaria show that GGT can be used as a reliable marker for chronic alcohol consumption. (Kotsev A., 2019)

Conventional markers have imperfect sensitivity and specificity, but have an additional clinical role in detecting complications of drinking and comorbidities that may increase the risk of drinking. (Conigrave K. , 2003)
The clinical significance of serum liver markers for the timely recognition of risky alcohol consumption is specific only when combined with other diagnostic methods. (Liangpunsakul S., 2010)

After analyzing the echographic diagnostics of the liver in the studied individuals, we found that 41.15% of them had steatosis, 2.46% had alcoholic hepatitis and 1.48% had liver cirrhosis. The correlation analysis performed established a relationship between alcohol consumption and echographic changes in the liver. The increased frequency of alcohol consumption and the number of drinks consumed lead to an increase in the probability of clinical changes in the liver ($\alpha \leq 0.05$) .

A correlation between the two variables total number of points from the questionnaire and the result of the ultrasound diagnosis was also established. As the result increases, the number of patients with detected liver damage due to alcohol consumption also increases. ($\alpha \leq 0.05$).
The results of ultrasound examination for changes in the liver parenchyma showed a significant association with the corresponding changes in AUDIT scores, serum bilirubin levels, and ASAT. The ultrasound results were also significantly associated with the total number of years of drinking and the average alcohol consumption (in AA) per day over the past 3 years. (Chail, A ., 2024)

Most patients with alcohol-related liver fibrosis, which is the main prognostic factor for progression to end-stage liver disease, may have normal blood tests. (Gamie S., 2019)

3. Health and social harms from alcohol consumption

Our analysis shows that just over 6% of respondents have shown aggressive behavior towards themselves or others due to alcohol use in the last 12 months or before. About 6% are also the group of people who have

been admitted to a medical facility due to alcohol use. This group also includes the people with the highest measured values of the GGT marker.
Data from the national sample in the US shows that The hospitalization rate for alcohol overdose alone increased by 25% from 1999 to 2008, reaching 29,412 cases in 2008 at a cost of $266 million. (White A., 2011)

From March 2012 to March 2014, an analysis of the 26 cost components used to estimate the cost of binge drinking found that it cost the United States $249.0 billion in 2010 (Sacks J. , 2015)
In our survey, over 30% of respondents said that their GP had spoken to them about their alcohol consumption problems. This percentage includes the entire group of patients who sought medical help in a hospital setting. Over 10% of individuals had severed relationships with loved ones due to alcohol abuse. 1.6% of all participants had an episode of antisocial behaviour or a traffic accident due to alcohol consumption.

Evidence from laboratory and empirical studies supports the possibility of a causal role for ethanol in violent behavior. In addition to psychopharmacological effects, alcohol use can lead to violence through social processes such as drug distribution systems (systemic violence) and violence used to obtain drugs or money for drugs (economic coercive violence). (Boles S. , 2003)

Men are more likely to be the target of serious violence in public : 30 percent of the most serious incidents involving men as victims occurred in public places . (Quigley B., 2004)

A growing empirical literature reveals a strong association between alcohol use and the occurrence of intimate partner violence. (Klostermann K., 2006)
Abuse is a family and social disease that requires joint treatment of family members and community support. The family is an important part of the chain of diagnosis and treatment of alcohol and substance abuse. (Saatcioglu O., 2006)

4. Screening methods for detecting alcohol dependence in general medical practice

No policies and measures are implemented to prevent alcohol use adequately and the burden of alcohol-related diseases continues to increase dramatically. In order to prevent and reduce harmful the impact of alcohol, alcohol policies should be formulated based on the best evidence from a public health perspective. (Ilham M., 2020)

A number of screening tests are used internationally to detect alcohol abuse and dependence. The most commonly used ones have been analyzed for their sensitivity and specificity in multiple clinical trials.

CAGE demonstrates high test-retest reliability (0.80-0.95) and adequate correlations (0.48-0.70) with other screening tools. It is not a suitable screening test for milder forms of
drinking. (Dhalla S. , 2007)

For identifying risky drinking, AUDIT showed greater diagnostic power than these of SMAST /BMAST and CAGE (both $P < 0.001$). In screening for alcohol use disorders, AUDIT indicators are also significantly higher than those of SMAST and CAGE (both $P <0.001$). (Ryou Y. , 2012)

The AUDIT has demonstrated strong psychometric properties when used in psychiatric care. Routine use of this questionnaire may facilitate the detection of alcohol use disorders among psychiatric patients. (Carey K., 2003)

AUDIT has proven acceptable sensitivity for alcohol identification in multiple clinical studies problems or disorders in different age groups. (Knight J. , 2003)

After a thorough statistical analysis conducted by Bulgarian authors of the application of the AUDIT test , it was found that it has high specificity and sensitivity, good psychometric characteristics and validity for application in the study of population groups on the territory of Bulgaria. (Borisova S., 2022)

In the first comprehensive and only published since 1989. Guide for detecting and limiting alcohol harm of the National Center for Health and Welfare (NCHPA), an algorithm for medical care for patients who tested positive for the AUDIT screening test is proposed. (Tsolova G., 2018) Thus, the proposed algorithm is suitable for use in pre-hospital care, but only after a secure categorization of patients according to their alcohol consumption, which cannot be achieved only with a questionnaire method of diagnosis.

The model is detailed and covers the main aspects of the clinical course over time of addiction, but there are some differences compared to the current model of dispensary monitoring of a socially significant disease in Bulgarian healthcare. An accurate periodicity with the frequency of examinations, tests and consultations is necessary so that the monitoring of alcohol addiction can be carried out by the general practitioner according to the legally established standard set out in the National Framework Agreement.

In the present clinical study and to meet the needs of developing a combined screening method for detecting alcohol abuse and dependence in prehospital care, we used some of the questions of the AUDIT test and added additional ones to create a questionnaire. We presented the results as a total number of points and their respective distribution by groups. From the derived data, we identified 19.2% of individuals with risky alcohol consumption, 9.7% with harmful, 14.1% with probable alcohol dependence and 2% with alcohol dependence and psychosomatic impairments.

After a reliability and validity check of our proposed questionnaire, the results obtained show that the developed screening questionnaire is highly reliable and construct valid for the given sample. This allowed us to use it as the basis of our combined methodology and the initial part of a model for the management of alcohol dependence in general medical practice.

The current model is based on an evidence-based medical approach and combines the three most rapid, effective and accessible methods for detecting alcohol dependence in prehospital care. The simultaneous and consistent use of a questionnaire developed for the Bulgarian population, biochemical markers of liver function and ultrasound diagnostics underlie the proposed model. The distribution of patients at the prehospital care level according to this methodology supports their positioning in dispensary groups, which facilitates their subsequent monitoring and treatment.

The dispensary method of follow-up is a key part of pre-hospital care, as well as the management and control of socially significant diseases. As is evident from the results of the present clinical study and their comparison with the global database, the need in Bulgaria to accept alcohol dependence as a socially significant disease is justified.

VII. Conclusion

The results of the present clinical study highlight the high frequency of alcohol consumption among the studied population. A significantly high number of individuals with risky alcohol consumption, alcohol dependence and chronic alcohol disease was found, as well as an increased frequency of mental and physical impairments in individuals with alcohol dependence. This proves that it is necessary to look for manifestations of alcohol abuse and the presence of alcohol disease in preventive examinations, as well as in examinations in connection with some complaints of patients. The general practitioner is the primary unit in the detection, prevention, dispensary and subsequent long-term monitoring of socially significant diseases of his patients.

The proposed combined screening method for diagnosing alcohol dependence in general medical practice has proven statistically significant results. The correlation between the screening questionnaire, biochemical indicators and echographic diagnostics of the liver has been confirmed. The benefit of their parallel use in pre-hospital care for optimal sensitivity and specificity in the diagnosis of clinical abnormalities related to alcohol use has been proven. The low cost of using the proposed algorithm for detecting and dispensary examination of alcohol dependent individuals in general medical practice has also been confirmed.

The successful solution of the main diagnostic, therapeutic and prophylactic tasks is possible only with the participation of the entire healthcare network and the active application of the dispensary method in the search, monitoring and treatment of alcoholics.

VIII. Conclusions

Based on the results we obtained and the data from the literature available to us, we can draw the following main conclusions:

1. In the studied population, a high number of individuals with risky alcohol consumption and increased intake of alcoholic beverages was identified.
2. A statistically significant strong relationship was found between gender and alcohol use and a weaker relationship between age and alcohol intake.

3. The results obtained revealed a high level of psychosomatic complications and social harm in the group of individuals with alcohol abuse.
4. The distribution of the examined individuals into groups according to the survey responses contributes to the implementation of medical examination and subsequent follow-up.
5. There is a strong correlation between the simultaneous use of a screening questionnaire, liver enzymes, and liver ultrasound to detect alcohol abuse and dependence.
6. An algorithm for monitoring and medical examination of individuals with risky alcohol use and dependence has been created with high practical value in general medical practice.

XI. Contributions

Original scientific and applied contributions
1. For the first time in our country, an original comprehensive methodology for screening for alcohol abuse and dependence has been developed
2. An original questionnaire and assessment scale have been developed to identify patients with risky alcohol consumption, dependence and chronic alcohol disease.
3. Statistically reliable effectiveness of the proposed algorithm has been proven
4. Based on the statistically significant evidence from our study, a comprehensive model for the management of a patient with alcohol dependence in general medical practice has been developed

Contributions of a scientific and applied nature
1. This type of analysis can be applied in clinical practice for the purpose of early diagnosis and subsequent follow-up of patients with risky alcohol use and dependence.
2. The results argue for the need to apply the presented complex methodology in general medical practice
3. The results of the study confirm the need for control in prehospital care of patients regarding alcohol consumption

Confirmatory contributions

1. The role of risky alcohol consumption and alcohol dependence in the occurrence of psychosomatic damage has been confirmed.
2. The role of alcohol as a modifiable risk factor in the development of socially significant diseases has been confirmed, which is why it is necessary to actively seek it out by general practitioners.
3. The significant relationship between increased alcohol use, liver pathology and the parallel development of mental and physical impairments has been confirmed.
4. The role of screening tests, GGT testing, and ultrasound diagnostics in the detection and development of alcohol dependence has been confirmed.

X. Applications

Appendix 1. Alcohol Dependence Screening Questionnaire
Alcohol dependence screening questionnaire
Your answers will remain anonymous, so please be honest!
Instructions for completing the survey:
Please mark the answer that you think is correct for you and best reflects your condition over the past year. Answer all questions. In this survey, it is assumed that a standard drink meets the following measures:
50ml concentrate (with high alcohol content - 40% and above) - vodka, brandy, whiskey, cognac, gin, ouzo, mastic and others.
140ml wine (with an average alcohol content of about 12%)
330 ml beer (with a low alcohol content of about 5%)
These questions are for the last one year!
Please indicate your biological gender.
A) Man
B) Woman

Please indicate your age:
A) 18-24
B) 25-34
C) 35-44
D) 45-54
E) 55 – 64

F) 65-74
G) at and over 75

1. How often do you drink alcohol?
A. Once a month or less
B. 2 to 4 times a month
C. 2 to 3 times a week
D. 4 or more times a week

2. How many alcoholic drinks do you drink in a day?
A. 1 or 2
B. 3 or 4
C. 5 or 6
G. 7 to 9
E. 10 and above

3. How often do you have 5 or more drinks at once (one after another)?
A. Never
B. Less than once a month
C. Once a month
D. Once a week
D. Daily or almost daily

4. How often in the last year have you reached a state of helplessness when using alcohol?
A. Never
B. Less than once a month
C. Once a month
D. Once a week
E. Every day or almost every day

5. How often in the last year have you had any of the following symptoms - tremors, headaches, nervous tension /panic attacks/, dizziness, lack of concentration, after drinking alcohol?
A. Never

B. Less than once a month
C. Once a month
D. Once a week
E. Every day or almost every day

6. How often in the last year have you failed to do what is expected of you (personally or professionally) because of your alcohol use?
A. It has never happened to me that I could not do what was expected of me.
B. Less than once a month
C. Once a month
D. Once a week
E. Every day or almost every day

7. How often in the last year have you needed a drink in the morning to get you going after a heavy drinking episode?
A. Never
B. Less than once a month
C. Once a month
D. Once a week
D. Daily or almost daily

8. How often have you reached for alcohol in the last year, due to personal or professional problems?
A. Never
B. Less than once a month
C. Once a month
D. Once a week
D. Daily or almost daily

9. How often in the last year have you felt guilty or had remorse after drinking alcohol?
A. Never
B. Less than once a month
C. Once a month
D. Once a week

D. Daily or almost daily

10. Have you or anyone else ever been physically hurt as a result of your drinking?
A. Never
B. Yes, but not in the last year
C. Yes, once or more than once in the last year

11. Has your GP or other health professional ever been concerned about your drinking and suggested referring you to a psychologist or psychiatrist?
A. Never
B. Yes, but not in the last year
C. Yes, once or more than once in the last year

12. Have you ever broken off a relationship with a friend or relative because of your drinking?
A. Never
B. Yes, but not in the last year
C. Yes, once or more than once in the last year

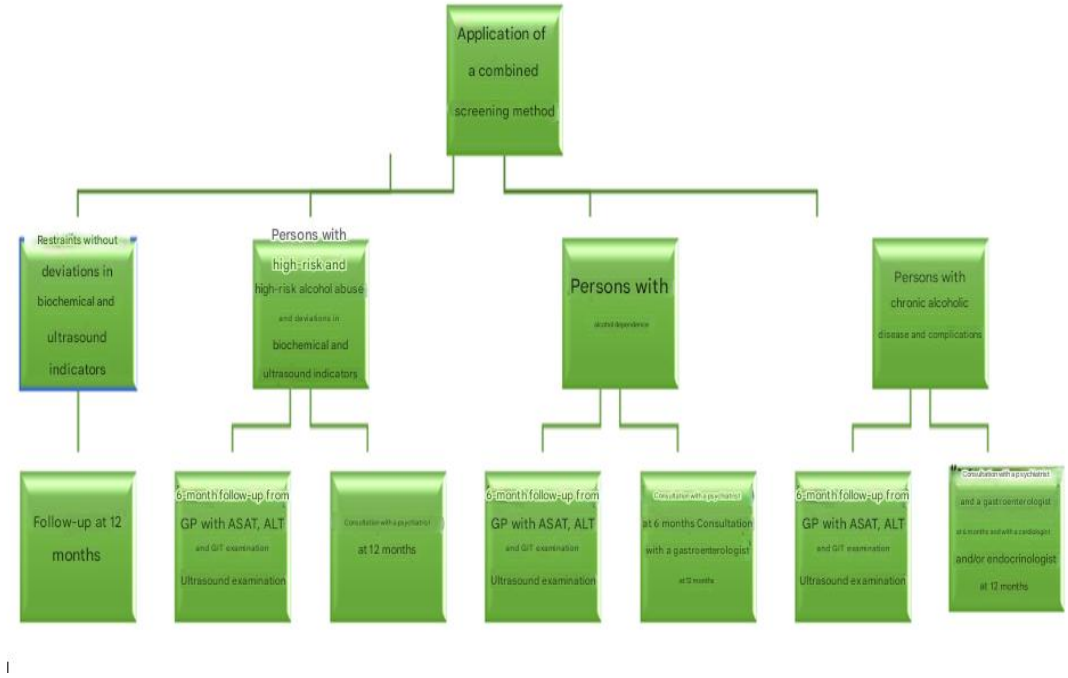
13. Have you ever been hospitalized because of alcohol use?
A. Never
B. Yes, but not in the last year
C. Yes, once or more than once in the last year

14. Have you ever been arrested for drinking alcohol or driving while intoxicated?
A. Never
B. Yes, but not in the last year
C. Yes, once or more than once in the last year

Appendix 2. Participant's clinical record
Clinical chart of the participant in a study on the topic "Management of alcohol dependence in general medical practice"

No……..... Initials:…….....
Laboratory test results:
ASAT……....U/I
ALAL……U/I
GGT……....U/I
Liver ultrasound result: ……

Appendix 3. Model for dispensary and monitoring of patients regarding alcohol behavior



XI. Articles and announcements related to the study

Publications related to the dissertation:

1. Published article in the journal "General Medicine" volume XXV 2023. issue 6 13-19pp. on the topic "Management of alcohol dependence in general medical practice - a pilot study" Dr. Daniela Krasimirova, Assoc. Prof. Dr. Zhenya Ruseva, MD, Prof. Valentina Madzhova, MD;

2. Article published in the magazine " GP news" Gastroenterology issue 4 (287) year 25, April 2024. pp. 45-49 on the topic "Disorders in zinc metabolism in alcohol dependence and the possibilities for therapeutic influence on them" Dr. Daniela Krasimirova, Assoc. Prof. Dr. Zhenya Ruseva, MD.
3. Published article in the journal "Science Endocrinology" issue 1/2024, pp. 4-9 on the topic "Metabolic changes in patients with alcohol dependence" Dr. Daniela Krasimirova, Assoc. Prof. Dr. Zhenya Ruseva, MD.

Scientific publications related to the dissertation:
1. Participation in the XVIII scientific meeting organized by SOIBOM on the topic "Cardiovascular Risk" 12.04.2024 - 14.04.2024 in the town of Bansko with a presentation on the topic "Alcohol Dependence and Cardiovascular Risk Factors" Dr. Daniela Krasimirova, Assoc. Prof. Dr. Zhenya Ruseva, MD.
2. Participation in a Scientific Meeting organized by SOIBOM with a presentation on the topic "The gray line between domestic alcohol use and dependence through the eyes of the general practitioner" held on 11.10-13.10.2024 in the city of Nessebar

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