

CLINICAL STUDY

Questionnaire for risk factors of alcoholic and nonalcoholic fatty liver disease

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ABSTRACT

OBJECTIVES: Non-communicable diseases are estimated to account for 90 % of total deaths and 19 % of premature deaths in Slovakia. Major preventable risk factors of premature mortality are overweight, obesity and alcohol consumption.

BACKGROUND: Screening of risk factors related to alcoholic and nonalcoholic fatty liver diseases (AFLD and NAFLD, respectively) in Slovak outpatients with liver disease.

METHODS: A total group of 923 patients, aged 19–91 years were included in the study. Self-administered anonymous questionnaires (Q) were filled in by them. Twelve questions were included relating to age, gender, education, BMI, intake of vegetable, fruit, fish, alcohol, and coffee, as well as to smoking and physical exercise.

RESULTS: Overweight/obesity was detected in 59 % of patients, insufficient fiber intake in 87 % of patients, insufficient fish intake in 85 % of patients, and insufficient physical exercise in 68 % of patients. BMI over 25 together with the risk of alcohol consumption was present in 68 % of patients. Smoking was present in 19 % of patients and insufficient coffee intake (from its hepatoprotective point of view) was in 35 % of patients. A total proportion of 75 % of patients were at risk for NAFLD. The risk of alcohol consumption was present in 64 % of patients.

CONCLUSIONS: An anonymous questionnaire is a useful screening tool for searching for the risks of NAFLD and AFLD in general practice. Recommendation of a screening schedule for general practitioners is implemented (*Tab. 2, Fig. 4, Ref. 36*). Text in PDF www.elis.sk

KEY WORDS: lifestyle factors, alcohol-related disease, non-alcoholic fatty liver disease.

Introduction

Morbidity and mortality from liver diseases have been increasing in the past years, with extreme accrual in the Covid-19 period.

Nonalcoholic fatty liver disease (NAFLD) experts from 29 European countries completed a cross-sectional study on public health response to NAFLD and nonalcoholic steatohepatitis (NASH) in 2020 (1). The data were compiled, their quality checked against existing official documents and reported descriptively. None of the 29 participating countries had written strategies or action plans for NAFLD. Two countries (7 %) mentioned NAFLD or NASH in related existing strategies. Ten countries (34 %) reported having national clinical guidelines specifically addressing NAFLD; all included recommendations for the assessment of diabetes and liver cirrhosis. Eleven countries (38 %) recommended screening for NAFLD in all patients with either diabetes, obesity and/or metabolic syndrome, and 7 (24 %) reported structured lifestyle programs aimed at NAFLD. We found that a comprehensive public health response to NAFLD is lacking in the surveyed European countries. This includes policies in form of a strategy, clinical guidelines, awareness campaigns, civil society involvement, and health system organizations, including registries (1).

There are two main forms of fatty liver disease, namely non-alcoholic fatty liver disease (NAFLD), in which fat built up in

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Tab. 1. Lifestyle questionnaire (LSQ) for screening ARD and NAFLD.

Demographic questions			
1. Age			
2. Gender			
3. Education	primary	secondary	university
NAFLD –related questions			
4. Weightkg		
Heightcm	BMI: below 25	0 p
		25-30	1 p
		30-35	2 p
		35-40	3 p
		Above 40	4 p
5. How much fruit or vegetables do you usually eat daily?			
		600 g and more	0 p
		400 g	1 p
		300 g	2 p
		200 g and less	3 p
(e.g.: 1 tomato, 1 cucumber, 1 paprika, 1 carrot, 1 apricot: 100 g, 1 apple, pear, banana, kale 150 g)			
6. How often do you eat fish?			
		daily	0 p
		2x weekly	1 p
		1x weekly	2 p
		less than once weekly	3 p
7. How often do you perform physical training of moderate intensity for 20 minutes?			
		daily	0 p
		every other day	1 p
		once weekly	2 p
		less than once weekly	3 p
		no	4 p
(e.g. running, aerobics, swimming, cycling, strengthening)			
Coffee & smoking			
8. How many cup of coffee do you drink?			
		3 and more daily	0 p
		1-2 daily	1 p
		less as daily	2 p
		none	3 p
9. How many cigarettes do you smoke daily?			
		none	0 p
		less than 20 weekly	1 p
		20 weekly-19 daily	2 p
		20 and more daily	3 p
ALCOHOL -related questions			
10. How often do you drink alcohol?			
		never	0 p
		1x monthly	1 p
		2-4x monthly	2 p
		2-3x weekly	3 p
		4x weekly and more	4 p
11. How much alcohol units do you usually drink daily?			
		1-2	0 p
		3-4	1 p
		5-6	2 p
		7-9	3 p
		10 and more	4 p
12. How often do you have 3-4 units of spirit (180 ml), 3-4 beers (1800 ml) or 600 ml of wine on one occasion?			
		never	0 p
		less than once monthly	1 p
		monthly	2 p
		weekly	3 p
		(almost) daily	4 p

Questions 4-7: ≥ 10 points: higher risk for NAFLD and METABOLIC SYNDROME and associated diseases

Questions 10-12: ≥ 4 points: higher risk for alcohol-related disease → complete the whole AUDIT test

the liver is not linked to drinking alcohol, and alcoholic fatty liver disease (ALD), in which fat built up in the liver is due to drinking alcohol (more than one drink per day on average for women and more than two drinks per day on average for men). Pooled data from various epidemiological studies show that daily consumption of at least 30 g/day of alcohol for women and 50 g/day for men for a duration of 5 years can lead to a clinically significant liver disease (2,3). Recently, ALD became the first cause of liver transplantation in Europe and USA.

Nonalcoholic steatohepatitis (NASH), defined as a combination of fatty liver together with inflammation and liver cell damage, may lead to liver cirrhosis or liver cancer. Alcoholic fatty liver disease is due to heavy alcohol use. Alcohol is metabolized through the liver. This process of degradation is accompanied with a production of harmful substances together with a sterile inflammatory reaction that can damage liver cells, promote inflammation and attenuate body's natural defense. Having the risk factor sensitizes a person to the manifestation of the disease. There are many risk factors for nonalcoholic fatty liver disease, including obesity, overweight, diabetes type 2 or insulin resistance and metabolic syndrome (excessive body weight, insulin resistance, high blood pressure and high triglyceride levels). NAFLD itself is an independent risk factor for cardiovascular disease leading to an increase in all-cause mortality, including liver-related mortality (4).

Considering the clinical impact of NAFLD on public health, and its increasing prevalence, timely screening and detection could be essential for avoiding further NAFLD-related morbidity, reduce healthcare costs, and promote early lifestyle interventions that may prevent or delay the deterioration of the disease (5).

Nonalcoholic fatty liver disease (NAFLD) is the leading cause of chronic liver diseases and liver transplantation worldwide. Many individuals have the risk factors associated with NAFLD, but the majority do not develop advanced liver disease, particularly cirrhosis, hepatic decompensation, or hepatocellular carcinoma. Identifying people at high risk of experiencing these complications is important in order to prevent the disease from progressing.

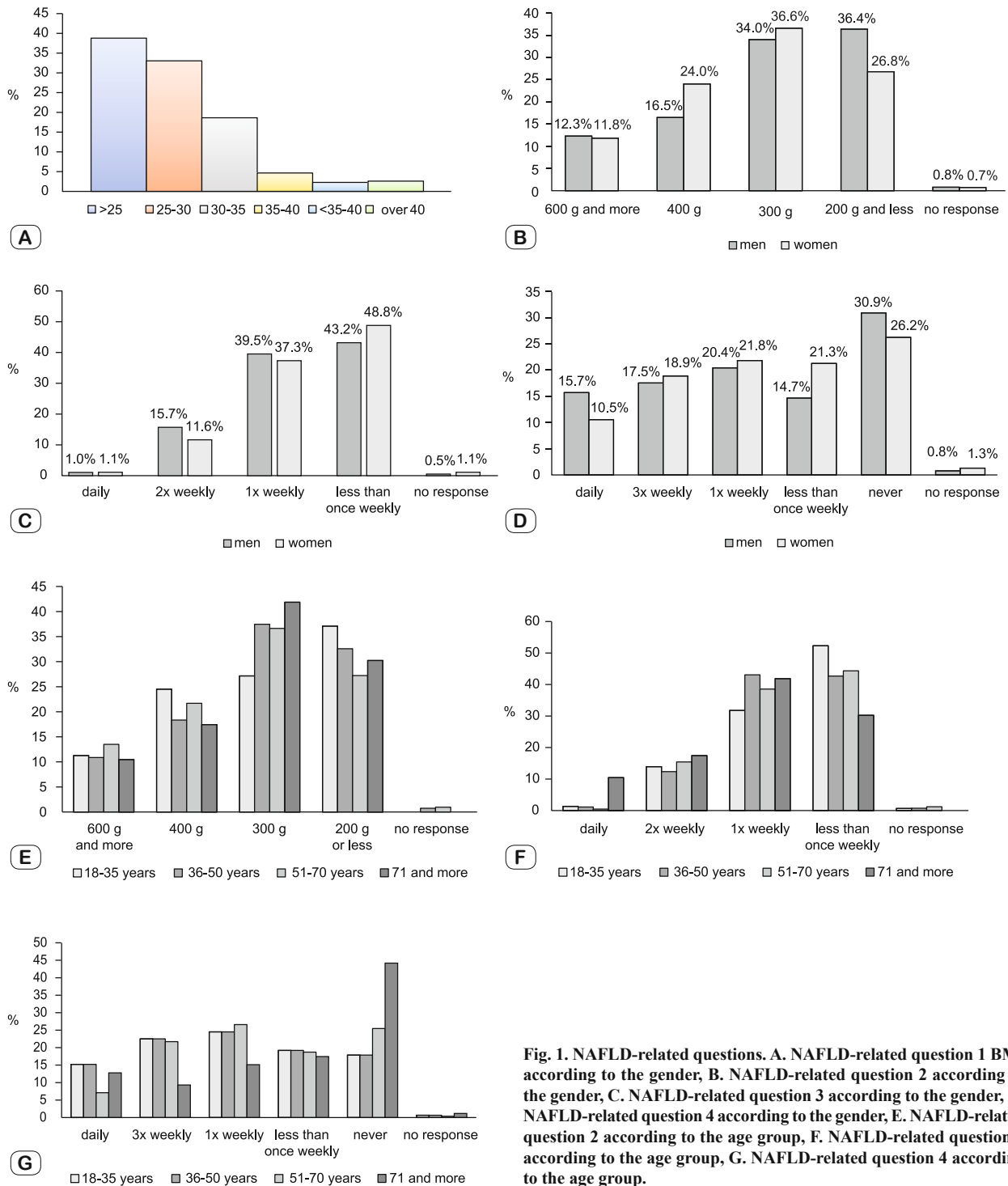


Fig. 1. NAFLD-related questions. A. NAFLD-related question 1 BMI according to the gender, B. NAFLD-related question 2 according to the gender, C. NAFLD-related question 3 according to the gender, D. NAFLD-related question 4 according to the gender, E. NAFLD-related question 2 according to the age group, F. NAFLD-related question 3 according to the age group, G. NAFLD-related question 4 according to the age group.

Overweight, obesity, smoking, and excessive alcohol consumption are the major risk factors for early reversible mortality and morbidity in the productive age (30–65 years). The Slovak Republic is one of the countries with the highest rate of avoidable, preventable deaths. Liver diseases mortality (in contrast with car-

diovascular mortality) has a rising tendency with the expectation of doubling the incidence in 2030 (6). Beside its top-five position in cirrhosis-related mortality, Slovakia is also listed among European countries with highest or increasing liver-related mortality (7, 8). Almost 90% of deaths from liver disease are preventable. In

Europe, the predominant bulk of them (50–70 %) is of alcoholic origin (ALD - alcoholic liver disease), while just about 30–40 % is due to nonalcoholic fatty liver disease (NAFLD) and metabolic syndrome, and only less than 10% are viral hepatitis, autoimmune, toxic, inherited metabolic diseases (hemochromatosis, Wilson's disease, porphyria) and vascular diseases.

Considering life expectancy, Slovakia holds the third and fourth worst positions among the OECD, and EU countries, respectively. It is 6 years shorter than in Spain, France or Italy (9).

According to WHO estimates, alcohol consumption, and overweight/obesity in Slovakia are higher as compared to OECD average. Deaths from cancer are in Slovakia on the second worst position in the EU region (9). Eventually, in 2019 and 2020, according to the Health Statistics Yearbooks, in the Slovak Republic, the liver diseases became the first cause of death in people aged 25–44 (10,11). Unhealthy lifestyle factors are undoubtedly the principal causes of these unfavorable statistics. On the other hand, goal-directed systematic approach can prevent as many as 90 % of these adverse outcomes resulting from the end-stage liver disease and hepatocellular carcinoma.

The goal of the study was to determine quantitatively the main lifestyle factors known to lead to NAFLD, and ALD in outpatients of liver and gastroenterology clinics. We found a general lack of national policies, awareness campaigns and civil society involvement. The NAFLD is a growing challenge to global public health. The NAFLD may occur in patients with normal weight, however it is closely associated with the presence of the metabolic syndrome, and therefore with obesity, type 2 diabetes mellitus, hypertension and dyslipidemia. It is defined as an increased accumulation of hepatic triglyceride (> 5 %) in the absence of excessive alcohol consumption.

Nonalcoholic steatohepatitis (NASH) is an inflammatory form of the condition marked by the presence of hepatocyte damage and progressive fibrosis that may lead to cirrhosis (12, 13). Although not widely appreciated as being a major health threat, NAFLD is a cause of significant morbidity and mortality. NAFLD-related cirrhosis can progress into end stage liver disease and hepatocellular carcinoma (14, 15). Recently, NAFLD has become one of the main causes of liver transplantation in the United States (13, 16, 17). It is also the key factor of the increased cardiovascular risk and premature cardiovascular mortality.

Patients and methods

A pivotal epidemiologic survey of lifestyle factors was conducted among adult outpatients of hepatology and gastroenterology clinics of Slovakia during the interval from September 1, 2015, to April 30, 2016. In total, 923 liver patients were included. All patients provided written informed consent. The study was approved by ethical committee. Patients were proposed to fill in the lifestyle questionnaire (LSQ) in an anonymous manner. After having the aims of the study explained, and protection of anonymity guaranteed, the patients and young adults placed the completed LSQ into the box located in a discrete zone of the clinics. The only inclusion criterion for enlisting the liver outpatients was the specialized hepatologic or gastroenterological examination. The

selection of clinics was based on the free decision of hepatologists and gastroenterologists. NAFLD was assessed using ultrasonography in the absence of excessive alcohol use or any other identifiable cause of liver disease.

In total, 13 hepatology/gastroenterology outpatient units over Slovakia were included. The completion of the LSQ took 5–10 minutes.

The LSQ fast screening tool consisted of 12 questions (Tab. 1) grouped in 3 domains focused particularly on demographic characteristics (domain A; questions 1–3), risk of NAFLD (domain B; questions 4–7), risk of alcohol-related diseases (ARD), mainly alcoholic liver disease (domain C; questions 10–12) plus 2 outlier questions (8 and 9) that were included for their known associations with NAFLD, ALD, and, in case of smoking, with overall NCD risk. Majority of questions pertained to more than one NCD. A score of 10 points or more in the NAFLD domain B (questions 4–7) was considered positive for the risk of NAFLD. Subjects were classified according to BMI as having normal weight (BMI=18.5–24.9 kg/m²), overweight (BMI 25–29.9 kg/m²) or obesity (BMI>30 kg/m²).

Audit-C is considered by WHO to be the gold standard for screening risky alcohol consumption (domain C; questions 10–12); AUDIT-C scores of ≥4 points for women, and ≥5 for men were considered positive for ARD/ALD risk. Positive screening implied recommendations of further assessment. The data from each center were entered separately with a personal individual physician's entry code to the anonymous internet register HEPAREG.

Statistical analysis

Statistical analysis was done using the software IBM SPSS Statistics 24. Exact Kruskal–Wallis nonparametric test was used for comparing series while the nonparametric exact Mann-Whitney test was used for the comparing variables for men and women and for the education level (18). Contingency table analysis and Fisher exact test were used for comparing frequencies of appropriate variables (19). The results are presented as a percentage (%) with the relevant 95% confidence intervals. The differences between the rates were considered statistically significant if the 95% confidence intervals did not overlap.

Results

The LSQs were collected from 923 outpatients. Demographically, the group of liver outpatients included 59 % women, and 41 % men, with the mean age of 52 years (18–89 years). As to their highest education level, secondary education was reported by 39 % of respondents, who were followed by those with university (24 %) and elementary education levels (5 %); 32 % of patients did not report their education level.

Overweight and obesity (BMI >25 kg/m²) were present in 59 % of patients (Fig. 1A). The two most represented cohorts were from Bratislava and Banská Bystrica (42 % and 28 % of respondents, respectively).

In fruit and vegetable consumption, only 13 % of patients reached the daily level of more than 600 g recommended by WHO.

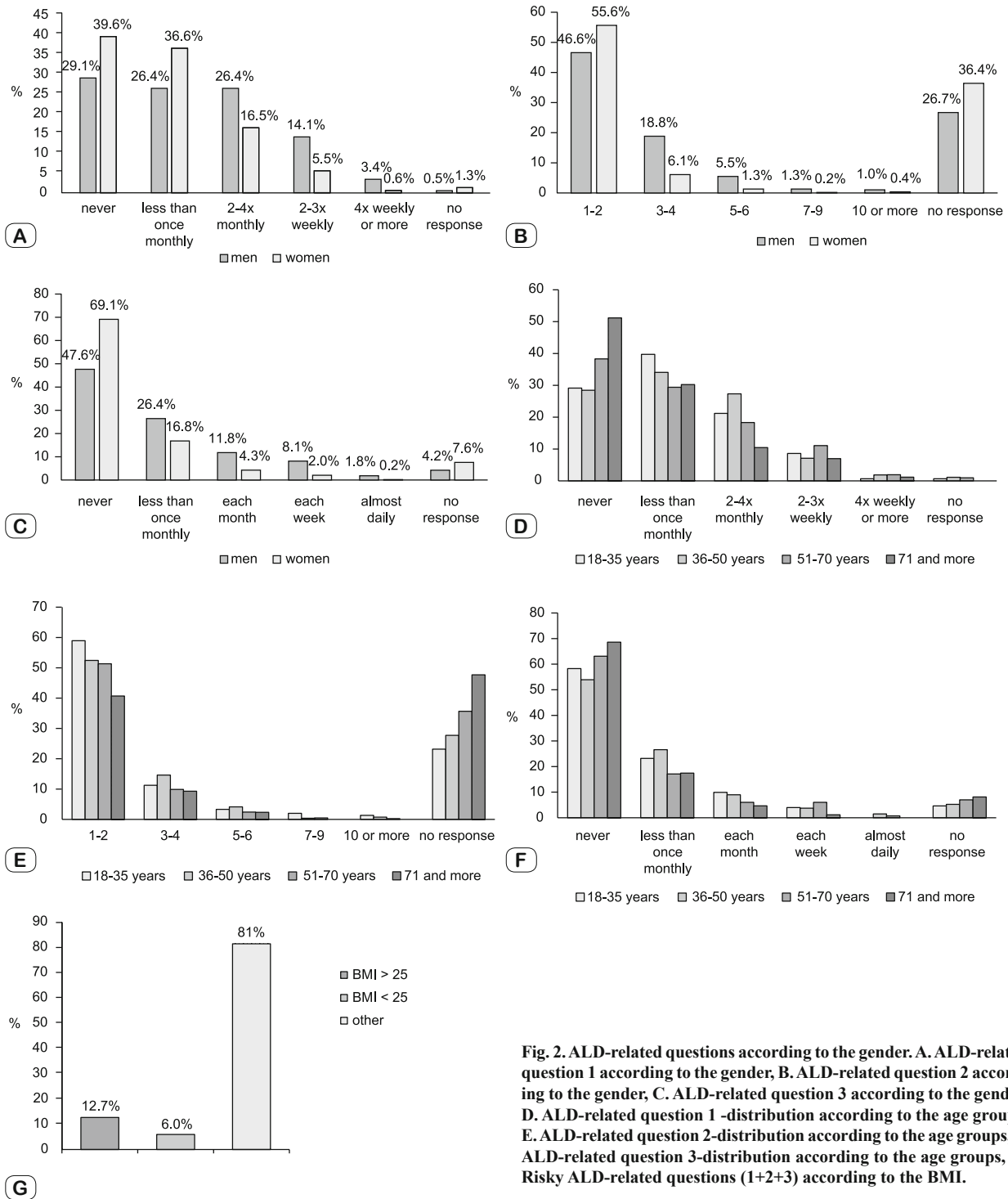


Fig. 2. ALD-related questions according to the gender. **A.** ALD-related question 1 according to the gender, **B.** ALD-related question 2 according to the gender, **C.** ALD-related question 3 according to the gender, **D.** ALD-related question 1 -distribution according to the age groups, **E.** ALD-related question 2-distribution according to the age groups, **F.** ALD-related question 3-distribution according to the age groups, **G.** Risky ALD-related questions (1+2+3) according to the BMI.

Insufficient consumption of fruit and vegetable (less than 400 g) was present in 87% of patients (6, 20, 21, 22). Answers to NAFLD-related question 2 are given in Figure 1B per gender and age.

In fish consumption, only 15% of patients consumed fish twice per week or more frequently. In 85% of patients, the fish intake

was insufficient (i.e., once per week or none). Fish consumption was higher in men than in women (16.7% vs 12.7%; $p=0.05$). According to the age, patients aged 51–70 years and 18–35 years (13.5% and 11.3%, respectively) had their daily consumption of fruit and vegetables higher than 600 g. The highest fish con-

sumption was in patients aged 51–70 years (Fig. 1). According to education, the highest fruit and vegetable consumption was in individuals with primary education, who were followed by those with university and secondary levels of education (12.2 % vs 10.8 % vs 9.7 %; $p=0.05$). Fish consumption was highest in the patients with university education, who were followed by those with secondary, and elementary levels of education (12.2 %, 10.5 %, and 10 %, respectively; $p=0.05$). Answers to NAFLD-related question 3 are given per gender and age in Figure 1C. According to the region, the fruit and vegetable consumption in Banska Bystrica was higher than in Bratislava.

Physical workout every other day or more frequent was reported only by 32 % of patients while physical workout once weekly or none was reported by 68 % of patients and 28 % of patients reported no physical activity at all. The frequency of physical workout was higher in men than in women (15.7 % of men vs 10.5 % of women had their training daily), and in those aged 18–35 and 51–70 as compared to 36–50 years of age (15.2 % and 14.9 % vs 7.1 %; $p=0.05$). Answers to NAFLD-related question 4 are given per gender and age in Figure 1D. Insufficient coffee consumption (less than 3 cups daily) in the light of its hepatoprotective effect, was reported by 35 % of patients. Smoking was reported by 19 % of patients.

Relative risk for NAFLD according to the predefined score in the domain B in adults younger than 35 years was 3.75 for men (6 %) as compared to women (1.6 %) ($p=0.0001$).

The results of screening for alcohol consumption, as determined by three questions from the AUDIT-C questionnaire areas follows. As to the first question, namely “How often do you have a drink containing alcohol?”, 64 % of patients responded “monthly, or less frequently”. As to the second question, namely, “How many units of alcohol do you drink on a typical day when you are drinking?”, 16 % of patients responded, “more than 3 units”. The recommendation for this group is to get brief advice to decrease their alcohol intake. The third question, namely “How often do you have 60 grams of alcohol on a single occasion (up to 2 hours)?” defines binge drinking. Monthly or more frequent binge drinking was reported by 40 % of patients. Risky alcohol consumption together with BMI >25 was detected in 68 % of patients. According to the AUDIT C screening questionnaire, as many as 40 % of adult outpatients with liver disease were at an increased alcohol risk. Answers to ALD-related questions are given per gender and age in Figure 2.

Discussion

Questionnaires are the best tools for collecting information on eating habits among populations. Many various tools are available, e.g., Singh’s verbal autopsy questionnaire for the assessment of causes of death, social autopsy, tobacco autopsy, and dietary autopsy. There are also dietary questionnaires used in the HBSC and ESPAD projects (23, 34). Our option was to select a simple self-administered questionnaire that could be filled in up to 10 minutes. It was from this point of view that we used LSQ by Szantova et al (20).

Our survey showed unfavorable data of lifestyle patterns in the surveyed outpatients. The results indicate insufficient con-

sumption of fruit, vegetable, and fish, absolute lack of regular physical workout and excessive alcohol consumption in 64 % of patients. Especially alarming are the resulting data bearing in mind that our patients are aware of their liver diseases and have already been advised by health professionals to abstain from alcohol, adopt a healthy diet, keep healthy body weight, and exercise. A complete change in lifestyle would be needed in 59 % of patients with overweight or obesity. The need for increasing the intake of vegetables and fruit was present in 87 % of patients with insufficient fiber consumption. More frequent weekly physical training would be needed in 68 % of patients. On the other hand, suboptimal coffee consumption (considered here is its hepatoprotective effect) was detected. According to the large population studies in Japan, China, Italy, and Norway, more than 3 cups of coffee assured most protection against liver cirrhosis and hepatocellular carcinoma (22, 23).

According to the WHO database, three key factors of premature mortality are as follows: alcohol consumption, overweight and obesity, and tobacco use (9, 24). Hypertension, tobacco use, obesity, and alcohol are the most important preventable risk factors worldwide. In Europe, 59 % of the population have overweight or obesity, 30 % use tobacco while alcohol consumption is 11 liters per capita. In Slovakia, 59.5 % of the adult population (>20 years old) are overweight, 25.4 % are obese, and 35 % use tobacco while average alcohol consumption per capita is 12.5 liters per year (24). The prevalence of overweight is higher among men (64.7 %) than among women (54.8 %). In Europe, 25% of all deaths between 20–50 years of age are alcohol-attributable and further 48 % are associated with overweight or obesity (25). In Slovakia and East European countries, the data are much higher.

Fruit and vegetable intake

According to WHO, the recommended daily intake of fruit and vegetable is more than 600 g (23). Slovakia had a fruit and vegetable supply of 463 grams per day according to estimates in 2009 (26). According to WHO, this is the sixth lowest position in the European region. In our survey, insufficient fiber intake (400 g or less) was reported by 87 % of patients. Only 12 % of patients reported fruit and vegetable intake of 600 g or more. Low-fiber intake is associated with the risk of cancer and premature cardiovascular death.

Overweight or obesity

The prevalence of overweight and obesity is higher in East European countries as compared to Western Europe. In Slovakia, 25 % of adults are obese and 60 % are overweight or obese (65 % of men, 55 % of women) (24). In our study, 59 % of patients were overweight or obese with the recommendation of weight reduction. It is known that overweight and obesity increase liver mortality 19-fold (17). The prevention or therapy in form of lifestyle intervention should include a gradual weight-loss (1–2 kg per month), change in diet, and regular exercise – at least twice a week. Relatively small amounts of weight loss (5–10 %) are able to reduce the liver fat content, improve hepatic insulin resistance, and improve liver histology (27).

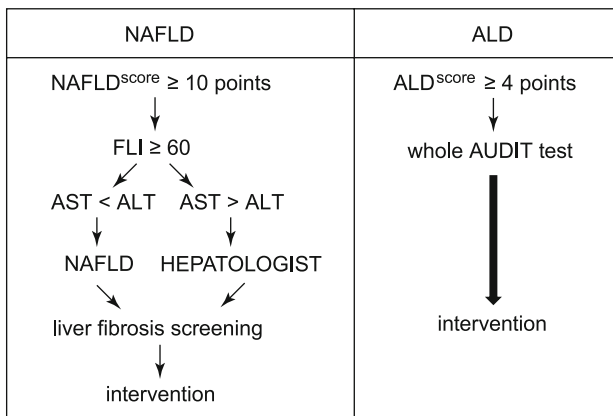


Fig. 3. NAFLD and ALD screening.

Physical activity

According to the estimates generated by WHO, 22.5 % of the population in Slovakia aged 18 years or older were insufficiently active (23.1 % of men and 22 % of women) (27). Our screening detected physical inactivity in a much higher proportion (68 % of outpatients with liver disease.). Regular physical workout twice a week should be recommended for prevention of all avertable non-communicable diseases (NAFLD included).

Fish intake

Recommended fish intake according to the American Cardiology Society is at least two portions of fish weekly (24). Inhabitants of inland countries usually have a much lower fish intake as compared to seaside countries. In our screening, a fish intake of once a week or less was reported by 85 % of patients. The reasons for this finding are unclear. By adhering to the recommendation of higher fish consumption, the patients obtain the beneficial effects of omega-3 fatty acids.

Smoking

The level of smoking in our series of patients was 19 % which is lower than the Slovak average of 35 % estimated by WHO and Statistical Office of the Slovak Republic (24). The reason is unknown. The lower smoking rate in our patients might be explained by their disease-awareness; however, their restraint from smoking on the one hand, while not abstaining from alcohol, unhealthy diet, and inactivity on the other would be debatable.

Alcohol

The diagnostic power of AUDIT-C questionnaire was proven by many scientific studies and accepted by EASL and WHO (7, 8, 16). The AUDIT-C questionnaire proved to be as effective as the AUDIT with sensitivity of 54 to 98 % and a specificity of 57 to 93 % for various definitions of heavy drinking (29, 31). AUDIT questionnaire has been considered by WHO to have been the gold standard for detecting risky alcohol consumption since 1982 (30). Our study detected risky alcohol consumption in 40 % of adult patients with liver disease. The whole AUDIT (AUDIT-10 questionnaire test) should be completed by them. Binge drinking was recorded in 40 % of patients in our study while being highly predominant in subjects at young productive age (Fig. 2F). A daily alcohol consumption of 3 units or more was recorded in 16 % of patients in our study. This level of drinking should be entered by brief recommendation of drinking reduction. The recommendation of reducing alcohol drinking is twice as efficient as brief advice for smoking cessation (32, 33). Brief intervention can prevent one in three deaths occurring among problem drinkers. Eight patients with hazardous alcohol consumption need to be advised for one patient’s benefit (31). Primary health care brief interventions were found to be highly cost-effective (29). It is the cheapest of all preventive medical interventions. The most effective intervention is at the earliest age, in adolescents and young adults.

Overweight, or obesity was detected in 68 % of patients with risky alcohol consumption. Another study provided by Szantova Jr. found out that among healthy students aged 18–35, there was

Tab. 2. AUDIT test.

QUESTION	0 point	1 point	2 points	3 points	4 points
1. How often do you have a drink containing alcohol?	never	1x monthly	2–4 times a month	2–3 times a week	4 or more times a week
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more
3. How often do you have 6 or more drinks on 1 occasion?	never	Less than monthly	monthly	weekly	daily or almost daily
4. How often during the last year have you found that you were not able to stop drinking once you had started ?	never	Less than monthly	monthly	weekly	daily or almost daily
5. How often during the last year have you failed to do what was normally expected of you because of drinking?	never	Less than monthly	monthly	weekly	daily or almost daily
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	never	Less than monthly	monthly	weekly	daily or almost daily
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	never	Less than monthly	monthly	weekly	daily or almost daily
8. How often during the last year have you been unable to remember what happened the night before because of your drinking?	never	Less than monthly	monthly	weekly	weekly
9. Have you or someone else been injured because of your drinking?	no	Yes, but not in the last year		Yes, during the last year	
10. Has a relative, friend, doctor or other health care worker been concerned about your drinking or suggested you cut down?	no	Yes, but not in the last year		Yes, during the last year	

ALD		
Risk degree	Criterion	Intervention
Lower risk	AUDIT C < 5 ♂, < 4 ♀ AUDIT < 8	Primary prevention
Increasing risk	AUDIT C ≥ 5 ♂, ≥ 4 ♀ AUDIT 8-15	Brief advice
Higher risk	AUDIT 16-19	Extended brief advice 20-30min+ monitoring
Possible dependence	AUDIT ≥ 20	Specialised treatment

Brief advice
15 min. advice + feedback
+ counseling
+ aim

Schema 5A:
1. Assess – consumption by screening test
2. Advise – reduction of consumption
3. Agree – aim of reduction
4. Assist – help to motivate
5. Arrange – plan for guidance and refer to specialized tx

NAFLD 1. exercise 30 minute daily
2. reduce intake and change the food composition
3. weight control and food composition

Fig. 4. Intervention.

a higher proportion of overweight and obesity in the group with risky alcohol drinking (21). Overweight or obesity, together with alcohol consumption, have a synergism in increasing the risk of death from liver failure or hepatocellular carcinoma (36).

Coffee consumption

Large population studies documented a hepatoprotective effect of coffee consumption. An intake of three cups of coffee or more is associated with a reduced risk of liver cirrhosis and liver carcinoma (27, 32). The question on coffee consumption has two intents. The first one covers the effect of making patients being open to providing relevant information and the second one is the liver-protective aspect. In our study, 35 % of patients had a gap of less than one daily in coffee intake. According to the numerous published population studies, the recommended daily intake should be three or more cups (27).

Future directions

We recommend the LSQ to be used in a wider-scale in hepatology/gastroenterology practice, by general practitioners, specialists, and in pediatric – adolescent primary care, as well as in schools. It could provide impetus for an earlier lifestyle intervention – either preceding, or complementary to pharmacotherapy. In schools, more lifestyle-specific education could be implemented into regular teaching programs; if assessed on annual basis, it could also serve as a stimulating, and/or directing feedback. In the clinical practice, the LSQ could and should be followed by the management plan.

The LSQ-based management plan:

Step 1: Annual screening of life-style factors by means of LSQ at general practitioner clinics, and elementary, and high schools (Tab. 1).

Step 2: Assessment of the risk for NAFLD and ARD/AFLD by means of LSQ in gastroenterology, and hepatology practices,

if at risk for NAFLD, proceed by the fatty liver index (FLI), and noninvasive assessment of liver fibrosis. The risk for ARD/AFLD should be considered according to the whole AUDIT test, and by stratification of the liver disease (Fig. 3).

Step 3: The whole AUDIT test in those who achieved 4 or more points in AUDIT- C questionnaire (Tab. 2).

Step 4: Intervention according to the score achieved in AUDIT test or NAFLD scoring (Fig. 4).

Recommendation of a lifestyle change should include cooperation with psychologist, personal trainer and nutritional therapist. A personal dietary plan should be incorporated into the treatment plan in hand with regular physical workout and cognitive-behavioral treatment. Already a small change in weight loss together with quitting drinking alcohol is associated with histological improvement of the liver, life’s prolongation together with improvement of its quality (35). Action plan directed at the young can help to save more lives, improve quality of life and decrease health-care expenditure.

Conclusion

In Slovakia, there is an urgent need for a systematic approach to detecting unhealthy lifestyle and supporting the subsequent process of making a change. We recommend a screening by means of LSQ in an outpatient setting, and at schools. This screening tool is fast, simple to use, and inexpensive. Its advantage, if switched from anonymous to personalized, lies in the linkage to care, followed by brief advice, and other measures. The power of LSQ should be in the de-anonymized format. It may save lives of our patients. For the effective management of an unfavorable national statistics on NCD, immediate action should be taken as soon as possible, and it should take the form of a national preventive program. No specialized equipment or expertise is needed, and it can be easily used by general practitioners to predict the extent of fatty infiltra-

tion in cases of NAFLD. This will have an important impact on public health and reflected in health care costs.

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Received September 1, 2020.

Accepted February 21, 2022.