International Journal of Medical Science and Clinical Invention 11(10): 7260-7267, 2024
DOI:10.18535/ijmsci/v11i.10.01
https://valleyinternational.net/index.php/ijmsci

Knowledge-Attitude-Practices of Non-Alcoholic Fatty Liver Disease among Indian Patients with Metabolic Disorders: A Multi-centric Cross-Sectional Observational Study

Dr. Shehla Shaikh[1], Dr. Vijay Negalur[2], Dr. Shubhashree Patil[3], Dr. Ramesh Dargad[4], Dr. Ashok Jaiswal[5], Dr. Aditi Bhandari[6], Dr. Kunal Jhaveri[7]

[1]Consultant Endocrinologist, Saifee Hospital, Mumbai, Maharashtra-400004, India.
[2]Internal Medicine, Negalur's Diabetes and Thyroid Center, Thane, Maharashtra-400615, India.
[3]Internal Medicine Diabetes and Wellness Clinic, Mumbai, Maharashtra – 400093, India.
[4]Internal Medicine Dr. Patel's Polyclinic, Mumbai, Maharashtra- 400093, India
[5]Medical Affairs Zydus Healthcare Limited, Mumbai, Maharashtra – 400063, India.
[6]Department of Pharmacology Ravindra Nath Tagore Medical College, Udaipur, Rajsthan-313001, India.
[7]Medical Affairs, Zydus Healthcare Limited, Mumbai, Maharashtra – 400063, India.

Corresponding Author : Dr. Kunal Jhaveri Medical Affairs, Zydus Healthcare Limited, Mumbai, Maharashtra – 400063, India.

Abstract:

Background:

Non-alcoholic fatty liver disease (NAFLD) is a common liver disease. Despite the increasing incidence of NAFLD, its diagnosis rate is extremely low. Patients at increased risk for NAFLD are usually those with at least one metabolic disease like, type 2 diabetes mellitus (T2DM), hypertension, obesity, dyslipidemia, or polycystic ovarian disease (PCOD). Few regional studies have found a need to improve the understanding of NAFLD and its associated burden. Thus, this study was conducted to assess the knowledge, attitudes, and practices regarding NAFLD among Indian patients with metabolic diseases.

Methodology: A cross-sectional, observational, multicentric study conducted among 100 patients having at least one metabolic disease presenting to the outpatient departments of general physicians, diabetologists, and endocrinologists of a tier-1 city in western India. Information regarding demographic details, clinical profile, and a structured pre-validated questionnaire comprising 25 questions in three sections: questions to evaluate knowledge, attitude, and practice of NAFLD, was recorded in the Case Record Forms and included in this analysis. The total KAP score was derived, and subjects were classified as having low (0-7), average (8-14) or high score (15-22).

Result: In terms of knowledge, almost half (52%) were knowledgeable, 41% had a good attitude, and 52% had a good practice score.

Conclusion: This study concluded that the participants had a significant amount of knowledge and a positive attitude toward NAFLD, but practice must be developed.

Keywords: Steatotic liver disease, Fatty liver, High Triglyceride, Type 2 diabetes mellitus, Hypertension

Introduction:

Non-alcoholic fatty liver disease (NAFLD) is a prevalent hepatic disorder [1]. Although the number of patients with NAFLD is increasing, less than 20% have received a formal diagnosis [2]. Individuals who have a higher likelihood of developing NAFLD typically have at least one metabolic disorder, such as type 2 diabetes mellitus, hypertension, obesity, dyslipidemia (specifically hypertriglyceridemia), or Polycystic Ovarian Disease (PCOD). Several regional studies have identified a lack of knowledge regarding NAFLD and its associated impact, indicating the need for improvement [3-5]. In 2021, the Ministry of Health and Family Welfare of India incorporated NAFLD under the National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) [6]. The guidelines use essential public health strategies, including health promotion, risk

classification, timely diagnosis, and rapid treatment [7]. Currently, liver biopsy is considered as the most reliable method for diagnosing NAFLD. However, because of its invasive nature, high cost, and susceptibility to sampling errors, alternative non-invasive tests, such as the Fibrosis-4 index (FIB-4), NAFLD Fibrosis Score (NFS), and transient elastography, have been developed as more accessible and affordable options for identifying patients at high risk of NASH and advanced fibrosis [8].

However, the efficacy of NAFLD testing is ineffective due to the lack of awareness and knowledge gaps about the disease among both patients and physicians. This results in a delay in the identification and treatment of NAFLD, leading to its rapid progression and worsening impact on the healthcare system and economy [6]. The impact of knowledge, attitude, and practices (KAP) on self-management outcomes in patients with fatty liver is significant. However, the relationship between KAP and concomitant diseases in these patients remains unknown [9]. The number of studies on factors associated with such cases in India is limited. Therefore, this study was planned with the primary aim to conduct a multi-centric survey using a pre-validated questionnaire to evaluate the knowledge, attitudes, and practices regarding NAFLD among Indian patients with metabolic diseases.

Materials and methods:

This multicentric, cross-sectional, observational study was conducted over a two-month period from May to June 2024. This study was conducted at the outpatient departments of four internal medicine practitioners, diabetologists, and endocrinologists in Mumbai, India. The objective of this study was to assess the prevalence and characteristics of metabolic disorders in the selected population.

The sample size was 100 patients, recruited using convenience sampling to ensure a diverse and representative cohort. Patients over 18 years of age and have at least one of the following metabolic disorders: Type 2 Diabetes Mellitus (T2DM), Hypertension (HTN), Dyslipidemia (Hypertriglyceridemia), Obesity, or Polycystic Ovarian Disease (PCOD) were included in the study. Non-consenting patients were excluded from the study to maintain ethical standards and ensure voluntary participation. This approach aimed to provide insights into the prevalence and management of metabolic disorders in the urban population of Mumbai and provided valuable data for future research and healthcare strategies.

Data collection:

After obtaining written informed consent from the participants, information regarding demographic characteristics, clinical diagnosis, and the latest available laboratory parameters such as HbA1c (glycated hemoglobin), triglycerides (TG), aspartate transaminase (AST), alanine transaminase (ALT), platelet count and transient elastography parameters (controlled attenuation parameter (CAP) and liver stiffness measurement (LSM) within the last six months were recorded. Patients were interviewed based on a structured, pre-validated questionnaire about their knowledge, attitude, and practice regarding NAFLD, and data were collected in the prescribed case record forms and included in this analysis. The questionnaire comprised 25 closed-ended questions with Yes/No responses or multiple-choice options, of which 22 questions were included for scoring. A correct response was assigned a score of 1, and an incorrect response received a score of 0. The KAP score was derived by summing the scores and categorizing subjects into low (0-7), medium (8-14), and high (15-22) score groups. Data were entered into Microsoft Excel, analysed statistically using the Data Analysis Tool, and results were expressed as mean ± SD, percentage, or in tabulated form.

Operational definitions:[10]

1. **Knowledge:** It is the awareness of the community about NAFLD. It is measured by calculating the mean score of the 13 items and categorized as knowledgeable or not knowledgeable based on the mean score of the correctly answered questions.
2. **Attitude:** The way community thinks and behaves toward NAFLD. It is measured by calculating the mean score of the 6 questions. All individual answers to attitudinal questions were computed to obtain total scores; based on which participants were categorized as having good attitude or poor attitude.
3. **Practice:** The habitual community involvement to prevent NAFLD. It is measured by calculating the mean score of

the 6 questions and based on the mean score participants were categorized as good practice or poor practice.

Ethical consideration:

The study was designed and conducted in compliance with the Declaration of Helsinki. Prior to data collection, approval from the Ethical Committee was obtained through RPIEC230524 dated 29/05/2024.

Results:

In total, 100 patients demographic and clinical profiles were collected and analysed (Table 1). Of these, 52% were male and 48% were female. All patients had at least one comorbidity, with type 2 diabetes mellitus being the most common (72%) and PCOD being the least common (10%). The mean CAP score, LSM score and other clinical parameters are presented in Table 2. Individual responses regarding knowledge, attitudes, and practices regarding NAFLD in percentage of all patients are presented in Table 3.

Table 1: Demographic details of patients with metabolic disorders (N= 100):

Age (years, mean ± SD)	54.09 ± 14.64
	% of patients
Gender	
Male	52
Female	48
Education level	
Primary education	16
Secondary education	32
Graduate	31
Postgraduate	21
Comorbid conditions	
Obesity	19
Type 2 diabetes mellitus	72
Dyslipidemia	48
Hypertension	36
PCOD	10

Table 2: Laboratory parameters of patients with metabolic disorders (N=100):

Parameter	Value (mean ± SD)
TG (mg/dl)	138.48 ± 99.97
HbA1c (%)	6.80 ± 1.19
AST (Unit/Liter)	43.52 ± 30.35
ALT(Unit/Liter)	41.28 ± 38.07
Platelet Count (10^9/L)	229.98 ± 61.32
LSM in kilopascals (kPa)	6.39 ± 2.68
CAP, decibels per meter (dB/m)	258.16 ± 50.81
FIB-4 score	1.68 ± 0.84

[Abbreviations: ALT- Alanine transaminase, AST- Aspartate transaminase, CAP- Controlled Attenuation Parameter, FIB-4- Fibrosis-4 score, HbA1c- Glycated Hemoglobin, LSM- Liver Stiffness Measurement, TG- Triglycerides]

Table 3: Knowledge attitudes about NAFLD among patients with metabolic disorders (N=100):

No.	Question	Responses (%)
Knowledge aspects		
1.	NAFLD terminology	
	Yes	60
	No	40
2.	Source of Information	
	HCP	23
	Family /Families	16
	Mass media	17
	Do not know	44
3.	Occurrence of SLD without alcohol intake	
	Yes	57
	No	43
4.	Metabolic risk factors for SLD	
	Obesity	6
	T2DM	6
	Dyslipidemia	13
	Hypertension	6
	Do not know	69
5.	Impact of metabolic disease progression	
	Yes	35
	No	65
6.	Fatty liver disease symptoms	
	Yes	34
	No	66
7.	Diagnostic test for SLD	
	LFT	31
	USG	28
	VCTE	16
	Do not know	25
8.	Need for SLD treatment	
	Yes	54

	No	46
9.	Long-term complications of SLD	
	CVD	8
	DM	16
	Liver Cirrhosis	2
	HCC	4
	Do not know	70
10.	Impact of improper diet and lifestyle on SLD	
	Yes	63
	No	37
11.	Curability of SLDs	
	Yes	50
	No	50
12.	SLD is a disease of adults only	
	Yes	81
	No	19
13.	MASLD terminology	
	Yes	2
	No	98
Attitude aspects		
1.	Risk of developing fatty liver	
	Yes	74
	No	26
2.	Wanting information about fatty liver from the treating physician	
	Yes	93
	No	7
3.	Perception of SLD as a serious problem	
	Yes	65
	No	35
4.	Willingness to be tested for SLD	
	Yes	50
	No	50
5.	Expenditures on the diagnosis and treatment of SLD	
	Yes	48
	No	52
6.	Willingness to attend counseling sessions	
	Yes	73
	No	27
Practice aspects		
1.	Screening for SLD	
	Yes	53
	No	47
2.	Ask the doctor about the cause of SLD	
	Yes	35
	No	65
3.	Willingness to adopt specific diet	
	Yes	70
	No	30
4.	Willingness to exercise to lose weight	
	Yes	54
	No	46
5.	Willingness to take specific medications for SLD	
	Yes	40
	No	60
6.	Willingness to continue therapy for long periods	
	Yes	18
	No	82

[Abbreviations: CVD – cardiovascular disease, HCC – Hepatocellular carcinoma, HCP – Healthcare Physician, LFT – Liver function tests, MASLD – Metabolic dysfunction associated steatotic liver disease, NAFLD – Non-alcoholic fatty liver disease, SLD- Steatotic liver disease, T2DM – Type 2 diabetes mellitus, USG – Ultrasonography, VCTE – Vibration controlled transient elastography]

The mean value of the KAP score for NAFLD was observed to be 11.22 ± 4.34 with 47% of participants scoring higher than the mean score (table 4). The distribution of the overall KAP score among the participants (%) is illustrated in Figure 1.

Table 4: Mean KAP score for NAFLD among patients with metabolic disorders (N=100)

KAP Parameter	Value (mean ± SD)	% of participants with higher than mean score
Knowledge	4.49 ± 2.51	52
Attitude	4.03 ± 1.19	41
Practice	2.70 ± 1.67	52
Total score (KAP)	11.22 ± 4.34	47

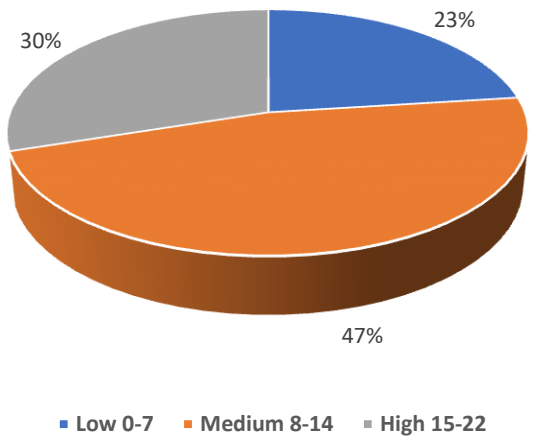

Figure 1: Distribution of participants (%) according to overall KAP score.

Discussion:

This cross-sectional study was conducted at four centers in a tier 1 city in India, where a diverse group of patients were interviewed. Recent study reported that the prevalence of NAFLD in Asia is estimated to be 29.6% [10,11]. In India, the prevalence of NAFLD in urban population ranges from 9-53% [12]. In a study by Mohan et al. (2009), the high rate of NAFLD in the urban population ranged from 16.6% to 32% in India [13]. Primary metabolic factors that elevate risk include metabolic syndrome, diabetes, obesity, mixed hyperlipidemia, and hypercholesterolemia resulting from familial hypobetalipoproteinemia. There is a suggestion that if NAFLD can be averted, it might also reduce other noncommunicable diseases [14]. Despite the high incidence of metabolic disorders and their association with NAFLD in India, awareness and understanding of its management remain relatively low. This study aimed to identify gaps in various aspects of knowledge, attitude, and practice (KAP) regarding NAFLD among the Indian population with metabolic disorders [15].

Knowledge of NAFLD: According to a study conducted by Lee JH et al (2023), only 25.7% of the general population is aware that NAFLD (non-alcoholic fatty liver disease) increases the occurrence of heart and brain disorders. Our study found a similar result, with approximately 30% of the participants being aware of the long-term cardiac and liver consequences associated with NAFLD [16]. In the study conducted by Singh P et al (2022), 50.15% of the participants were knowledgeable of the term "NASH," whereas only 8.62% were aware of non-alcoholic steatohepatitis (NASH). However, none of the participants were familiar with MAFLD (metabolic dysfunction associated fatty liver disease) [17]. The present study also found comparable results, with 60% of the participants being aware of the term "NASLD," while only 2% knew about MASLD. The majority of patients in our study (63%) were aware that non-alcoholic fatty liver disease (NAFLD) is a lifestyle disease with a prevalence of 97.4%. In Singh P's study, nearly all patients were knowledgeable about the diagnostic methods for fatty liver, such as ultrasound, CT-Scan, MRI, and VCTE. This awareness was reported to be 97.1%; however, our data showed a lower percentage of 75% [17]. In accordance with Roy K et al (2016), a significant majority of 96.7% of the participants with NAFLD were uninformed about the risk factors associated with NAFLD, in contrast to the 69% observed in our research [18]. The variation can be attributed to the fact that all patients were registered at clinics where physicians specialized in either diabetology or endocrinology. In addition, a study revealed that 81% of patients believe that this disease affects adults exclusively. However, Shalimar et al. (2022) demonstrated that 4 out of 10 youngsters in India experience fatty liver disease [19]. The study conducted by the University of Baroda in 2016 found that none of the participants perceived obesity to be a risk factor for NAFLD. However, our investigation revealed that 6% of the participants perceived obesity as a risk factor. Additionally, the same number of participants believed that the existence of type 2 diabetes could affect the liver [8]. Although there is a strong understanding of the terminology and therapy of NAFLD, there is a dearth of awareness regarding the potential progression of NAFLD to end-stage liver disease and cardiovascular disease. When calculating the average knowledge score, it was observed that almost half (52%) of the study participants can be said to be 'knowledgeable' in this study.

Attitude regarding NAFLD: In the Korean study, a significant majority (85.7%) of the general population acknowledged the potential for developing fatty liver. The study found that a significant number of responders (60.2%) expressed willingness to participate in the NAFLD treatment program, with similar outcomes. Additionally, 50% of the participants in the same

study emphasized the financial burden of medical expenditures [16]. This result corresponds to our finding that 74% of patients believe that they are at risk of developing fatty liver. Within our study, a significant majority of patients (93%) expressed a strong desire to receive further information from their treating physicians and 73% of the respondents indicated willingness to participate in counselling sessions. Additionally, 48% of the participants in our survey expressed that NAFLD diagnosis and treatment appeared to be costly to them. Weiland et al. (2015) conducted a study in an outpatient clinical environment to examine NAFLD awareness among individuals with high metabolic risk factors. The study found a lack of awareness regarding NAFLD among the participants [20]. Thus, an average of 41% of the patients had a good attitude in this study (participants scored ≥ mean score), with 9% of the patients obtaining a full score of 6/6.

Practice regarding NAFLD: In a Korean study [16], 58.5% of individuals indicated that they choose to engage in more physical activity as a means of preventing and managing NAFLD. At the same time, in this study, 54% of patients exhibited a willingness to exercise to lose weight and manage SLD. The practices toward medication and therapy seemed to be lacking, with only 40% of patients willing to take specific medications to treat SLD and only 18% agreed to take treatment for life. This behaviour can be reversed with active intervention and counselling from the treating physicians because patients have the utmost trust in the advice of their physicians. In total, 52% of the patients had a good practice score in this study (participants scored ≥ mean score).

Overall KAP Score: In terms of the mean NAFLD knowledge attitude practice (KAP) score in Roy K et al, it was in the poor category, but in this study, it came out to be in the medium category with a mean score of 11.22 ± 4.34, with a maximum number of patients in the medium category (47%) [18]. With improvements in patient care and counselling techniques by physicians and diabetology specialists, this score has shown positive outcomes over time. By incorporating NAFLD into the National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) since 2021 [7], further improvements in the awareness and attitude regarding NAFLD can be expected over the next decade in these patients [21].

The small sample size and focus on a single city limit the ability to generalize the findings to the entire Indian population. Additionally, the study specifically approached the clinics of internal medicine practitioners, diabetologists, and endocrinologists, which may introduce bias in patient awareness levels. There is a need to have more randomized, controlled trials with larger sample sizes with involvement of multiple specialities.

Conclusion:

The present study highlights the significant gaps in knowledge, attitudes and practices (KAP) regarding NAFLD among Indian patients with metabolic disorders. Despite a high prevalence of metabolic disorders, awareness and understanding of NAFLD remain low. Effective patient education and counselling by healthcare providers are crucial for improving NAFLD management. Incorporating NAFLD into national health programs can enhance awareness and preventive measures, ultimately reducing the burden of NAFLD and associated comorbidities in India.

Disclosures:

Human subjects: All participants in this study either provided or waived their consent. The Royal Pune Independent Ethics Committee has granted permission under reference number RPIEC230524, authorized on May 29, 2024.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Animal subjects: The authors have verified that this study did not include any animal subjects or tissues.

Conflicts of interest: As per the ICMJE universal disclosure form, all authors state the following:

Funding: The authors confirm that they did not receive any financial support from any organization for the study.

Financial relationships: All authors have stated that they do not currently have any financial ties or affiliations with any organizations that may have a vested interest in the work being submitted, nor have they had any such associations during the past three years.

Acknowledgments: We would like to acknowledge all authors for their contributions to this study.

References:

1. Younossi ZM: Nonalcoholic fatty liver disease: a global public health perspective . J Hepatol. 2019, 70:531- 544. 10.1016/j.jhep.2018.10.033. Epub on November 9, 2018.
2. Alexander, M., Loomis, A. K., Fairburn-Beech, J., et al.: Real-world data reveal a diagnostic gap in non-alcoholic fatty liver disease. BMC Med. 2018; doi: 10.1186/s12916-018-1103-x.
3. Ratziu V, Cadranel JF, Serfaty L, et al.: A survey of patterns of practice and perception of NAFLD in a large sample of practicing gastroenterologists in France. J Hepatol 2012;57:376-383. 10.1016/j.jhep.2012.03.019.
4. Matthias AT, Fernandopulle AN, Seneviratne SL: Survey on knowledge of non-alcoholic fatty liver disease (NAFLD) among doctors in Sri Lanka: a multicenter study. BMC Res Notes. 2018;11:556. doi: 10.1186/s13104- 018-3673-2.
5. Casler K, Trees K, Bosak K: Providing care for fatty liver disease patients: primary care nurse practitioners' knowledge, actions, and preparedness. Gastroenterol Nurs. 2020, 43:184-189. 10.1097/SGA.0000000000000487.
6. Operational Guidelines of Non-Alcoholic Fatty Liver Disease (NAFLD) Into NPCDCS . https://main.mohfw.gov.in/.
7. Srivastava P, Prasad M, Kapil U: Integration of nonalcoholic fatty liver diseases (NAFLD) into NPCDCS program: A recent initiative in India. Indian J Commun Health. 2022, 34:150-153.
8. Vilar-Gomez E, Chalasani N: Non-invasive assessment of non-alcoholic fatty liver disease: Clinical prediction rules and blood-based biomarkers. J Hepatol. 2018, 68:305-315. 10.1016/j.jhep.2017.11.013. Epub 2017 Dec 2.
9. Yang H, Gao J, Ren L, et al.: Association between Knowledge-Attitude-Practices and Control of Blood Glucose, Blood Pressure, and Blood Lipids in Patients with Type 2 Diabetes in Shanghai, China: A Cross- Sectional Study. J Diabetes Res. 20172017, 3901392. 10.1155/2017/3901392. Epub on December 31, 2017.
10. Kassahun CW, Mekonen AG: Knowledge, attitude, practices, and their associated factors toward diabetes mellitus among non-diabetes community members of Bale Zone administrative towns, Ethiopia. A cross-sectional study. PLOS ONE 2017, 2, 0170040. DOI: 10.1371/journal.pone.0170040.
11. Wong SW, Chan WK: Epidemiology of nonalcoholic fatty liver disease in Asia . Indian J Gastroenterol. 2020, 39:1-8. 10.1007/s12664-020-01018-x.
12. Anton MC, Shanthi B, Sridevi C: Prevalence of nonalcoholic fatty liver disease in an urban adult population in a Tertiary Care Center, Chennai. Indian J Community Med. 2023, 48:601-604. 10.4103/ijcm.ijcm_437_22.
13. Mohan V, Farooq S, Deepa M, Ravikumar R, Pitchumoni CS: Prevalence of nonalcoholic fatty liver disease in urban South Indians in relation to different grades of glucose intolerance and metabolic syndrome. Diabetes Res Clin Pract. 2009, 84:84-91. doi: 10.1016/j.diabres.2008.11.039.
14. Integration of Non-Alcoholic Fatty Liver Diseases (NAFLD) into NPCDCS program: A recent initiative in India. Corresponding Author Article Cycle. 362226458, 13:2024. doi: 10.47203/IJCH.2022.v34i02.003
15. Hassen, G., Singh, A., Belete G et al.: Nonalcoholic Fatty Liver Disease: An Emerging Modern-Day Risk Factor for Cardiovascular Disease. Cureus. 2022, 30:25495. DOI: 10.7759/cureus.25495.10.7759/cureus.25495.
16. Lee JH, Jung JH, Park H et al.: A survey on the awareness, current management, and barriers to nonalcoholic fatty liver disease among the general Korean population. Sci Rep. 13:15205.
17. Singh P, Mehta M, De A, Duseja A: Awareness and knowledge about Non-Alcoholic Fatty Liver Disease (NAFLD)

among patients with NAFLD. J Clin Exp Hepatol 2022, 2, 72. doi: 10.1016/j.jceh.2022.07.178.

18. K. Roy, U. Iyer, and T. Vaishnav: Knowledge attitude and practices of type 2 diabetics with ultrasound diagnosed non-alcoholic fatty liver disease". Int J Curr Res. 2016;8:
19. Shalimar AE, Bansal B, Gupta H, Anand A, Singh TP, Goel A: Prevalence of Non-alcoholic Fatty Liver Disease in India: A Systematic Review and Meta-analysis. J Clin Exp Hepatol. 2022, 12:818-829. 10.1016/j.jceh.2021.11.010.
20. Wieland, A. C., Settler, P., McDermott, M. T., et al. 2015. Low awareness of nonalcoholic fatty liver disease among patients with high metabolic risk. J Clin Gastroenterol, 49: e6-e10. 10.1097/MCG.0000000000000075.
21. Duseja A, Najmy S, Sachdev S et al.: High prevalence of non-alcoholic fatty liver disease among healthy male blood donors of urban India. JGH Open. 2019, 3:133-139. DOI: 10.1002/jgh3.12117.