

RESEARCH LETTERS

Accuracy, Reliability, and Comprehensibility of ChatGPT-Generated Medical Responses for Patients With Nonalcoholic Fatty Liver Disease



Nonalcoholic fatty liver disease (NAFLD) is an increasing global health problem and is expected to become the leading indication for liver transplantation.¹ There are no approved NAFLD-specific pharmacotherapies, and lifestyle modification is the primary recommended therapy.² Innovative approaches to facilitate the implementation and long-term maintenance of lifestyle changes are needed to address the challenging and complex nature of the management of NAFLD, which recently was renamed as *metabolic dysfunction-associated steatotic liver disease*, to overcome the limitations and stigma of the previous name.^{3,4} Artificial intelligence (AI)-powered chatbots have been shown to provide effective personalized support and education to patients, with the potential to complement health care resources. The OpenAI Foundation's AI chatbot, Chat Generative Pretrained Transformer (ChatGPT), has attracted worldwide attention for its remarkable performance in question-answer tasks.^{5–7} This study evaluated the accuracy, completeness, and comprehensibility of chatGPT's responses to NAFLD-related questions, with the aim of assessing its performance in addressing patients' queries about the disease and lifestyle behaviors.

This study was conducted in March 2023 and was Institutional Review Board exempt because no patient-level data were used. Two expert physicians (N.P. and A.A.) selected 15 questions commonly asked by NAFLD patients, taking into account their clinical expertise and guidelines (Table 1).^{2,3} The questions can be grouped into 3 domains: (1) questions 1, 14, and 15 focused on the need for specialist referral and the ability to detect worsening/improvement of NAFLD; (2) questions 2 to 9 and 13 focused on diet composition, weight loss, medications, coffee consumption, and alcohol intake; and (3) questions 10 to 12 focused on the type of physical activity.

On March 25, 2023, 3 users from Milan, Italy (N.P., C.H., and A.A.) separately and independently entered the questions into ChatGPT using the "New Chat" function.⁸ The responses generated by ChatGPT were recorded and distributed to 10 key opinion leaders (KOLs) in NAFLD and 1 nonphysician with expertise in patient advocacy in liver disease (Supplementary Table 1). Each KOL was asked to independently rate the AI-generated responses using the Likert scale for accuracy, completeness, and comprehensibility (Supplementary Table 2).⁹ The nonphysician KOL was asked to rate the responses using the Likert scale for comprehensibility only. The results of the survey were analyzed using descriptive statistics and concordance measures (Supplementary Methods).

Table 1. Questions Posed to ChatGPT

	Question
1	I have been diagnosed with NAFLD. Should I be referred to a hepatologist? Should I undergo additional blood tests or radiologic examinations?
2	How much weight should I lose if I have NAFLD?
3	Which diet should I follow if I have NAFLD?
4	Which foods should I avoid if I have NAFLD?
5	Can I drink alcohol if I have NAFLD?
6	Which foods have a positive effect on NAFLD?
7	Can I use herbal remedies if I have NAFLD?
8	Can I drink coffee if I have NAFLD?
9	Can I smoke if I have NAFLD?
10	How much exercise should I do if I have NAFLD?
11	Which type of exercise is better for NAFLD?
12	Should I do cardio or lift weights for NAFLD?
13	Which drugs should I take if I have NAFLD?
14	How do I understand if NAFLD is worsening?
15	How do I understand if NAFLD is improving?

ChatGPT, Chat Generative Pretrained Transformer; NAFLD, nonalcoholic fatty liver disease.

The mean accuracy score was 4.84 ± 0.74 on a Likert scale ranging from 1 to 6, with questions 10 and 11 receiving the highest scores (5.6 ± 0.51 and 5.6 ± 0.69 , respectively). Question 7 had the lowest mean score (3.3 ± 2). Questions 2 and 10 were the only 2 questions (13%) in which all KOLs scored the answer as 5 (nearly all correct) and 6 (correct). The physical activity domain had the highest mean score (5.56 ± 0.56), while the specialist referral domain had the lowest mean score (3.9 ± 1.44). Kendall's coefficients of concordance ranged from 0.167 to 0.568 with a mean of 0.477, indicating a moderate level of agreement among KOLs (Figure 1A).

Abbreviations used in this paper: AI, artificial intelligence; ChatGPT, Chat Generative Pretrained Transformer; KOL, key opinion leader; NAFLD, nonalcoholic fatty liver disease.

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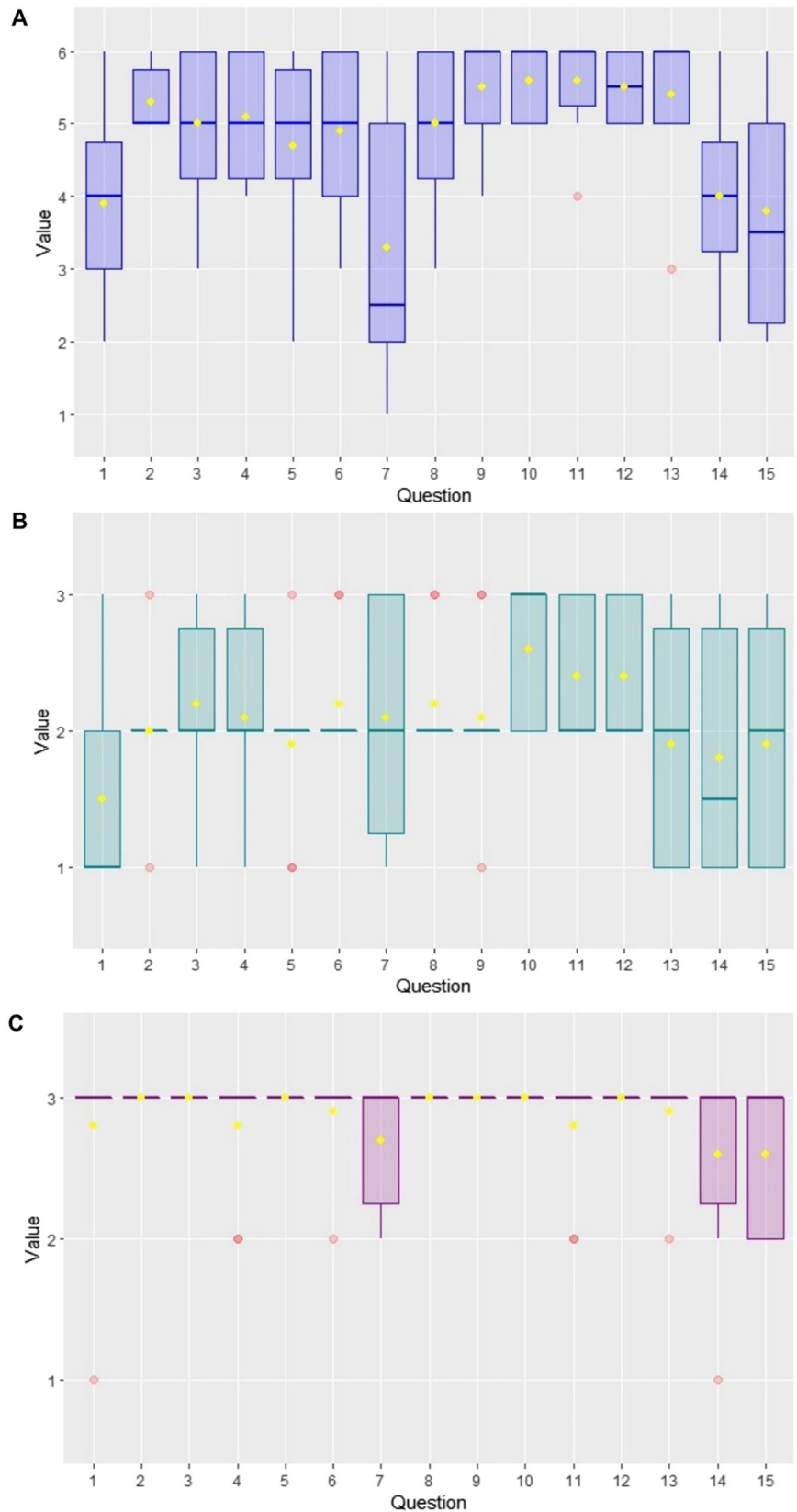


Figure 1. Box plot showing the distribution of accuracy (A), completeness (B) and comprehensibility (C) scores. Graph shows the interquartile range (box), median (horizontal line), mean (yellow dot), and outliers (whiskers).

The average completeness score was 2.08 ± 0.3 on a Likert scale of 1 to 3. Question 10 had the highest score of 2.6 ± 0.51 , while question 1 had the lowest score of 1.5 ± 0.71 . Only 5 responses (questions 6, 8, 10, 11, and 12) received unanimous evaluation scores

of 2 and 3. Looking at the domains, the physical activity domain had the highest mean score (2.46 ± 0.5), while the specialist referral domain had the lowest score (1.73 ± 0.82). Kendall's coefficients of concordance ranged from 0.371 to 0.616 with a mean of 0.471,

indicating a moderate agreement among KOLs (Figure 1B).

The results of the survey showed that the overall comprehensibility rating of ChatGPT's responses to the 15 NAFLD questions was high, with an average score of 2.87 ± 0.14 on a Likert scale of 1 to 3. Seven questions (questions 2, 3, 5, 8, 9, 10, and 12) received a unanimous score of 3 (easy to understand). The mean Kendall's coefficient of concordance across all 15 questions was 0.822, indicating a high level of agreement among the KOLs. Comprehensibility also was assessed by a nonphysician who rated 13 questions as 3, while questions 11 and 12 were rated as partly difficult to understand (Figure 1C).

AI is expected to transform everyday clinical practice and chatbots provide an opportunity for real-time patient counseling. We conducted an evaluation of ChatGPT's performance in answering 15 NAFLD-related questions. The results showed that the answers were accurate (mean score, 4.84 on a 6-point scale), complete (mean score, 2.08 on a 3-point scale), and easy to understand (mean score, 2.87 on a 3-point scale). It is important to recognize that responses generated by ChatGPT may vary owing to training data, context, and language nuances. Questions asked in different contexts or at different times may yield different answers, potentially affecting the accuracy and completeness of the information provided. The language used also may affect the answers generated. Therefore, potential variability in ChatGPT responses must be taken into account when interpreting study results. Caution also should be exercised when relying solely on ChatGPT for patient counseling. The study highlights a case in which the answer generated by ChatGPT regarding the use of herbal remedies in NAFLD was considered potentially harmful and incorrect by the majority of the KOLs.¹⁰ This example highlights the importance of validation and verification by health care professionals to ensure the accuracy and safety of information provided by the chatbot. We acknowledge the limitations of the study, such as a small cohort of physicians providing subjective ratings and the specific focus on ChatGPT 3.5, which may not represent the performance of other AI models, particularly those with medical-specific training. It also emphasizes that although ChatGPT cannot replace medical consultations for patients with NAFLD, efforts should be made to improve the reliability of AI-provided medical information through collaboration between health care professionals, patient associations, and medical literature databases. The aim is to improve the accuracy and completeness of AI models while maintaining their accessibility and ease of understanding for patients. In conclusion, although ChatGPT shows promise in providing information for NAFLD management, its use as a universal patient counseling tool should be approached with caution. Future research should address the identified limitations and work toward improving the reliability and usefulness of AI models in providing accurate and comprehensive medical information to patients.

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Supplementary Material

Note: To access the supplementary material accompanying this article, visit the online version of *Clinical Gastroenterology and Hepatology* at www.cghjournal.org, and at <http://doi.org/10.1016/j.cgh.2023.08.033>.

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Conflicts of interest

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Supplementary Methods

Data Analysis

Descriptive statistics were used to calculate the mean and SD of the responses for each question. Measures of concordance, specifically Kendall's coefficients of concordance, were used to assess the level of agreement among

the KOL responses. Kendall's coefficient of concordance is a nonparametric measure of agreement that accounts for both the magnitude and direction of the differences among raters. A coefficient of 1 indicates perfect agreement, while a coefficient of 0 indicates no agreement beyond chance. The SD was used to assess the variability of responses across the KOLs for each question. All statistical analyses were performed using NCSST 10 statistical software (NCSST).

Supplementary Table 1. Questions Posed to ChatGPT

INPUT: I have been diagnosed with NAFLD. Should I be referred to a hepatologist? Should I undergo additional blood tests or radiologic examinations?

OUTPUT: If you have been diagnosed with NAFLD, it is recommended that you see a liver specialist, such as a hepatologist, especially if you have advanced liver disease, such as nonalcoholic steatohepatitis (NASH) or cirrhosis. The hepatologist can help determine the severity of your condition and develop a personalized treatment plan. In terms of blood tests, your doctor may recommend liver function tests to assess the level of liver enzymes in your blood. These tests can help evaluate the degree of liver damage and monitor the progression of the disease. Additionally, your doctor may check your cholesterol and triglyceride levels because these are often increased in people with NAFLD. In terms of imaging tests, your doctor may recommend an abdominal ultrasound, which uses sound waves to create images of the liver. This test can help evaluate the amount of fat in your liver and detect any abnormalities, such as liver enlargement or scarring. Depending on the severity of your NAFLD, your doctor may also recommend a liver biopsy, which involves taking a small sample of liver tissue for examination under a microscope. This test can help determine the degree of liver damage and the presence of inflammation or scarring. Ultimately, the specific tests and examinations recommended for your NAFLD will depend on your individual situation and the severity of your condition. It is important to follow your doctor's recommendations and attend regular follow-up appointments to monitor your condition and make any necessary adjustments to your treatment plan.

INPUT: How much weight should I lose if I have NAFLD?

OUTPUT: NAFLD is a condition in which there is an excessive accumulation of fat in the liver, which can lead to liver damage and other health problems. Weight loss often is recommended as a treatment for NAFLD because it can help reduce liver fat and improve liver function. The amount of weight that you should aim to lose if you have NAFLD depends on various factors, such as your current weight, body composition, and overall health. In general, a weight loss of approximately 5%–10% of your body weight can improve liver health and reduce the severity of NAFLD. For example, if you weigh 200 pounds, a weight loss of 10–20 pounds may be beneficial. However, it is important to note that the exact amount of weight loss required to improve NAFLD may vary from person to person, and it is best to consult with a health care professional or a registered dietitian who can provide personalized recommendations based on your specific situation. They also can help you develop a safe and effective weight loss plan that takes into account any underlying health conditions or medications you may be taking.

INPUT: Which diet should I follow if I have NAFLD?

OUTPUT: If you have NAFLD, a healthy diet is an essential part of your treatment plan. Here are some dietary recommendations to follow: (1) Reduce your calorie intake: if you are overweight or obese, losing weight can help improve NAFLD. You should aim to lose weight gradually, approximately 1 to 2 pounds per week, by reducing your calorie intake. (2) Choose healthy fats: replace saturated and trans fats in your diet with healthy fats such as omega-3 fatty acids, found in fish, nuts, and seeds, and monounsaturated fats, found in olive oil and avocados. (3) Increase your fiber intake: eating high-fiber foods such as fruits, vegetables, and whole grains can help improve NAFLD. (4) Limit your intake of sugar and refined carbohydrates: consuming too much sugar and refined carbohydrates, such as white bread and pasta, can contribute to NAFLD. Choose whole grains instead. (5) Avoid alcohol: even if you do not have alcoholic liver disease, it is important to avoid alcohol if you have NAFLD. (6) Consult a dietitian: a registered dietitian can help you develop a personalized diet plan that meets your nutritional needs and helps manage NAFLD. Remember to always consult with your health care provider before making any significant dietary changes.

INPUT: Which food should I avoid if I have NAFLD?

OUTPUT: If you have NAFLD, it is important to avoid certain foods that may worsen your condition. Here are some foods to avoid: (1) Saturated and trans fats: foods high in saturated and trans fats, such as fatty meats, butter, cheese, and baked goods, can contribute to the development and progression of NAFLD. (2) Sugar and refined carbohydrates: consuming too much sugar and refined carbohydrates, such as sugary drinks, candy, and white bread, can lead to insulin resistance and increase the risk of developing NAFLD. (3) Alcohol: even small amounts of alcohol can damage the liver and worsen NAFLD. (4) Processed foods: highly processed foods such as fast food, chips, and packaged snacks often contain high amounts of unhealthy fats, sugar, and salt, and can contribute to NAFLD. (5) Fried foods: fried foods, such as French fries, fried chicken, and fried fish, can contribute to NAFLD because of their high-fat content. (6) High-glycemic index foods: foods that have a high glycemic index, such as white rice and potatoes, can increase insulin resistance and contribute to the development of NAFLD. Remember that everyone's needs are different, and it is important to consult with your health care provider or a registered dietitian to develop a personalized nutrition plan that meets your individual needs and goals.

INPUT: Can I drink alcohol if I have NAFLD?

OUTPUT: No, it is not recommended to drink alcohol if you have NAFLD. Even small amounts of alcohol can damage the liver and worsen NAFLD. Alcohol is metabolized by the liver, and excessive alcohol consumption can lead to inflammation and scarring of the liver, which can worsen NAFLD. In addition, people with NAFLD are at a higher risk of developing alcoholic liver disease if they drink alcohol, even in moderate amounts. Alcoholic liver disease can cause serious liver damage and complications, such as liver failure, if not treated promptly. Therefore, it is recommended that individuals with NAFLD completely avoid alcohol to prevent further damage to the liver. If you are struggling with alcohol addiction or dependence, it is important to seek help from a health care professional or addiction specialist.

Supplementary Table 1. Continued**INPUT:** Which food has positive effects on NAFLD?**OUTPUT:** There are several foods that have positive effects on NAFLD and may help improve liver health. Here are some examples: Fruits and vegetables: eating a variety of fruits and vegetables can help improve liver health because of their high fiber content and antioxidant properties. Aim to eat a wide range of colors and types to get the full spectrum of nutrients and benefits. Whole grains: whole grains such as brown rice, quinoa, and whole wheat bread contain complex carbohydrates and fiber, which can help improve insulin resistance and reduce the risk of developing NAFLD. Lean protein: choose lean sources of protein such as chicken, turkey, fish, and plant-based sources such as legumes, nuts, and seeds. These provide essential nutrients and help promote satiety without contributing to excessive amounts of unhealthy fats. Healthy fats: incorporate healthy fats into your diet such as omega-3 fatty acids found in fatty fish (salmon, mackerel, and sardines), nuts, and seeds. Also, monounsaturated fats found in olive oil, avocados, and nuts have been shown to have a positive effect on liver health. Coffee: studies have shown that drinking coffee regularly may help reduce the risk of developing NAFLD, as well as improve liver enzyme levels.**INPUT:** Can I use herbal remedies for NAFLD?**OUTPUT:** While some herbal remedies may show promise in improving liver function and reducing inflammation associated with NAFLD, it is important to speak with your health care provider before using any herbal remedies because they may interact with other medications or supplements you are taking. Here are some examples of herbal remedies that have been studied for their potential benefits in NAFLD: (1) Milk thistle: milk thistle is a herb that has been traditionally used to treat liver diseases. It contains a compound called silymarin, which has antioxidant and anti-inflammatory properties. Some studies have shown that milk thistle may help improve liver function in people with NAFLD. (2) Dandelion root: dandelion root has been traditionally used as a diuretic and liver tonic. It has been shown to have anti-inflammatory and antioxidant properties, and some studies suggest that it may help improve liver function in people with NAFLD. (3) Turmeric: turmeric is a spice that contains a compound called curcumin, which has antioxidant and anti-inflammatory properties. Some studies have shown that curcumin may help improve liver function in people with NAFLD. (4) Green tea: green tea contains compounds called catechins, which have antioxidant and anti-inflammatory properties. Some studies have suggested that green tea may help reduce liver fat and inflammation in people with NAFLD. Remember, it is important to speak with your health care provider before using any herbal remedies or supplements to manage NAFLD because some may not be safe or effective for everyone. It is important to work with a health care professional to develop a comprehensive treatment plan that meets your individual needs.**INPUT:** Can I drink coffee if I have NAFLD?**OUTPUT:** NAFLD is a condition in which fat builds up in the liver. If you have been diagnosed with NAFLD, it is important to take steps to improve your liver health, including making dietary changes. In general, moderate coffee consumption (3–4 cups per day) has been associated with a reduced risk of liver disease, including NAFLD. This may be owing to the presence of compounds in coffee, such as caffeine and antioxidants, that have been shown to have beneficial effects on liver health. However, it is important to note that individual responses to coffee may vary, and excessive caffeine intake also can have negative effects on the liver. Additionally, if you add sugar or cream to your coffee, it can increase your intake of calories and contribute to weight gain, which can exacerbate NAFLD. Therefore, if you have NAFLD and you enjoy drinking coffee, it is generally safe to consume in moderation. However, it is always a good idea to consult with your health care provider about your specific condition and any dietary restrictions or recommendations they may have.**INPUT:** Can I smoke if I have NAFLD?**OUTPUT:** It is not recommended to smoke if you have NAFLD. Smoking can worsen liver damage by increasing inflammation and oxidative stress in the liver. Smoking also can increase insulin resistance, which is a risk factor for NAFLD and can lead to the progression of the disease. In addition, smoking is a risk factor for other health conditions that can further worsen liver damage, such as cardiovascular disease and respiratory disorders. Quitting smoking can significantly improve overall health and reduce the risk of developing these conditions. If you are struggling to quit smoking, it is important to seek help from a health care professional or smoking cessation specialist. They can provide resources and support to help you quit smoking and improve your liver health.**INPUT:** How much should I exercise if I have NAFLD?**OUTPUT:** Exercise can be an effective way to improve liver health and manage NAFLD. The American College of Gastroenterology recommends at least 150 minutes of moderate-intensity exercise per week for people with NAFLD. This can be divided into 30 minutes of exercise on most days of the week. Moderate-intensity exercise includes activities such as brisk walking, cycling, or swimming. However, it is important to start slowly and gradually increase the intensity and duration of exercise to prevent injury or overexertion. If you are new to exercise or have any medical conditions that may limit your ability to exercise, it is important to speak with your health care provider before starting an exercise program. Strength training exercises such as weightlifting or resistance-band exercises also can be beneficial in improving liver health and managing NAFLD. It is recommended to incorporate strength-training exercises at least twice a week. Remember, physical activity should be part of a comprehensive treatment plan that includes dietary changes, weight loss (if necessary), and management of other underlying health conditions such as diabetes or high cholesterol. It is important to work with your health care provider and/or a certified fitness professional to develop an exercise program that meets your individual needs and goals.

Supplementary Table 1. Continued

INPUT: Which physical exercise is better for NAFLD?

OUTPUT: Aerobic exercise and resistance training are both beneficial for managing NAFLD. Here is a breakdown of each type of exercise and how it can help improve liver health: (1) Aerobic exercise: aerobic exercise, also known as cardiovascular exercise, involves continuous movements that increase heart rate and breathing rate. Examples include brisk walking, cycling, swimming, and dancing. Aerobic exercise has been shown to improve insulin sensitivity and reduce liver fat, inflammation, and oxidative stress in people with NAFLD. (2) Resistance training: resistance training, also known as strength training or weightlifting, involves using weights or resistance bands to build strength and muscle mass. Resistance training has been shown to improve insulin sensitivity, increase muscle mass, and reduce liver fat in people with NAFLD. A combination of both types of exercise is recommended for optimal results. The American College of Gastroenterology recommends at least 150 minutes of moderate-intensity aerobic exercise per week and at least 2 days of resistance training per week for people with NAFLD. It is important to start slowly and gradually increase the intensity and duration of exercise to prevent injury or overexertion. If you have any medical conditions or concerns about exercise, it is important to speak with your health care provider before starting an exercise program. Working with a certified fitness professional also can help you develop a safe and effective exercise program that meets your individual needs and goals

INPUT: Should I do cardio or lift weights for NAFLD?

OUTPUT: Both cardio and weightlifting can be beneficial for managing NAFLD, so it is recommended to incorporate both types of exercise into your fitness routine. Cardiovascular exercise, such as brisk walking, cycling, or swimming, can help improve insulin sensitivity and reduce liver fat, inflammation, and oxidative stress in people with NAFLD. It is recommended to aim for at least 150 minutes of moderate-intensity aerobic exercise per week. Resistance training, such as weightlifting or resistance band exercises, can help increase muscle mass, improve insulin sensitivity, and reduce liver fat in people with NAFLD. It is recommended to aim for at least 2 days of resistance training per week. It is important to start slowly and gradually increase the intensity and duration of exercise to prevent injury or overexertion. If you have any medical conditions or concerns about exercise, it is important to speak with your health care provider before starting an exercise program. Working with a certified fitness professional also can help you develop a safe and effective exercise program that meets your individual needs and goals.

INPUT: Which drugs should I take if I have NAFLD?

OUTPUT: As an AI language model, I cannot provide medical advice or prescribe any medications. NAFLD is a medical condition that requires diagnosis and treatment from a health care professional, typically a gastroenterologist or hepatologist. Treatment for NAFLD usually involves lifestyle changes such as weight loss, exercise, and a healthy diet. In some cases, medications also may be prescribed by a health care professional to manage related conditions such as diabetes, high cholesterol, or high blood pressure. It is essential to consult with your health care provider before taking any medications because they will be able to recommend the most appropriate treatment plan for your individual needs and medical history.

INPUT: How do I understand if NAFLD is worsening?

OUTPUT: NAFLD can progress to a more severe condition called nonalcoholic steatohepatitis (NASH) or advanced fibrosis, cirrhosis, or liver cancer in some cases. Therefore, it is important to monitor the condition and seek medical attention if there are any signs of worsening. Here are some ways to understand if NAFLD is worsening: (1) Symptoms: NAFLD may not cause any symptoms in the early stages, but as the disease progresses, symptoms may appear, such as fatigue, weakness, abdominal discomfort, and jaundice. If you experience any of these symptoms, it is important to consult your doctor. (2) Blood tests: liver function tests can measure levels of liver enzymes that are increased in NAFLD. If these levels are increasing over time, it could indicate that the disease is worsening. (3) Imaging tests: ultrasound, computed tomography scan, and magnetic resonance imaging can provide images of the liver to assess its size, shape, and texture. If the liver appears enlarged or has a lumpy texture, it could indicate that the disease is worsening. (4) Biopsy: a liver biopsy can confirm the presence of NASH or advanced fibrosis. It involves removing a small sample of liver tissue for examination under a microscope. If the biopsy shows more severe liver damage than previously, it indicates that the disease is worsening. (5) Lifestyle changes: making changes to your lifestyle, such as losing weight, eating a healthy diet, and exercising regularly, can help improve NAFLD. If you are not making progress with these changes or your condition worsens despite these changes, it is important to discuss this with your doctor. If you have NAFLD, it is important to work closely with your doctor to monitor your condition and detect any signs of worsening. Your doctor can recommend the appropriate tests and treatments to help manage the disease and prevent it from progressing.

INPUT: How do I understand if NAFLD is improving?

OUTPUT: NAFLD is a condition in which there is an accumulation of fat in the liver that is not caused by excessive alcohol consumption. NAFLD can progress to nonalcoholic steatohepatitis (NASH) and can lead to liver damage, cirrhosis, and liver cancer if left untreated. To understand if NAFLD is improving, several methods can be used: (1) Blood tests: blood tests such as liver function tests, lipid profile, and fasting blood sugar can help monitor the progress of NAFLD. If these tests show an improvement in liver enzyme levels, a decrease in triglyceride levels, and better blood sugar control, it indicates that the liver is improving. (2) Imaging studies: imaging studies such as ultrasound, magnetic resonance imaging, or computed tomography scans can provide information about the degree of liver fat accumulation and liver inflammation. If there is a reduction in liver fat and inflammation, it suggests that the liver is improving. (3) Fibroscan: Fibroscan (Echosens) is a noninvasive procedure that measures the stiffness of the liver. An improvement in liver stiffness suggests that the liver is becoming less inflamed and less damaged. (4) Lifestyle changes: lifestyle changes such as losing weight, following a healthy diet, increasing physical activity, and reducing alcohol consumption can help improve NAFLD. If these changes result in weight loss and better blood sugar control, it indicates that NAFLD is improving. It is important to note that NAFLD can take time to improve, and the rate of improvement can vary from person to person. Regular follow-up evaluation with a health care provider is essential to monitor progress and adjust treatment as needed.

Supplementary Table 2. Likert Scales

Accuracy rating by a 6-point Likert scale	
1	Completely incorrect
2	More incorrect than correct
3	Approximately equally correct and incorrect
4	More correct than incorrect
5	Nearly all correct
6	Correct

Completeness rating by a 3-point Likert scale	
1	Incomplete, addresses some aspects of the question, but significant parts are missing or incomplete
2	Adequate, addresses all aspects of the question and provides the minimum amount of information required to be considered complete
3	Comprehensive, addresses all aspects of the question and provides additional information or context beyond what was expected

Comprehensibility rating by a 3-point Likert scale	
1	Difficult to understand
2	Partly difficult to understand
3	Easy to understand