

# Effects of nutrition in diabetic/non-diabetic participants who have increased fat in the liver

<b>Submission date</b> 25/01/2022	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 18/04/2022	<b>Overall study status</b> Ongoing	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 09/07/2024	<b>Condition category</b> Digestive System	<input type="checkbox"/> Individual participant data <input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

The Twin Health platform uses a Whole-Body Digital Twin unique to the patient, powered by artificial intelligence and Internet of Things technology, to precisely understand the metabolic impairment in a patient's body. This strategy is successfully being used in patients with diabetes. Current ongoing studies in diabetic patients have shown a significant improvement in parameters that are involved in non-alcoholic fatty liver disease (NAFLD) such as body weight, fat content and insulin resistance. NAFLD is a group of conditions caused by high levels of fat in the liver. The aim of this study is to find out whether a precision-based approach of lifestyle modifications using the Twin Health platform can help to reduce disease progression in patients with NAFLD or nonalcoholic steatohepatitis (NASH). NASH is liver inflammation and damage caused by a build up of fat in the liver.

### Who can participate?

Patients aged 18 years and over with NAFLD or NASH, BMI 19 kg/m<sup>2</sup> and above, who are not diabetic or diabetic and on a stable dose of antidiabetic medication for the last 3 months

### What does the study involve?

Participants are randomly assigned to one of two groups: either the Twin Precision Treatment (TPT) along with standard care group or the standard care only group. The TPT group will get the usual care along with a few personalized lifestyle modifications. These include providing an optimal combination of macronutrients, micronutrients, and microbiome, while simultaneously guiding individual patients to avoid foods that cause blood glucose spikes and to replace them with foods that do not produce glucose spikes. Nutritional counselling will be provided by trained coaches through the app and via telephone. Participants will be asked to do 10,000 steps per day (measured using a Fitbit sensor) and do resistance and breathing exercises. Sleep will be monitored (using a Fitbit sensor) and participants will be counselled to get at least 7 hours of sleep. The sensors and the app will be used to provide a personalized diet, and the researchers will collect information on the blood sugar response to different foods (collected using a continuous glucose monitoring patch), changes in blood pressure, heart rate, and body composition via Fitbit sensors connected to the mobile app via Bluetooth and by participants entering their food intake into the app every day.

What are the possible benefits and risks of participating?

The study may or may not benefit the patients directly. Based on ongoing diabetes studies the researchers have found improvements in blood sugar, reductions in blood pressure and weight loss in patients on Twin Precision treatment. If the intervention works in this group of patients, there can be a reduction in disease progression and its associated complications. This includes progression to cirrhosis, need for liver transplant and risk of hepatocellular cancer.

Since the intervention is in the form of lifestyle modifications and dietary interventions based on micro and macronutrients, during the first 15 days there can be fatigue and headache which will subside with adequate hydration. The researchers do not foresee any serious adverse events. Occasionally there can be a drop in blood sugar levels in diabetic patients due to improvement in blood sugar control. However, all these patients will be continuously monitored for any change in blood sugar level and drug doses will be changed accordingly.

Where is the study run from?

TWIN Health (India)

When is the study starting and how long is it expected to run for?

December 2021 to October 2025

Who is funding the study?

TWIN Health (India)

Who is the main contact?

Dr Paramesh Shamanna

paramesh@twinhealth.com

## Contact information

### Type(s)

Principal Investigator

### Contact name

Dr Paramesh Shamanna

### ORCID ID

<http://orcid.org/0000-0002-0693-4483>

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## Additional identifiers

**EudraCT/CTIS number**

Nil known

**IRAS number****ClinicalTrials.gov number**

Nil known

**Secondary identifying numbers**

TPT-03/2021

## Study information

**Scientific Title**

Efficacy of Twin Precision treatment in patients with non-alcoholic fatty liver disease - a multicenter, open-label, parallel-arm, randomized controlled trial

## Acronym

TPT-NAFLD

## Study objectives

Though several studies have been conducted, currently there is no approved pharmacological therapy for non-alcoholic fatty liver disease (NAFLD). Treatment strategies are largely focused on lifestyle modifications such as change in dietary habits and improvement in physical activity. However, the same dietary approach may not be effective and acceptable by all individuals. Twin Precision Treatment is a personalized form of dietary intervention based on data collected from individuals using sensors and analyzed using computer technology.

The Twin Health platform uses a Whole-Body Digital Twin, powered by artificial intelligence and Internet of Things technology, to precisely understand the metabolic impairment in the patient's body, which is unique to the patient. This strategy is successfully being implemented in patients with diabetes. Current ongoing studies in diabetic patients (unpublished data) have shown significant improvement in parameters that are implicated in NAFLD such as body weight, fat content and insulin resistance.

Thus it is hypothesized that a precision-based approach using Twin Health platform on lifestyle modifications can help in reducing disease progression in patients with NAFLD or nonalcoholic steatohepatitis (NASH).

## Ethics approval required

Old ethics approval format

## Ethics approval(s)

1. Approved 29/10/2021, Medisys Clinisearch Ethical Review Board (No 426, 4th Cross, 2nd Block, Kalyan Nagar, Bangalore 560043 Karnataka, India; +91 (0)8025421333, 25902546; mcerbblr@gmail.com), ref: MCERB/197
2. Approved 29/10/2021, Medisys Clinisearch Ethical Review Board (No 426, 4th cross, 2nd block, Kalyan Nagar, Bangalore 560043, Karnataka, India; +91 (0)8025421333, 25902546; mcerbblr@gmail.com), ref: MCERB/198
3. Approved 29/10/2021, Medisys Clinisearch Ethical Review Board (No 426, 4th cross, 2nd block, Kalyan Nagar, Bangalore 560043, Karnataka, India; +91 (0)8025421333, 25902546; mcerbblr@gmail.com), ref: MCERB/199
4. Approved 18/02/2022, Medisys Clinisearch Ethical Review Board (No 426, 4th cross, 2nd block, Kalyan Nagar, Bangalore 560043, Karnataka, India; +91 (0)8025421333, 25902546; mcerbblr@gmail.com), ref: MCERB/208
5. Approved 25/05/2022, Medisys Clinisearch Ethical Review Board (No 426, 4th cross, 2nd block, Kalyan Nagar, Bangalore 560043, Karnataka, India; +91 (0)8025421333, 25902546; mcerbblr@gmail.com), ref: MCERB/215
6. Approved 19/03/2022, Universal Ethics Committee (6/2RR Villa, 180/109, Rangarajapuram main road, kodambakkam, chennai-600024, Chennai, 600024, India; 044-23720600/ 32472446; universalethicscommittee@gmail.com), ref: UEC/APP/017/21-22
7. Approved 05/03/2022, Universal Ethics Committee (6/2RR Villa, 180/109, Rangarajapuram main road, kodambakkam, chennai-600024, Chennai, 600024, India; 044-23720600/32472446; universalethicscommitte@gmail.com), ref: UEC/APP/016/21-22
8. Approved 28/06/2022, Intersystem Biomedica Ethics Committee (C/O Kasturba health society, Sthanakwasi jain aradhna dham, 14 khandubhai desai road, vile parle, Mumbai-400056, Mumbai, 400056, India; 022-6736128, 9819181950, 9820050852; isbec.india@gmail.com), ref: ISBEC/NR-16 /KM-KM/2022

**Study design**

Multicenter open-label parallel-arm randomized controlled trial

**Primary study design**

Interventional

**Secondary study design**

Randomised controlled trial

**Study setting(s)**

GP practice

**Study type(s)**

Treatment

**Participant information sheet**

Not available in web format, please use the contact details to request a participant information sheet

**Health condition(s) or problem(s) studied**

Non-alcoholic fatty liver disease (NAFLD)

**Interventions**

Patients will be stratified based on the presence or absence of diabetes. Randomisation code will be generated using online software using block randomisation. Specific treatment will be assigned using Interactive Web Response Systems (IWRS). Participants are randomly assigned in a 1:1 ratio using central randomisation to one of two groups: either the Twin Precision Treatment (TPT) along with standard care group or the standard care only group. The TPT group will get the usual care along with a few personalized lifestyle modifications. These include providing an optimal combination of macronutrients, micronutrients, and microbiome, while simultaneously guiding individual patients to avoid foods that cause blood glucose spikes and to replace them with foods that do not produce glucose spikes. Nutritional counselling will be provided by trained coaches through the app and via telephone. Participants will be asked to do 10,000 steps per day (measured using a Fitbit sensor) and do resistance and breathing exercises. Sleep will be monitored (using a Fitbit sensor) and participants will be counselled to get at least 7 hours of sleep. The sensors and the app will be used to provide a personalized diet, and the researchers will collect information on the blood sugar response to different foods (collected using a continuous glucose monitoring patch), changes in blood pressure, heart rate, and body composition via Fitbit sensors connected to the mobile app via Bluetooth and by participants entering their food intake into the app every day. The duration of the intervention is 2 years and follow-up is 6 months.

**Intervention Type**

Other

**Primary outcome measure**

1. Fibrosis score and hepatic fat content measured by magnetic resonance elastography (MRE) at 1 year
2. Liver fibrosis assessed using enhanced liver fibrosis (ELF) scores measured from baseline to the end of 1 year

## Secondary outcome measures

1. Fibrosis score and hepatic fat content measured using transient elastography at baseline, day 180, day 360, day 540, day 720 and day 900
2. Liver fibrosis assessed using enhanced liver fibrosis (ELF) scores at 2 years
3. Metabolic changes measured using:
  - 3.1. Fasting plasma glucose at baseline, day 30, day 60, day 90, day 180, day 270, day 360, day 450, day 540, day 630, day 720, and day 900
  - 3.2. Insulin, lipid profile, hemoglobin A1c at baseline, day 90, day 180, day 270, day 360, day 450, day 540, day 630, day 720, and day 900
  - 3.3. Adiponectin at baseline, day 180, day 360, day 540, day 720, and day 900
4. Non-invasive markers for fat and fibrosis:
  - 4.1. Fat assessed using the Framingham Steatosis Index (FSI), Fatty Liver Index (FLI), NAFLD liver fat score
  - 4.2. Fibrosis assessed using the AST to platelet ratio index (APRI), Fibrosis-4 score, NAFLD fibrosis scoreMeasured at baseline and every 3 months until 2 years
5. Quality of life measured using chronic liver disease questionnaire for nonalcoholic steatohepatitis (CLDQ-NASH), EQ 5D at baseline and every 3 months until 2 years
6. Microbiome status measured using whole genome metagenomic sequencing at day 1, day 30, day 90, day 360, day 720, and day 900

## Overall study start date

23/12/2021

## Completion date

14/10/2025

## Eligibility

### Key inclusion criteria

1. Patients with NAFLD (either ELF score > 7.7 or MRE with kPa 2.5 to 5) or with a histological diagnosis of NASH (biopsy < 6 months old)
2. Age ≥18 years of age of either gender
3. BMI 19 kg/m<sup>2</sup> and above
4. Non-diabetic or diabetic (HbA1c <9%) on a stable dose of antidiabetic medications for the last 3 months
5. Willing to provide written informed consent and comply with the study protocol

### Participant type(s)

Patient

### Age group

Adult

### Lower age limit

18 Years

### Sex

Both

**Target number of participants**

68

**Total final enrolment**

79

**Key exclusion criteria**

1. Those with a history of significant alcohol consumption. Significant alcohol intake is considered when alcohol consumption >7 standard drinks/week (70 g ethanol) in women and >14 standard drinks/week (140 g ethanol) in men (according to Asia-Pacific Guidelines)
2. AUDIT score >8 indicating harmful alcohol consumption
3. Patients with a diagnosis liver disease due to other etiologies such as alcohol or drug abuse, medication, chronic hepatitis B or C, autoimmune, hemochromatosis, Wilson's disease,  $\alpha$ 1-antitrypsin deficiency
4. Those with clinical evidence of hepatic decompensation such as a history of ascites, esophageal bleeding varices, or spontaneous encephalopathy
5. Those with evidence of portal hypertension such as low platelet counts (< 1.5 lakhs per microlitres), esophageal varices, ascites, history of hepatic encephalopathy, splenomegaly (moderate, severe)
6. Child-Pugh class B/C
7. ALT and AST elevation greater than five times the upper limit of normal (ULN)
8. Alkaline phosphatase more than 2 ULN (less than 250–300 271 U/L)
9. Severe hypertension either treated or untreated. (defined as systolic blood pressure (SBP) >180 mmHg or diastolic blood pressure (DBP) >100 mmHg)
10. Patients with a history of clinically significant heart disease (New York Heart Association (NYHA) Class greater than grade II), peripheral vascular disease (history of claudication), or diagnosed pulmonary disease
11. History of bariatric surgery or intestinal bypass surgery within the 5 years prior to randomization or planned during the conduct of the study
12. Change in body weight more than 5% in the last 3 months
13. History of malignancy in the last 5 years
14. Active, serious medical disease with a likely life expectancy <2 years
15. Participation in an investigational new drug trial in the 60 days or 5 half-lives, whichever is longer, prior to randomization
16. Patients on supplements for weight loss, pioglitazone, vitamin E
17. Pregnant and lactating women and postpartum up to 2 years
18. Those with contraindications for MR elastography
19. Any other condition that, in the opinion of the Investigator, would impede compliance, hinder completion of the study, compromise the well-being of the patient, or interfere with the study outcomes

**Date of first enrolment**

31/12/2021

**Date of final enrolment**

11/10/2022

**Locations****Countries of recruitment**

India

**Study participating centre**

**Bangalore Diabetic Centre**

No 426, 4th Cross, 2nd Block, Kalyan Nagar

Bangalore

India

560043

**Study participating centre**

**Chandana clinic**

#13/4, 7th main road, Bhubaneshwar Nagar, Hesaraghatta main road

Bangalore

India

560057

**Study participating centre**

**Trinity Gastroenterology & Liver Clinic**

410, 5th Main Rd, HRBR Layout 2nd Block, HRBR Layout, Kalyan Nagar, Bengaluru, Karnataka

Bangalore

India

560043

**Study participating centre**

**Lilavati Hospital And Research Centre**

A-791, Bandra Reclamation Rd, General Arunkumar Vaidya Nagar, Bandra West

Mumbai

India

400050

**Study participating centre**

**Institute of Gastroenterology Sciences & Organ Transplant (IGOT)**

Victoria Hospital Campus, Bengaluru, Karnataka

Bangalore

India

560002

**Study participating centre**

**RPS Hospital**

NO.65/2, Water canal road, Korattur North



Chennai  
India  
600076

**Study participating centre**

**DiabEndoIndia**

NO.26, Bishops Garden, Off Greenways Road, Raja Annamalai Puram  
Chennai  
India  
600028

**Study participating centre**

**Vedanta Gastro Centre**

Park, Vedanta Gastro Centre 695, 9th main, Old Madras Road, Indira Nagar 1st stage  
Bangalore  
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## **Sponsor information**

**Organisation**

TWINS Digital Services India pvt ltd

**Sponsor details**

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**Sponsor type**

Industry

## **Funder(s)**

**Funder type**

Industry

**Funder Name**

TWIN Health

## Results and Publications

**Publication and dissemination plan**

Planned publication in a high-impact peer-reviewed journal. A clinical study report as additional supporting information will be shared. The analysis will be done to achieve the aims of the approved proposal.

**Intention to publish date**

01/01/2026

**Individual participant data (IPD) sharing plan**

All of the individual participant data collected during the trial will be shared on request from Dr Paramesh Shamanna (paramesh@twinhealth.com). The data will be accessible in a digital format after the consent is obtained from participants and participant identity will be anonymised. The data will be the shared individual participant data that underlie the results after de-identification. The files are able to be viewed by researchers whose proposed use of the data has been approved by an independent review committee identified for this purpose. The data will be available immediately following publication with no end date.

**IPD sharing plan summary**

Available on request

**Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>	version 1	29/09/2021	21/02/2022	No	Yes
<a href="#">Protocol file</a>	version 1	29/09/2021	21/02/2022	No	No