

# Can weight loss surgery help improve sleep apnea and metabolic health? A long-term study of sleeve gastrectomy outcomes

<b>Submission date</b> 08/07/2025	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
<b>Registration date</b> 10/07/2025	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
<b>Last Edited</b> 09/07/2025	<b>Condition category</b> Nutritional, Metabolic, Endocrine	<input type="checkbox"/> Individual participant data
		<input checked="" type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Obstructive Sleep Apnea (OSA) significantly impacts both health and quality of life and is associated with multiple comorbid conditions, including uncontrolled hypertension, type 2 diabetes mellitus, stroke, and obesity hypoventilation syndrome. As obesity is a major risk factor for the development of OSA, metabolic and bariatric surgery—particularly sleeve gastrectomy—has gained recognition in recent years as an effective intervention. It has demonstrated substantial benefits in achieving significant weight loss and improving or even resolving OSA and related cardiometabolic conditions such as type 2 diabetes, hypertension, and dyslipidemia. This prospective observational cohort study aimed to assess the prevalence and long-term outcomes /effects (at five years) of sleeve gastrectomy on OSA and other commonly associated cardiovascular diseases (type 2 diabetes, hypertension, and dyslipidemia). Specifically, the study evaluated whether these conditions showed complete resolution or improvement following surgery.

### Who can participate?

The study included adult patients aged 18 to 60 years diagnosed with obesity in our bariatric medicine and bariatric surgery clinics at Hamad Medical Corporation in Doha, Qatar. Eligible patients met international criteria for sleeve gastrectomy and had no contraindications for surgery. All participants provided informed consent and met the study’s inclusion criteria.

### What does the study involve?

Preoperatively, patients were assessed by multidisciplinary teams of specialists, including bariatric surgery, bariatric medicine, pulmonary medicine and sleep laboratory technicians. The assessment included detailed history, physical examination and laboratory testing screening as well as a sleep study. The patients were initially assessed by bariatric surgeons to determine eligibility, select the appropriate procedure, and obtain informed consent. Then they were evaluated by bariatric medicine for medical evaluation, risk stratification and optimization. The STOP BANG questionnaire was administered during this visit, and the score was recorded. Following this, patients were referred to sleep laboratory technicians to be educated on how to use the device. The current study used the Alice PDx home screening polysomnography device

to diagnose/screen for OSA. The sleep study results were analyzed and documented by a sleep laboratory technician and reviewed by a pulmonary/sleep physician. Patients with moderate/severe OSA are referred to the pulmonary sleep clinic for further management. Data collected before surgery were demographics [e.g. age, sex], medical comorbidities, type of and number of medications and insulin therapy use, anthropometric parameters [e.g. weight, height, neck circumference (NC), waist circumference (WC)]. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were also recorded. Laboratory tests included fasting blood glucose (FBS), hemoglobin A1c (HBA1C), insulin level, triglycerides (TG), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and total cholesterol (TC). Postoperatively, all information collected was collected again, including blood tests, Stop Bang questionnaire and polysomnography parameters [apnea hypopnea index (AHI), oxygen desaturation index (ODI)].

What are the possible benefits and risks of participating?

Participation in the study provided patients with a comprehensive cardiometabolic assessment and screening for undiagnosed OSA before surgery, ensuring appropriate management of related conditions before undergoing bariatric surgery. There were no risks or harms associated with the study, as all diagnostic procedures, including blood tests and OSA assessments (using approved devices), were safe and non-invasive.

Where is the study run from?

Hamad Medical Corporation, the main governmental healthcare provider in Doha, Qatar

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

May 2017 to December 2020

Who is funding the study?

Hamad Medical Corporation, Qatar

Who is the main contact?

Dr. Wahiba Elhag, WElhag1@hamad.qa, hibahamid@hotmail.com

## Contact information

### Type(s)

Public, Scientific, Principal Investigator

### Contact name

Dr Wahiba Elhag Elhag

### ORCID ID

<https://orcid.org/0000-0002-7630-2668>

### Contact details

Doha-Qatar - Zone, street, House

Doha

Qatar

3050

+97433065586

WElhag1@hamad.qa

# Additional identifiers

## EudraCT/CTIS number

Nil known

## IRAS number

## ClinicalTrials.gov number

Nil known

## Secondary identifying numbers

Nil known

# Study information

## Scientific Title

Long-term effects of sleeve gastrectomy on metabolic parameters, and obstructive sleep apnea resolution: a prospective observational study

## Study objectives

The objective of this prospective cohort study is to evaluate the five-year impact of sleeve gastrectomy (SG) on the following outcomes:

Changes in anthropometric and cardiometabolic parameters, including blood pressure, glycemic control, lipid profile, and sleep apnea indices. Remission of obesity-related comorbidities such as hypertension, type 2 diabetes mellitus (T2DM), and dyslipidemia and the prevalence and rate of resolution and/or improvement of obstructive sleep apnea (OSA), as confirmed by polysomnographic data.

## Ethics approval required

Ethics approval required

## Ethics approval(s)

Approved 22/05/2017, Hamad Medical Corporation Institutional Review Board (Medical Research Center, Doha, 3547, Qatar; +974 44390614; irb@hamad.qa), ref: 16416/16

## Study design

Prospective observational cohort study

## Primary study design

Observational

## Secondary study design

Cohort study

## Study setting(s)

Hospital, Medical and other records

## Study type(s)

Diagnostic, Treatment, Efficacy

## **Participant information sheet**

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

Long-term impact of metabolic and bariatric surgery, specifically sleeve gastrectomy, on obstructive sleep apnea and cardiometabolic disorders in patients with obesity: A five-year follow-up study.

### **Interventions**

This is a prospective observational cohort conducted by the Bariatric Medicine, Bariatric Surgery and the Pulmonary Medicine departments at Hamad Medical Corporation.

Preoperatively, patients were assessed by multidisciplinary teams of specialists, including bariatric surgery, bariatric medicine, pulmonary medicine and sleep laboratory technicians. The assessment included detailed history, physical examination and laboratory testing screening as well as a sleep study. The patients were initially assessed by bariatric surgeons to determine eligibility, select the appropriate procedure, and obtain informed consent. Then they were evaluated by bariatric medicine for medical evaluation, risk stratification and optimization. The STOP BANG questionnaire was administered during this visit, and the score was recorded. Following this, patients were referred to sleep laboratory technicians to be educated on how to use the device. The current study used the Alice PDx home screening polysomnography device to diagnose/screen for OSA. The sleep study results were analyzed and documented by a sleep laboratory technician and reviewed by a pulmonary/sleep physician. Patients with moderate/severe OSA are referred to the pulmonary sleep clinic for further management. Data collected before surgery were demographics [e.g. age, sex], medical comorbidities, type of and number of medications and insulin therapy use, anthropometric parameters [e.g. weight, height, neck circumference (NC), waist circumference (WC)]. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were also recorded. Laboratory tests included fasting blood glucose (FBS), hemoglobin A1c (HBA1C), insulin level, triglycerides (TG), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and total cholesterol (TC). Postoperatively, all information collected was collected again, including blood tests, Stop Bang questionnaire and polysomnography parameters [apnea hypopnea index (AHI), oxygen desaturation index (ODI)].

### **Intervention Type**

Procedure/Surgery

### **Primary outcome measure**

The following outcome variables assess changes in anthropometric and cardiometabolic parameters at baseline and five years after the surgery, including:

Types of medical comorbidities, type of and the number of medications and insulin therapy use, anthropometric parameters [e.g. weight, height, neck circumference (NC), waist circumference (WC)]. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were also recorded. Laboratory tests included fasting blood glucose (FBS), hemoglobin A1c (HBA1C), insulin level, triglycerides (TG), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and total cholesterol (TC). Postoperatively, at five years, all information was collected again, including blood tests, Stop Bang questionnaire and polysomnography parameters [apnea hypopnea index (AHI), oxygen desaturation index (ODI)].

The following outcome variables assess the remission/improvement of obesity-related comorbidities of type 2 diabetes mellitus, hypertension, and dyslipidemia before and after surgery:

Blood test parameters and the number of medications used for each disease studied. For type 2 diabetes mellitus: HBA1C, fasting blood sugar, insulin use, number of medications used, for hypertension: blood pressure readings and the number of medications used, for dyslipidemia: lipid profile: total cholesterol, triglyceride, HDL, LDL, and the number of medications used.

### **Secondary outcome measures**

Remission/ improvement /worsening of obstructive sleep apnea (OSA) measured using polysomnography and improved repeat score of AHI (Apnea Hypopnea Index) on the screening tool compared with preoperative. Decreased severity of disease on repeat objective testing with PSG: AHI < 5 (e.g., going from severe to mild or from mild to normal) before and after surgery.

### **Overall study start date**

22/05/2017

### **Completion date**

12/12/2020

## **Eligibility**

### **Key inclusion criteria**

1. Adults aged between 18 to 60 years old
2. Eligible for metabolic and bariatric surgery, and selected the sleeve gastrectomy as their procedure
3. Agreed to participate in the research

### **Participant type(s)**

Patient

### **Age group**

Adult

### **Lower age limit**

18 Years

### **Upper age limit**

60 Years

### **Sex**

Both

### **Target number of participants**

72

### **Total final enrolment**

72

### **Key exclusion criteria**

1. Previous bariatric procedure (e.g. gastric band, intragastric gastric balloon)
2. Current use of steroids
3. Uncontrolled psychiatric illness
4. Alcohol or substance abuse

**Date of first enrolment**

16/05/2018

**Date of final enrolment**

30/11/2020

## **Locations**

**Countries of recruitment**

Qatar

**Study participating centre**

**Hamad Medical Corporation**

Doha-Qatar

Doha

Qatar

3547

## **Sponsor information**

**Organisation**

Hamad Medical Corporation

**Sponsor details**

Doha -Qatar

Al -Saad - Sport round about

Doha

Qatar

3050

+97444396795

nesmaak@hamad.qa

**Sponsor type**

Hospital/treatment centre

**Website**

<https://www.hamad.qa/EN/Pages/default.aspx>

**ROR**

## Funder(s)

### Funder type

Hospital/treatment centre

### Funder Name

Hamad Medical Corporation

### Alternative Name(s)

, HMC

### Funding Body Type

Government organisation

### Funding Body Subtype

National government

### Location

Qatar

## Results and Publications

### Publication and dissemination plan

Planned publication in a peer-reviewed journal

### Intention to publish date

09/09/2025

### Individual participant data (IPD) sharing plan

The datasets generated and/or analyzed during the current study are not expected to be made publicly available due to institutional data storage regulations. As per these regulations, the principal investigator is not permitted to share data stored on a personal, password-protected computer. The raw data files are securely stored on the principal investigator's device and will not be shared unless formally requested and approved by the relevant institutional authorities.

- Data-sharing details: Row data available at the Excel sheet in the Principal Investigator's laptop under password protection.
- The name and email address of the investigator/body who should be contacted for access to the datasets: Dr. Sama Abdulrazzaq Asal (sama.asal@yahoo.com), while institutional (SALjuboori@hamad.qa)
- The type of data that will be shared: an Excel sheet that contains the demographics, cardiometabolic and disease status parameters at baseline and five years after the sleeve gastrectomy.

- Timing for availability: Upon request.
- Whether consent from participants was required and obtained: yes, obtained on the day of recruitment.
- Comments on data anonymization: Each patient has a code entered in the Excel sheet -the code is a number that
- Any ethical or legal restrictions: The ethical approval was obtained from Hamad Medical Corporation -IRB
- Any additional comments: As the study is a comprehensive medical assessment for the cardiometabolic risks and what sleeve gastrectomy can change at five years.

**IPD sharing plan summary**

Stored in non-publicly available repository, Available on request