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Coenzyme Q10 for people with heart failure to improve their quality of life - the CORAL study

Submission date 13/03/2024	**Recruitment status** Recruiting	[X] Prospectively registered [X] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 15/05/2024	**Overall study status** Ongoing	
Last Edited 12/02/2026	**Condition category** Circulatory System	

Plain English summary of protocol

Background and study aims
Heart failure is a long-term condition that causes difficulty breathing, tiredness and leg swelling, which can all impact daily life. Between 10 and 15% of people over the age of 75 have heart failure and it is responsible for around 5% of all emergency hospital admissions. Most people with heart failure have two or more long-term medical conditions and usually take a number of different medicines every day.
Co-enzyme Q10 (CoQ10) is a nutrient that is available to buy in chemists and health food shops as a supplement. It is known to remove potentially damaging free radicals that can harm cells and also has an essential role in energy production. CoQ10 may improve how much energy and exercise people with heart failure can do, which in turn may improve their daily lives.

Who can participate?
Patients aged 18 years or over and have heart failure that impacts their daily lives

What does the study involve?
Potential participants will be invited to take part in the study via a letter from their GP surgery. Half of the people in the study will be chosen at random (by a computer) to take a CoQ10 pill three times a day for 12 months and half will have a different pill that looks exactly the same but doesn't contain CoQ10 3 times a day for 12 months. People in the study will not know which type of pill they are taking. The researchers will ask people in the study to complete a questionnaire at the start of the study, and 4 more times over 12 months to record how they are feeling, and if they have taken time off work or needed any care. The researchers will also request to look at the information that is normally recorded in medical notes about them, such as time in hospital and the cause, any referrals, emergency admissions or medications that are being taken.

What are the possible benefits and risks of participating?
Participants taking part might see an improvement in their quality of life. They will also receive a £10 voucher for every questionnaire completed. There are potential side effects, though these are rare and mild (tummy problems, headaches, dizziness, and skin reactions). Once the results of the study have been looked at, the researchers will know if CoQ10 can benefit people with heart failure and should be recommended by doctors.

Where is the study run from?
Bristol Trials Centre, University of Bristol (UK)

When is the study starting and how long is it expected to run for?
March 2024 to June 2027

Who is funding the study?
National Institute for Health Research (NIHR) Health Technology Assessment (HTA) (UK)

Who is the main contact?
Dr Barbara Warnes, coral-study@bristol.ac.uk

Contact information

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Principal investigator

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

Integrated Research Application System (IRAS)
1006083

Protocol serial number
2022-6799

Study information

Scientific Title
The effectiveness and cost effectiveness of COenzyme Q10 in heaRt fAiLure with reduced ejection fraction (CORAL): a pragmatic, patient-centred, data-enabled trial in primary care

Acronym
CORAL

Study objectives
Primary objectives:
1. To estimate the difference between groups (intervention [CoQ10] and control [placebo]) in the primary endpoint of heart failure specific Health Related Quality of Life.
2. To determine the cost effectiveness of CoQ10 compared with the control.

Secondary objectives:
To estimate the difference between groups (intervention and control) with respect to:
1. A composite hierarchical endpoint including all cause death, all cause hospitalisation and HF-specific quality of life, analysed using the win ratio.
2. Death (all cause and from cardiovascular causes).
3. Hospitalisation (all cause, cardiovascular and HF related).
4. Major adverse cardiovascular events (MACE).
5. New York Health Association functional classification (severity of physical symptoms caused by HF).
6. Resource and health service use.
7. Quality of life assessed by the EQ-5D-5L questionnaire
8. Formal and informal care.
9. Adverse events related to the interventions.
10. Adherence to study interventions.

Ethics approval required

Ethics approval required

Ethics approval(s)
approved 03/05/2024, London - Central Research Ethics Committee (3rd Floor, 3 Piccadilly Place, London Road, Manchester, M1 3BN, United Kingdom; +44 207 104 8225; londoncentral.rec@hra.nhs.uk), ref: 24/LO/0249

Study design
Double-blind randomized placebo-controlled trial

Primary study design
Interventional

Study type(s)
Efficacy, Safety

Health condition(s) or problem(s) studied
Heart failure with reduced ejection fraction

Interventions
Current interventions as of 12/02/2026:
CORAL is a multi-centre, individually randomized, pragmatic, patient-centred, data-enabled, placebo-controlled superiority trial in primary care with internal pilot and economic evaluation. Participants will be recruited from primary care (~75 GP surgeries in England) via NIHR Clinical Research Networks (CRN) including (but not limited to) the West of England, South West Peninsula, East Midlands and North East/North Cumbria.

Adults with heart failure with reduced ejection fraction will be identified from electronic GP records. Following completion of the initial ineligibility checks of the components recorded in the GP medical records, potential participants identified will be sent an invitation pack. The invitation pack will contain an invitation letter (which will have a link to the online PIL and online expression of interest (EOI) form), a study summary, paper EOI and freepost envelope. Once an EOI has been received at the central research office at the Bristol Trials Centre, potential participants will complete the screening questionnaire over the phone with a member of the research team. Following completion of the screening questionnaire, eligible participants will be sent a Participant Information Leaflet and given time to read it. A trained member of the research team will then speak with the patient, confirm understanding about the study and answer any questions, before receiving informed consent to take part in the study. Consent will also be sought for access to the participant's medical records (HES, ONS and GP records) 12 months post-randomisation and HES and ONS records again at 5 years post-randomisation (subject to funding). It will be made clear that participants are free to stop their participation in the study at any time, without giving reasons and without prejudicing their future treatment.

The eligibility criteria of consented participants will be re-checked by an appropriate clinician at the GP practice. If the criteria have been met a Clinical member of the CORAL TMG, will prescribe study medication using a study-specific ePrescription to initiate the study medication dispensing process. Trial participants will be allocated in a 1:1 ratio, stratified by GP practice (to account for difference in case mix) with cohort minimisation for statin use (which may deplete CoQ10 levels), and NYHA score (group 1: NYHA score = II, group 2: NYHA score of III or IV) to balance groups according to their symptom burden) to receive one tablet three times a day for 12 months of 100 mg CoQ10 (intervention) or placebo (control). The randomisation sequence

will be generated by Sealed Envelope™ using their online randomisation system. The person undertaking the randomisation and the participant will remain blinded as to which treatment group this code refers.

Participants will be asked to complete questionnaires (online or paper, according to preference) at baseline, 3, 6, 9 and 12 months post-randomisation, with reminders for non-responders. With permission, we will request data on demography, long-term conditions, medical history and current medication data from the participant's GP records at baseline. At least 12 months post-randomisation, healthcare resource and clinical outcome data will be extracted from the participant's electronic GP medical records and from the HES and ONS databases. A further check on clinical outcomes recorded in HES and ONS databases will occur 5 years post-randomisation (subject to funding).

Previous interventions:
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Intervention Type
Drug

Phase
Phase III

Drug/device/biological/vaccine name(s)
Myoqinon [ubidecarenone (approved)]

Primary outcome(s)
Participant-reported heart failure specific measure of health-related quality of life (HRQoL) assessed using the 23-item self-administered Kansas City Cardiomyopathy Questionnaire (KCCQ) at 12 months after randomisation. These data will also be collected at four other timepoints (baseline, 3, 6, and 9 months after randomisation) via self-reported questionnaires.

Key secondary outcome(s))
Defined from routine or patient reported data:
1. All-cause death, all-cause hospitalisation and HF-specific HRQoL analysed using the win ratio, collected via routine data and participant-reported HRQoL (KCCQ) at 12 months and 5 years post-randomisation (subject to funding)
2. All-cause death, collected via routine data at 12 months and 5 years post-randomisation (subject to funding)
3. Cardiovascular death, collected via routine data at 12 months and 5 years post-randomisation (subject to funding)
4. All-cause hospitalisations, collected via routine data at 12 months and 5 years post-randomisation (subject to funding)
5. Cardiovascular hospitalisation, collected via routine data at 12 months and 5 years post-randomisation (subject to funding)
6. Heart failure specific hospitalisation, collected via routine data at 12 months and 5 years post-randomisation (subject to funding)
7. Major adverse cardiovascular events (MACE) including death, cardiovascular hospitalisation, mechanical assist implantations or urgent cardiac transplantations, collected via routine data at 12 months and 5 years post-randomisation (subject to funding)
8. Resource and health service use, collected via routine data at 12 months and 5 years post-randomisation (subject to funding)
9. New York Heart Association (NYHA) functional classification collected via self-reported questionnaire at baseline, 3, 6, 9 and 12 months post-randomisation
10. Quality of life assessed using the EQ-5D-5L questionnaire collected via self-reported questionnaire at baseline, 3, 6, 9 and 12 months post-randomisation
11. Formal and informal care collected via self-reported questionnaire at baseline, 3, 6, 9 and 12 months post-randomisation
12. Time off paid employment collected via self-reported questionnaire at baseline, 3, 6, 9 and 12 months post-randomisation
13. Adverse events related to the study interventions collected via self-reported questionnaire at 3, 6, 9 and 12 months post-randomisation

14. Self-reported adherence to study interventions collected via self-reported questionnaire at 3, 6, 9 and 12 months post-randomisation

Completion date
30/06/2027

Eligibility

Key inclusion criteria
1. Adults ≥18 years
2. Evidence in the GP record of left ventricular systolic dysfunction
3. Self-reported New York Heart Association (NYHA) class of ≥II (physical activity triggers symptoms of heart failure to some degree)

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 years

Upper age limit
100 years

Sex
All

Total final enrolment
0

Key exclusion criteria
Current exclusion criteria as of 12/02/2026:
1. Diastolic dysfunction with no evidence of left systolic dysfunction
2. Supplementary CoQ10 intake within the last 6 weeks
3. Current warfarin use (CoQ10 may reduce the anticoagulant effect of warfarin)
4. Known allergy to soy
5. Known allergy to peanuts
6. Currently enrolled in another interventional clinical trial
7. Unable to provide informed consent
8. Unwilling to take part due to diet choices (placebo and CoQ10 capsules contain halal bovine gelatine)

Women only:
9. Pregnant
10. Breastfeeding

Previous exclusion criteria:
1. Diastolic dysfunction with EF ≥50% or preserved left ventricular function
2. Supplementary CoQ10 intake within the last 6 weeks
3. Current warfarin use (CoQ10 may reduce the anticoagulant effect of warfarin)
4. Known allergy to soy
5. Known allergy to peanuts
6. Currently enrolled in another interventional clinical trial
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10. Breastfeeding

Date of first enrolment
21/02/2025

Date of final enrolment
28/02/2027

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Not provided at time of registration
-
-
England
-

Sponsor information

Organisation
University of Bristol

ROR
https://ror.org/0524sp257

Funder(s)

Funder type
Government

Funder Name
Health Technology Assessment Programme

Alternative Name(s)
NIHR Health Technology Assessment Programme, Health Technology Assessment (HTA), HTA

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
Data will be made available for sharing subject to the necessary approvals from NHS Digital. Data sharing will be in line with the University of Bristol research data management and open data policy and in agreement with NHS Digital. Any shared data will be available after publication of the main results of the study.

The final anonymised trial dataset will be stored as restricted data on the data.bris research data repository for at least 5 years after the end of the study. Data will be made available after the end of the study to approved bona fide researchers only after their host institution has signed a data access agreement. Details of how to request access are available at the University of Bristol' s data repository website.

IPD sharing plan summary
Stored in non-publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol file	version 2.0	26/04/2024	20/05/2024	No	No
Protocol file	version 6.0	12/12/2025	12/02/2026	No	No
Study website		11/11/2025	11/11/2025	No	Yes