

Can a 12-week physical activity programme change blood levels of soluble RAGE (receptor for advanced glycation end products) in people receiving haemodialysis?

Submission date 11/09/2026	Recruitment status No longer recruiting	☐ Prospectively registered
Registration date 15/09/2026	Overall study status Completed	☐ Protocol
Last Edited 15/09/2026	Condition category Urological and Genital Diseases	☐ Statistical analysis plan
		☐ Results
		☐ Individual participant data
		☒ Record updated in last year

Plain English summary of protocol

Background and study aims

People with kidney failure who need regular haemodialysis have a higher risk of heart and blood vessel disease. Researchers are interested in a blood protein called soluble receptor for advanced glycation end products (sRAGE), which may play a role in inflammation and cardiovascular health. However, it is not clear whether being more physically active can affect sRAGE levels in people receiving haemodialysis.

The aim of this study was to find out whether taking part in a 12-week moderate-intensity physical activity programme, alongside usual haemodialysis care, could change blood levels of sRAGE compared with usual care alone. The study also looked at whether the programme affected physical activity levels, body measurements, blood pressure, and other blood test results.

Who can participate?

Adults aged 18 years to 80 years who had been receiving maintenance haemodialysis for at least 4 months could take part. Participants had to be physically active at least once per week, be willing to make lifestyle changes, and be able to provide written informed consent.

People could not take part if they were pregnant, had severe heart failure, severe chronic obstructive pulmonary disease, a history of certain cancers, a recent acute illness, advanced joint disease, or a physical disability that prevented them from taking part in the exercise programme.

What does the study involve?

Participants were randomly assigned to one of two groups.

Those in the intervention group received their usual haemodialysis care as well as a structured physical activity programme. The programme began with a 2-week educational phase about active lifestyles, followed by a 12-week exercise programme. Participants were encouraged to carry out walking and other suitable activities such as cycling, resistance exercises, or elliptical training. Exercise plans were tailored to each person's abilities and approved by a kidney specialist.

Participants were asked to complete at least three exercise sessions each week. Their progress was monitored through face-to-face meetings, telephone calls, pedometers, and exercise diaries. Blood samples and health measurements were collected before the study started and again after 12 weeks. The comparison group continued to receive standard haemodialysis care.

What are the possible benefits and risks of participating?

Participants in the exercise programme may have benefited from increased physical activity, which could help improve aspects of their health and fitness. The study may also help researchers understand whether physical activity can affect biological processes linked to cardiovascular disease in people receiving haemodialysis.

As with any exercise programme, there may have been a risk of tiredness, muscle soreness, or minor injury. To reduce these risks, all exercise plans were tailored to the participant's physical abilities and approved by a nephrologist.

Where is the study run from?

Poznań University of Medical Sciences, Poland

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

December 2018 to April 2019.

Who is funding the study?

This was an investigator-initiated study and was funded by the principal investigator.

Who is the main contact?

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Additional identifiers**Study information****Scientific Title**

Effects of a 12-week moderate-intensity physical activity programme on plasma soluble receptor for advanced glycation end products in haemodialysis patients: an exploratory randomised controlled trial

Acronym

Ph.Act-sRAGE-HD

Study objectives

Primary objective:

To determine whether a 12-week moderate-intensity physical activity programme, in addition to standard care, changes plasma soluble receptor for advanced glycation end products (sRAGE) concentrations compared with standard care alone in adult patients receiving maintenance haemodialysis.

Secondary objectives:

To assess the effect of the programme on physical activity level, expressed as metabolic equivalent of task-minutes per week (MET-min/week), and on selected clinical, anthropometric and biochemical parameters, including blood pressure, body mass index, lipid profile, high-sensitivity C-reactive protein, albumin, haemoglobin, glycated haemoglobin, and insulin resistance estimated by HOMA-IR.

Exploratory objective:

To explore associations between plasma sRAGE concentrations and clinical, anthropometric, dialysis-related, and biochemical variables at baseline and after 12 weeks.

Ethics approval required

Ethics approval required

Ethics approval(s)

Approved 04/12/2014, Institutional Review Board of Poznań University of Medical Sciences, Poland (Fredry str.10, Poznan, 61-701, Poland; +48 61 854 60 00; bioetyka.ump@ump.edu.pl), ref: protocol code 945/14

Primary study design

Interventional

Allocation

Randomized controlled trial

Masking

Open (masking not used)

Control

Active

Assignment

Parallel

Purpose

Treatment

Study type(s)

Health condition(s) or problem(s) studied

End-stage renal disease in adults receiving maintenance haemodialysis

Interventions

After baseline assessment and provision of written informed consent, participants were randomly allocated in a 1:1 ratio to the intervention or control group using a computer-generated randomisation list created with the Sealed Envelope randomisation generator. The randomisation list was prepared by an independent statistician who was not involved in participant recruitment. Allocation concealment was ensured using sequentially numbered, opaque, sealed envelopes. Envelopes were opened only after a participant had been enrolled.

Participants allocated to the intervention group received standard haemodialysis care plus a structured moderate-intensity physical activity programme. The programme consisted of a 2-week educational phase focused on active lifestyles, followed by a 12-week intervention phase. Participants were encouraged to undertake walking-based physical activity and other individually tailored exercise modalities. Physical activity goals were set at a minimum of three exercise sessions per week and a weekly energy expenditure of at least 370 MET-min/week. The educational phase consisted of a 2-week training programme on active lifestyles. Walking-based activity was the principal recommended modality. Additional recommended activities included resistance training using resistance bands or medicine balls, stationary or outdoor cycling, and elliptical training.

Exercise plans were tailored to each participant's physical limitations and were approved by a nephrologist.

At least three exercise sessions per week, targeting weekly energy expenditure of at least 370 MET-min/week.

Adherence was monitored through face-to-face meetings and regular telephone calls. Physical activity was recorded using pedometers (Yamax Digi-Walker SW-200 pedometer) and exercise logs.

Participants allocated to the control group received standard haemodialysis care alone for 12 weeks. They did not receive the structured physical activity programme, its educational component, individualised exercise recommendations, or the regular adherence-monitoring

contacts provided to the intervention group. Standard haemodialysis treatment was continued three times weekly for approximately 4 - 4.5 hours per session, according to routine clinical practice at the dialysis centre.

Intervention Type

Behavioural

Primary outcome(s)

1. Plasma soluble receptor for advanced glycation end products (sRAGE) concentration measured using the Human sRAGE ELISA Kit (Abcam, Cambridge, MA, USA), according to the manufacturer's protocol. Blood samples were collected before the midweek haemodialysis session after an overnight fast at baseline and 12 weeks after randomisation

Key secondary outcome(s)

Completion date

18/04/2019

Eligibility

Key inclusion criteria

1. Aged 18 years or older
2. Maintenance haemodialysis treatment duration of at least 4 months
3. Engagement in physical activity at least once per week
4. Willingness to adopt lifestyle changes and participate in the physical activity programme
5. Ability to provide written informed consent

Healthy volunteers allowed

No

Age group

Mixed

Lower age limit

18 Years

Upper age limit

80 Years

Sex

All

Total final enrolment

64

Key exclusion criteria

1. Pregnancy
2. Active or previous neoplasm, as defined in the study protocol
3. Severe heart failure
4. Severe chronic obstructive pulmonary disease

5. Acute illness within 3 months before enrolment
6. Advanced polyarticular degenerative disease
7. Physical disability preventing participation in the prescribed physical activity programme

Date of first enrolment

04/12/2018

Date of final enrolment

28/03/2019

Locations

Countries of recruitment

Poland

Sponsor information

Organisation

Poznan University of Medical Sciences

ROR

<https://ror.org/02zbb2597>

Funder(s)

Funder type**Funder Name**

Investigator initiated and funded

Results and Publications

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

Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Other files			15/09/2026	No	No
Other files			15/09/2026	No	No
Participant information sheet			15/09/2026	No	Yes

