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Does daily buttermilk intake improve blood lipid levels in perimenopausal women?

Submission date
13/06/2026

Recruitment status
No longer recruiting

Registration date
25/06/2026

Overall study status
Completed

Last Edited
15/07/2026

Condition category
Nutritional, Metabolic, Endocrine

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Changes in hormone levels during perimenopause may affect blood lipid levels and may increase cardiovascular risk. Buttermilk is a dairy product that contains polar lipids, which may influence cholesterol metabolism. The aim of this study is to assess whether daily intake of fermented buttermilk for 28 days affects blood lipid levels in perimenopausal women with moderately elevated low-density lipoprotein cholesterol (LDL-C).

Who can participate?
Women aged 45 to 55 years who are in perimenopause, have moderately elevated LDL-C levels, and have had a stable body weight during the previous 6 months can participate.

What does the study involve?
Participants are randomly allocated to either an intervention group or a control group. Participants in the intervention group consume 250 mL of 0.5% fermented buttermilk every day for 28 days. Participants in the control group do not receive an additional dietary intervention and are asked not to make additional changes to their usual diet during the study period.

All participants complete questionnaires and dietary records about their usual diet and lifestyle. Blood samples are collected at the start of the study and after 28 days. These blood samples are used to measure total cholesterol, LDL-C, high-density lipoprotein cholesterol (HDL-C), triglycerides and alanine aminotransferase (ALAT/ALT).

What are the possible benefits and risks of participating?
Participants receive information about their dietary intake and blood lipid profile. The main risk is related to venous blood sampling. Possible risks include pain or bruising at the puncture site. Less common risks include bleeding, infection, dizziness or fainting.

Where is the study run from?
The study is run from the Latvia University of Life Sciences and Technologies in collaboration with Riga Stradiņš University. Blood samples are collected and analysed in an accredited laboratory in Latvia.

When does the study start, and how long is it expected to run
The study was planned to run from November 2022 to June 2024. Each participant takes part in the intervention period for 28 days.

Who is funding the study?
The study is investigator-initiated and conducted as part of doctoral research at the Latvia University of Life Sciences and Technologies. This research was funded by the “Strengthening Research Capacity in the Latvia University of Life Sciences and Technologies” program project, “The study of buttermilk polar lipids”; by the ERAF project No. 1.1.1.8/1/24/1/002 "LBTU Doctoral Students Support and Development Initiative.”

Who is the main contact?
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Contact information

Type(s)
Scientific, Principal investigator, Public

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Study information

Scientific Title
Effect of 28-day daily fermented buttermilk consumption on plasma lipid profile in perimenopausal women with moderately elevated LDL cholesterol: a randomised controlled parallel-group dietary intervention study in Latvia

Acronym
BUTTERMILK

Study objectives
1. To evaluate whether daily consumption of 250 mL fermented buttermilk for 28 days affects plasma LDL-C concentration in perimenopausal women with moderately elevated LDL-C
2. To assess the effect of the intervention on total cholesterol, HDL-C and triglycerides

3. To describe dietary intake and its relationship with plasma lipid profile parameters during the study

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 23/11/2022, Riga Stradiņš University Research Ethics Committee (Dzirciema 16, Riga, LV1007, Latvia; +371 26691306; pek@rsu.lv), ref: 2-PĒK-4/513/2022

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Open (masking not used)

Control
Placebo

Assignment
Parallel

Purpose
Prevention

Study type(s)

Health condition(s) or problem(s) studied
Moderately elevated LDL cholesterol/dyslipidaemia/cardiovascular risk markers in perimenopausal women

Interventions
Participants are randomly allocated to an intervention group or a control group after baseline assessment. Participants in the intervention group consume 250 mL of 0.5% fermented buttermilk daily for 28 days. Participants in the control group receive no additional dietary intervention and are asked not to make additional dietary changes during the 28-day study period. Blood samples are collected at baseline and after 28 days to measure total cholesterol, LDL-C, HDL-C, triglycerides and ALAT. Dietary intake is assessed using a general questionnaire, a 24-hour dietary record, a 72-hour dietary record and a food frequency questionnaire.

Participants were randomised using block randomisation to maintain balanced group sizes between the intervention and control groups. A predefined randomisation list was generated in Microsoft Excel before participant enrolment. Following baseline assessment and confirmation of eligibility, participants were assigned sequentially to the next allocation on the randomisation list.

Intervention Type
Other

Primary outcome(s)
1. Change in low-density lipoprotein cholesterol concentration (LDL-C) measured using venous blood samples using standard clinical laboratory blood analysis in an accredited laboratory. The result is reported in mmol/L at baseline and after 28 days of intervention.

Key secondary outcome(s)
1. Change in total cholesterol concentration measured using Total cholesterol concentration measured in venous blood samples using standard clinical laboratory blood analysis in an accredited laboratory. The result is reported in mmol/L at baseline and after 28 days of intervention.

2. Change in high-density lipoprotein cholesterol concentration (HDL-C) measured using venous blood samples using standard clinical laboratory blood analysis in an accredited laboratory. The result is reported in mmol/L at baseline and after 28 days of intervention

3. Change in triglyceride concentration measured using venous blood samples using standard clinical laboratory blood analysis in an accredited laboratory. The result is reported in mmol/L at baseline and after 28 days of intervention

Completion date
26/06/2024

Eligibility

Key inclusion criteria
1. Women aged 45-55 years
2 .Perimenopausal status
3. Moderately elevated low-density lipoprotein cholesterol within the previous 6 months, defined as LDL-C 3.01-4.12 mmol/L
4. Stable body weight during the previous 6 months, defined as change within +/- 2 kg

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
45 Years

Upper age limit
55 Years

Sex
Female

Total final enrolment
61

Key exclusion criteria

1. Consumption of buttermilk 5-7 times per week
2. History of primary hyperlipidaemia
3. History of cardiovascular disease, including ischaemic heart disease, myocardial infarction, stroke, chronic heart failure, angina or arrhythmia
4. Endocrine diseases, including type 1 or type 2 diabetes, thyroid disorders, adrenal disease or secondary renal failure;
5. Liver disease, including non-alcoholic fatty liver disease, alcoholic fatty liver disease, hepatitis, cirrhosis or chronic liver failure
6. Chronic kidney disease or nephrotic syndrome
7. History of gastrointestinal surgery
8. Hormonal therapy
9) Immunosuppressive therapy;
10) Pharmacological treatment for hyperlipidaemia or hypertension, including medicines or dietary supplements;
11) Lactose intolerance.

Date of first enrolment
10/11/2023

Date of final enrolment
22/04/2024

Locations

Countries of recruitment
Latvia

Sponsor information

Organisation
Latvia University of Life Sciences and Technologies

ROR
https://ror.org/03f077y84

Funder(s)

Funder type

Funder Name
ERAF project No. 1.1.1.8/1/24/I/002 "LBTU Doctoral Students Support and Development Initiative"

Funder Name
Strengthening Research Capacity in the Latvia University of Life Sciences and Technologies programme project "The study of buttermilk polar lipids"

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?
Results article		06/07/2026	15/07/2026	Yes	No
Participant information sheet	Consent form		15/06/2026	No	Yes