INPLASY

Associations Between Fasting-Induced Gut Microbiome Changes and Cardiometabolic Outcomes: A Systematic Review

INPLASY202650037
doi: 10.37766/inplasy2026.5.0037
Received: 7 May 2026
Published: 7 May 2026

Saleh, SNZ; Ludin, CACM; Mokhtar, NM; Aminuddin, A.

Corresponding author:
Amilia Aminuddin

amilia@hctm.edu.my

Author Affiliation:
Universiti Kebangsaan Malaysia.

ADMINISTRATIVE INFORMATION

Support - FF-2025-032.

Review Stage at time of this submission - Risk of bias assessment.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202650037

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 7 May 2026 and was last updated on 7 May 2026.

INTRODUCTION

Review question / Objective This study aims to evaluate the effects of fasting interventions on gut microbiota composition and metabolomic profiles, and their associations with metabolic health parameters in adults.

Condition being studied Fasting interventions are increasingly studied for their potential role in improving metabolic health through modulation of the gut microbiota and associated metabolites. Alterations in gut microbial composition and metabolomic profiles are closely linked to cardiometabolic risk factors such as impaired glucose regulation, and obesity. Understanding how fasting influences these pathways may provide insight into its potential as a strategy for improving metabolic health in adults.

METHODS

Search strategy A computerized database search will be conducted in PubMed, Scopus, Google Scholar, and OVID. Reference lists of included studies will also be manually screened for additional eligible studies. Publication date is within 10 years of publication. No geographical location will be applied. Only studies published in English will be included.

Participant or population Adult participants aged 18 years and above, including both healthy individuals and those with metabolic conditions such as overweight, obesity, or metabolic syndrome. Studies involving children, pregnant women, or individuals with severe chronic diseases will be excluded to minimize potential physiological confounding factors.

Intervention Studies that investigated fasting-based dietary interventions, including intermittent fasting (e.g., alternate day fasting, periodic fasting), time-restricted eating, and Ramadan fasting. Eligible interventions must involve structured and repeated fasting periods rather than single or overnight fasting.

Comparator Non-fasting control group or baseline parameters.

Study designs to be included Randomized controlled trials, non-randomized intervention studies, controlled clinical trials, and pre and post studies. Observational studies without intervention, animal studies, in vitro studies, and review articles will be excluded.

Eligibility criteria Any clinical and preclinical studies that mentioned the effects of fasting towards gut microbiota or metabolomics, and their associations with metabolic health.

Information sources A systematic search will be conducted in PubMed, Scopus, Google Scholar, and OVID. Relevant keywords related to fasting, gut microbiota, metabolomics, and metabolic health will be used as following: ("fasting" OR "intermittent fasting" OR "time-restricted feeding" OR "time-restricted eating" OR "caloric restriction" OR "calorie restriction" OR "Ramadan fasting") AND ("gut microbiome*" OR "gut microbiota" OR "gastrointestinal microbiome*" OR "intestinal microbiota" OR "dysbiosis") AND ("metabolomics" OR "metabolome" OR "short-chain fatty acid*" OR "SCFA" OR "butyrate" OR "bile acid*" OR "glucose" OR "insulin" OR "lipid profile" OR "cholesterol" OR "triglycerides" OR "BMI" OR "HbA1c").

Main outcome(s) (i) gut microbiota, including diversity indices and taxonomic composition; (ii) metabolomic profiles or metabolites, such as short-chain fatty acids, bile acids, or other metabolites measured using metabolomics techniques (e.g., LC-MS, GC-MS); and (iii) the associations between gut microbiome or metabolites with metabolic parameters, including glucose metabolism (e.g., fasting glucose, insulin, HbA1c), lipid profile, Body Mass Index (BMI), blood pressure or inflammatory markers.

Additional outcome(s) Additional outcomes may include immune responses, and gastrointestinal symptoms, where reported.

Data management Three reviewers (S.N.Z.S, C.A.C.M.L., and A.A) will independently extract data using a standardized form. Any disagreements will be resolved through a discussion. Data collected will be managed in Microsoft Excel. Extracted data will include author, year, population, study design, methodology, and main outcomes: gut microbiota, metabolites and their associations with metabolic parameters.

Quality assessment / Risk of bias analysis Risk of bias will be assessed independently by two reviewers (S.N.Z.S, and C.A.C.M.L) using the Cochrane RoB 2 tool for randomized trials and ROBINS-I for non-randomized studies. Any disagreements will be resolved by discussion with a third reviewer. The RoB 2.0 consists of 5 domains: (1) randomization process, (2) deviations from intended interventions, (3) missing outcome data, (4) measurement of the outcome, and (5) selection of the reported result. For the Cochrane's ROBINS-I tool, seven domains were assessed: (1) confounding, (2) selection of participants, (3) classification of interventions, (4) deviations from intended interventions, (5) missing data, (6) measurement of outcomes, and (7) selection of reported results.Risk of bias will be assessed independently by two reviewers using the Cochrane RoB 2 tool for randomized trials and ROBINS-I for non-randomized studies. Any disagreements will be resolved by discussion with a third reviewer. The RoB 2.0 consists of 5 domains: (1) randomization process, (2) deviations from intended interventions, (3) missing outcome data, (4) measurement of the outcome, and (5) selection of the reported result. For the Cochrane's ROBINS-I tool, seven domains were assessed: (1) confounding, (2) selection of participants, (3) classification of interventions, (4) deviations from intended interventions, (5) missing data, (6) measurement of outcomes, and (7) selection of reported results.

Strategy of data synthesis Findings will be presented in tables and summarized narratively describing microbiota, metabolite, and metabolic outcomes.

Subgroup analysis Subgroup analyses will be performed based on fasting type, participant health status, and intervention duration, where possible.

Sensitivity analysis Sensitivity analyses will only be conducted if a meta-analysis was performed.

Language restriction English.

Country(ies) involved Malaysia.

Keywords intermittent fasting; ramadan fasting; gut microbiota; microbial diversity; short-chain fatty acids; cardiometabolic health.

Contributions of each author

Author 1 - Siti Noor Zahirah Saleh.
Email: snzahirahs@gmail.com
Author 2 - Che Amirnudin Che Mohd Ludin.
Email: cheamirnudin@gmail.com
Author 3 - Norfilza Mohd Mokhtar.
Email: norfilza@msu.edu.my
Author 4 - Amilia Aminuddin.
Email: amilia@hctm.edu.my