Protocol

Time-Use Diary Research on Food- and Physical Activity–Related Behaviors Within the 24-Hour Day: Protocol for a Scoping Review

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Abstract

Background: Diet and physical activity (PA) are both important to public health, with unhealthy diets and physical inactivity recognized as major modifiable risk factors for noncommunicable diseases. Time is central to the everyday practice of these behaviors, with lack of time often cited as a barrier to both being physically active and eating well. While 24-hour time-use diary data have been applied in public health research to examine health-related behaviors across the day, there is limited synthesized evidence on how food- and PA-related behaviors have been examined, operationalized, and situated within the wider 24-hour day.

Objective: This scoping review aims to (1) map the range of food- and PA-related behaviors examined using 24-hour time-use diary data; (2) characterize how these behaviors have been operationalized; and (3) examine how they have been situated within the wider 24-hour day, including their relationships alongside other daily activities and contextual factors, and whether they have been analyzed in relation to health-related variables.

Methods: The review protocol is registered with OSF Registries and follows Joanna Briggs Institute (JBI) methodology for scoping reviews. The completed review will be reported using the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) guidelines. A comprehensive search was conducted across 5 databases: MEDLINE, Embase, PsycInfo, Scopus, and Web of Science Core Collection. Eligible studies will include published, peer-reviewed empirical studies of free-living individuals using diary-based activity records covering at least 1 complete 24-hour day to examine food- and/or PA-related behaviors. Two independent reviewers will screen titles and abstracts and subsequently assess full-text articles against the eligibility criteria. Data will be charted and summarized in tables and a narrative summary.

Results: The literature searches, conducted in June 2026, identified 2082 records, of which 825 remained after duplicate removal. Title and abstract screening is ongoing. Full-text assessment, data charting, and synthesis will be undertaken according to the methods described in this protocol.

Conclusions: This review will be the first to map the current literature on how food- and PA-related behaviors have been examined, operationalized, and situated within the wider 24-hour day in time-use diary research. The findings will clarify existing methodological approaches and evidence gaps, providing a foundation for future empirical studies using time-use diary data in this area.

Trial Registration: OSF Registries osf.io/xaryp; https://osf.io/xaryp

International Registered Report Identifier (IRRID): DERR1-10.2196/107942

(JMIR Res Protoc 2026;15:e107942) doi: 10.2196/107942

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KEYWORDS

time-use diary; 24-hour time use; food-related behaviors; physical activity; scoping review; protocol

Introduction

Background

Diet and physical activity (PA) are both important to public health and noncommunicable disease prevention [1,2]. Time is central to the everyday practice of these behaviors, with lack of time often cited as a barrier to both being physically active and eating well [3]. Food-related time use offers insight into how eating, food preparation, and related practices are organized within daily life and how time spent on these activities may relate to dietary choices, nutrition, and health outcomes [4]. Time constraints can limit engagement in health-related activities [5], including food choices and eating practices [6,7], as well as PA [8,9]. Empirical evidence supports this across both domains: among studies examining perceived reasons for skipping meals, 9 of 10 identified lack of time as the strongest correlate [10], while a UK survey found that 37% of adults reported difficulty finding time for PA [11].

Time-use approaches have increasingly been applied in public health research to study health-related behaviors across the day, including eating, PA, and sedentary behavior [12]. A key feature of 24-hour time-use diaries is that they record activities across a full day, often in short time intervals [12], and may include contextual information such as location and the presence of other individuals [12,13]. More broadly, time-use research can contribute to public health by describing the distribution and correlates of health-enhancing patterns of time use and supporting population-level surveillance of behavioral trends over time [14]. Time-use research may also inform intervention design by identifying temporal and contextual opportunities for health-promoting behavior change [15].

In studies of food-related time use, 24-hour diary data have been used to examine changes over time in main eating and secondary eating (ie, eating recorded alongside another primary activity) [16], concurrent eating and television viewing [17], meal preparation in relation to time pressure, stress and health [18], participation in home cooking and time spent cooking among US adults [19], and foodwork within wider daily routines and 24-hour activity compositions [20]. PA studies have used time-use data to examine compliance with World Health Organization PA guidelines [21] and to characterize how adults accumulate moderate to vigorous PA across life domains (eg, work, household, leisure, and transportation), times of day, and types of activities [22,23]. Further PA-related research has evaluated the reliability and validity of time-use surveys for assessing 24-hour movement behaviors [24] and compared experiential well-being across PA and other health-enhancing behaviors [25].

Existing reviews have examined related methodological areas, including analytic methods for identifying the temporal patterning of dietary and 24-hour movement behaviors and their contextual correlates across a range of behavioral assessment approaches [26], and compositional modeling of time reallocations between daily activity components in relation to health outcomes [27]. While these reviews focus primarily on analytical approaches, the present review focuses specifically on empirical studies using structured, multidomain 24-hour time-use diaries. It seeks to clarify what types of behaviors have been examined, such as foodwork, eating, meal preparation, or moderate to vigorous PA; how they have been operationalized from diary records, for example, by defining foodwork through diary-recorded activities such as food shopping, meal preparation, washing up and clearing away; and how they have been situated within the wider 24-hour day, for example, by examining them alongside other daily activities, such as paid work or sleep, across contextual factors, or in relation to health-related variables or outcomes. Clarifying this evidence base is important for establishing the current scope of research in this area and informing future work using a time-use diary perspective.

Objective

The overarching objective of this scoping review is to map the published evidence base to understand how 24-hour time-use diary data have been used to study food- and PA-related behaviors, including how these behaviors have been examined, operationalized, and situated within the wider 24-hour day.

Review Questions

This scoping review focuses on the following review questions: (1) What types of food- and PA-related behaviors have been examined in studies using 24-hour time-use diary data? (2) How have food- and PA-related behaviors been operationalized using 24-hour time-use diary data? (3) How have studies situated food- and/or PA-related behaviors within the wider 24-hour day, including alongside other daily activities and contextual factors, and in relation to health-related variables?

Methods

Overview

To maintain transparency and methodological rigor, the review protocol was registered with the OSF Registries (osf.io/xaryp; registered on June 26, 2026). This scoping review will be conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews [28]. The completed review will be reported using the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) guidelines [29].

The population, concept, and context (PCC) framework guided the development of the eligibility criteria [30]. A preliminary search of Ovid MEDLINE, the Cochrane Database of Systematic Reviews, JBI Evidence Synthesis, and PROSPERO identified no published or ongoing reviews that specifically map how 24-hour time-use diary data have been used to study food- and PA-related behaviors.

Inclusion and Exclusion Criteria

For this review, 24-hour time-use diary data will refer to records of activities across a complete 24-hour day. Eligible data sources

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may include national time-use surveys, cohort or survey datasets with a 24-hour diary component, and other structured previous-day activity records that capture activities across a full day. No restrictions were placed on the publication year of eligible studies. The inclusion and exclusion criteria are presented in Table 1.

Table 1. Inclusion and exclusion criteria for the scoping review.

	Inclusion criteria	Exclusion criteria
Population	• Studies of free-living individuals across all age groups • Time-use diary data may be completed by participants or proxy respondents or with interviewer assistance	• Studies conducted exclusively among individuals who are not free-living
Concept	• Studies using diary-based activity records covering 1 or more complete 24-hour days to examine food- and/or PAa-related behaviors • PA-related behaviors may include PA across occupational, household, active transport, and leisure domains • Eligible diary-based activity records may include national time-use surveys, cohort or survey datasets with a 24-hour diary component, or other structured diary-based activity records that capture multiple daily activity domains	• Studies that do not use diary-based activity records across at least 1 complete 24-hour day • Studies relying only on behavior-specific measures, such as food frequency questionnaires, dietary recalls, PA questionnaires, exercise logs, accelerometry, or movement monitoring methods without full-day activity records • Studies in which 24-hour time-use diary data are used to investigate other research topics without examining food- or PA-related behaviors as part of the study analyses • Studies focusing exclusively on sleep, sedentary behavior, or screen time, without examining food- or PA-related behaviors
Context	• Studies examining the everyday activities of free-living individuals across any geographic location, country income level, or cultural setting	• Studies conducted exclusively among individuals living in institutional or residential care settings, such as care homes, nursing homes, long-term care facilities, residential hospitals, boarding schools, or prisons
Language	• Studies published in English	• Studies not published in English

[a]PA: physical activity.

Types of Evidence Sources

This review will include published, peer-reviewed empirical studies using 24-hour time-use diary data to examine everyday food- and/or PA-related behaviors. Eligible study designs may include cross-sectional, longitudinal, repeated cross-sectional, and cohort studies. Mixed methods and qualitative studies will also be considered where 24-hour time-use diary data are included. If intervention studies are identified, only analyses of preintervention baseline data that meet the review's eligibility criteria will be considered for inclusion. Data collected during or after the intervention will be excluded, as this review focuses on food- and PA-related behaviors in everyday life rather than intervention-related changes.

Systematic reviews, scoping reviews, narrative reviews, commentaries, editorials, protocols, and text or opinion papers will not be included as evidence sources. Gray literature will not be included as an evidence source, as this review focuses on published, peer-reviewed empirical studies to provide a clearly defined evidence base for comparing how food- and PA-related behaviors have been examined and operationalized using 24-hour time-use diaries. A preliminary exploratory search was conducted in Google Scholar to inform this decision, with the search strategy and examples of retrieved records documented in Multimedia Appendix 1.

Search Strategy

The search strategy was developed to identify studies using 24-hour time-use diary data to examine food- and PA-related behaviors. Search terms were developed around 3 key concepts: "24-hour time-use diary data," "food-related behaviors," and "physical activity–related behaviors." Relevant text words identified from titles and abstracts, together with database-specific subject headings and index terms, were incorporated into the search strategies.

Search strategies were developed for MEDLINE (Ovid), Embase (Ovid), PsycInfo (Ovid), Scopus, and Web of Science Core Collection. The database searches were conducted on June 26, 2026. No publication date limits were applied. The full database-specific search strategies, including search terms, subject headings, Boolean operators, and applied limits, are provided in Multimedia Appendix 2. Reference lists of included studies will also be screened to identify additional potentially eligible published studies, and citation tracking may be used where feasible.

Study and Source of Evidence Selection

Following the search, all identified records were imported into Rayyan (Rayyan Systems Inc) [31], and duplicates were removed. Screening is being conducted in 2 stages. In the first stage, titles and abstracts are being screened independently by 2 reviewers against the inclusion and exclusion criteria. Records are classified as "include," "exclude," or "unclear." A pilot screening exercise was undertaken on 25 records independently assessed by 2 reviewers to support consistency in screening decisions. The reviewers discussed their decisions to clarify the application of the eligibility criteria before proceeding to formal screening.

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In the second stage, records classified as include or unclear by either reviewer will be retrieved in full and assessed independently by 2 reviewers against the same eligibility criteria. Reasons for exclusion at the full-text screening stage will be recorded and reported in the final scoping review.

Disagreements or uncertainties at either stage will be resolved through discussion between reviewers and, where necessary, consultation with a third member of the team. The results of the search and study selection process will be reported using a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram [29].

Data Extraction

A draft data extraction form has been developed for this review informed by the JBI methodology for scoping reviews [28]. Data will be charted using Microsoft Excel. The key data charting domains are summarized in Textbox 1.

Textbox 1. Key data charting domains.

- Source or reference and year of publication
- Country or region, dataset, and data collection year
- Aims or purpose
- Study design and methods (eg, cross-sectional, repeated cross-sectional, or longitudinal designs)
- Population characteristics and sample size (eg, age eligibility, analytic sample description, and sample size)
- Diary data characteristics (eg, diary format or coverage, completion mode, temporal resolution, and number of diary days)
- Key information relevant to the following:
  - The food-related behaviors and/or physical activity (PA)–related behaviors examined, such as foodwork, eating, meal preparation, or moderate to vigorous PA
  - The operationalization of food- and/or PA-related behaviors from diary data, for example, by grouping food preparation or cooking, setting the table, and washing or putting away dishes to capture foodwork or by assigning metabolic equivalent of task values to diary-recorded activities to derive moderate to vigorous PA measures or assess guideline compliance
  - How food- and/or PA-related behaviors were examined within the wider 24-hour day, including alongside other daily activities (eg, paid work or sleep) and across contextual factors (eg, weekday, weekend, or season), and whether they were analyzed in relation to health-related variables or outcomes (eg, BMI)

The draft data extraction form will be pilot-tested on 5 potentially relevant studies. The form may be refined during data charting, if necessary, to better capture content relevant to the review questions. The data extraction approach will depend on the final number of included studies. If 50 or fewer studies are included, 2 reviewers will independently extract data from each study. If more than 50 studies are included, 1 reviewer will extract the data, and a second reviewer will check each extracted field against the original article for every included study to ensure accuracy and completeness. This verification approach is supported by methodological guidance for scoping reviews [32]. Any disagreements or uncertainties will be resolved through discussion between reviewers, with a third member of the team consulted if necessary.

Substantive modifications will be detailed when the scoping review is reported. A risk of bias assessment will not be undertaken, as this scoping review aims to map the available evidence, concepts, and methods and does not seek to assess the internal validity of the included evidence.

Data Analysis and Presentation

In line with JBI guidance, the findings will be presented in tables and, where appropriate, diagrams, accompanied by a narrative summary [28,32]. The charted data will be organized according to the review questions, including the types of food- and PA-related behaviors examined across included studies, how these behaviors were operationalized using diary data, and how they were situated within the wider 24-hour day. For food- and PA-related behaviors, study-specific definitions, activity codes, groupings, and diary-derived measures will be recorded as reported in each study and compared descriptively to identify similarities and differences in operationalization. Given the descriptive and mapping purpose of this scoping review, no meta-analysis or pooled effect estimation will be undertaken.

Ethical Considerations

This scoping review will synthesize data from published studies and will not involve the collection of primary data or access to identifiable individual-level data. Therefore, ethics approval and informed consent are not required.

Results

The database searches identified 2082 records. After removing 1257 duplicates, 825 records remained for title and abstract screening. The identification and deduplication stages are illustrated in Figure 1. Title and abstract screening is ongoing and is being carried out independently by 2 reviewers against the predefined eligibility criteria. Full-text assessment, data charting, and synthesis will be undertaken according to the methods described in this protocol. The findings will be disseminated through publication in a peer-reviewed journal.

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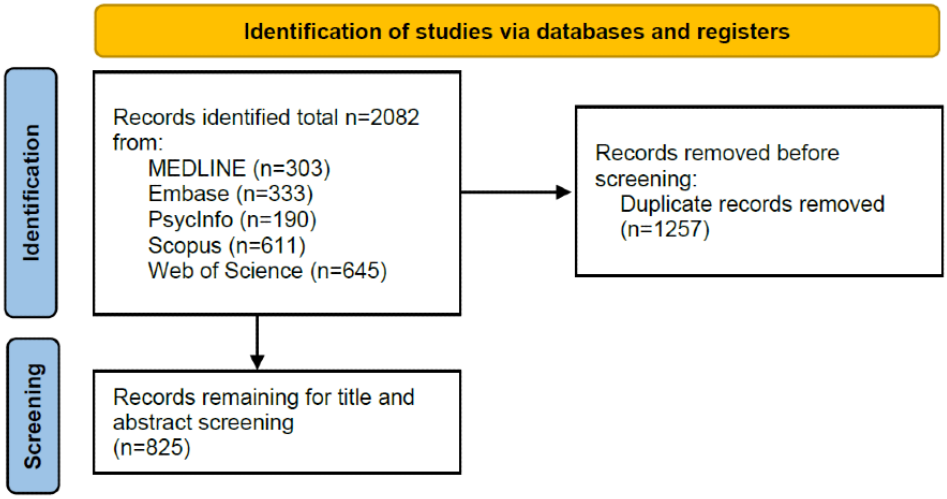
Figure 1. PRISMA 2020 flow diagram of study identification and deduplication.



Discussion

Anticipated Findings

This review addresses an important gap in the use of time-use diary research to understand food- and PA-related behaviors. Time-use diary data provide rich information on daily activities, timing, and context that can offer insights into 2 important health-related behaviors: PA and eating behaviors. While Leech et al [26] focused on analytic methods for examining temporal patterns of dietary and 24-hour movement behaviors, the present review offers a complementary perspective by examining the broader use of complete 24-hour time-use diaries in food- and PA-related research, including whether these data have been used to examine individual behaviors or to explore their relationships with other activities across the day. This perspective is relevant given evidence that competing time demands can constrain healthy eating and PA [9].

Reviewing this literature will clarify the range of approaches currently used and establish what is known about how these behaviors are represented in time-use diary research. By mapping study populations, datasets, diary characteristics, operational definitions, and relevant 24-hour contextual features, this review will provide a foundation for future studies using time-use diary data to examine how food- and PA-related behaviors are organized within everyday routines.

Strengths and Limitations

This review protocol has notable strengths. It adheres to established methodological guidance, including registration on OSF, use of JBI methodology for scoping reviews [28], and reporting guided by PRISMA-ScR [29], supporting transparency and reproducibility. The comprehensive search strategy spans 5 major databases, increasing the likelihood of capturing relevant studies across public health, behavioral science, psychology, and multidisciplinary research. The inclusion criteria are clearly defined, focusing on published, peer-reviewed empirical studies that use 24-hour time-use diary data to examine food- and/or PA-related behaviors. Additionally, the dual-reviewer approach for title and abstract screening and full-text assessment, with a third reviewer available to resolve disagreements, further strengthens the methodological rigor. The structured data charting process is aligned with the review questions and will support systematic comparison of study characteristics, diary data characteristics, behaviors examined, operationalization approaches, and relevant 24-hour contextual features.

However, this review also has some limitations. First, the inclusion of only English-language publications may introduce language bias and limit the comprehensiveness of the evidence base. Second, the review will focus on published, peer-reviewed empirical studies and will not include gray literature as an evidence source. Consequently, material available only in reports, theses, dataset documentation, or other non–peer-reviewed sources will not be captured. Finally, the review focuses on reported analyses of food- and PA-related behaviors rather than the potential secondary applications of existing time-use diary datasets.

Conclusions

This scoping review will map how 24-hour time-use diary data have been used to examine food- and PA-related behaviors and how these behaviors have been operationalized and situated within the wider 24-hour day. By synthesizing evidence across behavioral domains, diary-derived measures, and contextual features, this review will identify methodological patterns and gaps in current time-use diary research. As existing reviews have not specifically mapped how food- and PA-related behaviors are examined using 24-hour time-use diary data, this review will provide a foundation for future empirical studies in this area.

Acknowledgments

The authors would like to thank Dr Elena Mylona, Research Associate at the Centre for Time Use Research, University College London (UCL), for generously sharing her expertise in time-use research, and Dr Debora Marletta, Training and Clinical Support Librarian at UCL Library, Culture, Collections and Open Science, for her assistance with developing the search strategy.

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Funding

PYC receives PhD funding from the Ministry of Education, Taiwan, through the Government Scholarships for Overseas Study program. OM is funded by a UKRI Future Leaders Fellowship (MR/T041226/1 and UKRI2740). RC is funded by the National Institute for Health and Care Research (NIHR) Policy Research Unit in Healthy Weight (PR-PRU-0916-21001; grant 174868). The funders had no involvement in the study design or manuscript preparation and will have no role in data analysis or the decision to publish. The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

Data Availability

No datasets were generated or analyzed during the preparation of this protocol. Data generated during the completed scoping review will be available from the corresponding author on reasonable request.

Generative AI Use

The authors declare that generative AI was used in the creation of this manuscript. Generative AI, ChatGPT (GPT-5.6 Sol; OpenAI) was used for proofreading, editing, or language polishing. The authors verified all outputs of the tool used in the preparation of this manuscript and take full responsibility for the final content of the manuscript.

Authors' Contributions

All authors were directly involved in the development of this protocol. PYC, AF, OM, and RC contributed to the conceptualization and methodology of the review. PYC drafted the manuscript. AF, OM, and RC critically reviewed and revised the manuscript. All authors read and approved the final manuscript for publication.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Preliminary exploratory Google Scholar search of gray literature.
[DOCX File , 17 KB-Multimedia Appendix 1]

Multimedia Appendix 2

Database search strategies.
[DOCX File , 14 KB-Multimedia Appendix 2]

Multimedia Appendix 3

PRISMA-ScR checklist.
[DOCX File , 84 KB-Multimedia Appendix 3]

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Abbreviations

JBI: Joanna Briggs Institute
PA: physical activity
PCC: population, concept, and context
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRISMA-ScR: Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews

Edited by J Sarvestan; submitted 27.Jul.2026; peer-reviewed by Q Chen, J Brummer; comments to author 09.Oct.2026; revised version received 27.Oct.2026; accepted 16.Nov.2026; published 25.Nov.2026

Please cite as:
Chen P-Y, Fisher A, Mytton O, Conway R
Time-Use Diary Research on Food- and Physical Activity–Related Behaviors Within the 24-Hour Day: Protocol for a Scoping Review
JMIR Res Protoc 2026;15:e107942
URL: https://www.researchprotocols.org/2026/1/e107942
doi: 10.2196/107942
PMID:

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