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Contribution ID: **384** Type: **2 - Scientific Poster or Talk**

Toward Real-Time Understanding of Cancer-Related Fatigue and Physical Activity: A Scoping Review of Ambulatory Assessment Research

Context Cancer-related fatigue (CRF) is one of the most prevalent and debilitating symptoms among cancer survivors. Although physical activity is widely recommended to mitigate CRF, existing evidence largely relies on retrospective, between-person approaches that fail to capture intra-individual fluctuations and contextual influences in daily life. Ambulatory Assessment (AA) enables real-time monitoring and offers opportunities to examine the micro-temporal interplay between CRF and physical activity behavior in everyday life.
Objective This scoping review examined: (a) AA-based approaches for assessing CRF; (b) concurrent physical activity assessment; and (c) emerging evidence on bidirectional relationships. Key methodological challenges were identified to inform future precision-oncology research.
Design Scoping review conducted according to PRISMA-ScR guidelines.
Eligibility Criteria Studies using AA methods to assess CRF in adult cancer survivors, with or without concurrent physical activity measurement.
Study Selection PubMed, Web of Science, EMBASE, CINAHL, and Scopus were systematically searched through March 2026. Titles, abstracts, and full texts were independently screened, supplemented by forward and backward citation tracking.
Main Outcome Measures AA procedures, CRF operationalization, physical activity assessment, temporal alignment between measures, and reported associations.
Results Forty-three studies met inclusion criteria, of which 21 included concurrent physical activity assessment. Substantial methodological heterogeneity in CRF and physical activity assessment was identified, and precise temporal synchronization between measures was rare. Nevertheless, AA approaches revealed substantial intra-individual variability and diurnal CRF fluctuations. Emerging intensive longitudinal findings provide preliminary evidence for time-sensitive, potentially bidirectional associations, with higher physical activity and lower sedentary behavior generally linked to lower fatigue.
Conclusion AA is shifting CRF research toward a dynamic, within-person framework. However, limited temporal synchronization and lack of standardized assessment approaches constrain interpretability and translation. This review provides methodological recommendations for standardized CRF assessment, objective activity monitoring, temporally aligned measurements, and within-person analytical approaches to advance adaptive, context-sensitive interventions for cancer survivorship care.

Keywords

Cancer-Related Fatigue, Physical Activity Behavior, Ambulatory Assessment, Symptom Assessment

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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Session Classification: Poster Session