CANCER • SURVIVORSHIP • SLEEP • FATIGUE • EXERCISE

# Circadian disruption in people living with cancer: from identification to a feasible multimodal intervention

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## 1 | INTRODUCTION / BACKGROUND

Circadian disruption is increasingly recognised as an important contributor to symptom burden and reduced quality of life yet remains under-recognised in routine oncology and survivorship care.[1] Although disrupted circadian rhythms are associated with poorer patient outcomes, there has been limited consensus on standardised methods for identifying clinically relevant circadian disorders or evaluating interventions to improve survivorship outcomes.

## 2 | Assessment and diagnosis of circadian rest-activity rhythm disorders (CARDs) in cancer

**AIM AND METHODS:** to a three round international e-Delphi study recruited 16 participants and aimed to generate international consensus opinion on the assessment and diagnosis of circadian rest-activity rhythm disorders in patients with cancer.

**KEY FINDINGS:** 66% of statements achieved consensus and stability between rounds. Circadian rest-activity rhythm disruption reflects an ongoing change in physical rest and activity patterns over a 24-hour period, or between 24-hour periods, with associated increased morbidity and/or decreased quality of life. This change must be present for at least 1 month with a clinical impact, be demonstrated by objective (e.g. accelerometry) and subjective measures (patient-reported symptoms, patient diary) and not be due primarily to another cause.

## 3 | Characterising circadian rhythms in patients with advanced cancer

**AIM AND METHODS:** 72 patients with locally advanced or metastatic cancer were objectively monitored using wrist and thigh accelerometry for at least 72-hours, provided a blood sample and completed questionnaires on symptoms, quality of life, a diary with the aim to identify the prevalence of circadian rhythm disruption and clinically important associations.

**KEY FINDINGS:** CARDs were identified in 60% of patients with advanced cancer. Increased disruption was seen with more advanced disease, particularly metastatic organ involvement ($p = 0.038$), poorer performance status ($p = 0.018$), higher inflammatory status ($p = 0.018$), anaemia ($p = 0.007$) and iron deficiency ($p = 0.02$). Patients with advanced cancer and a CARD had higher symptom burden, particularly fatigue ($p = 0.003$) and drowsiness ($p = 0.005$), higher symptom-related distress ($p = <0.001$), a poorer global health status ($p = 0.005$) and poorer functioning subscales (all $p <0.014$).

## 4 | Assessing the feasibility of a multi-modal, non-pharmacological intervention

**AIMS AND METHODS:** 20 people with advanced cancer and a CARD were recruited to an 8-week feasibility study assessing the use of daily bright light therapy, online cognitive behavioural therapy for insomnia and a personalised physical activity plan with the aim of improving circadian rhythmicity and clinical outcomes.

**KEY FINDINGS:** Participants completed questionnaires (80%) and accelerometry (75%) and engaged with the CBT-I course (100%), bright light therapy (80%) and physical activity plan (100%). Participants reported acceptability and usability of the intervention, with no intervention-related adverse events. Preliminary improvements were seen for fatigue ($p = 0.003$) and insomnia ($p – 0.021$), and symptom-related distress scores ($p<0.01$). Scores also improved for social ($p = 0.001$), cognitive ($p = 0.006$), emotional ($p = 0.012$) and physical ($p = 0.046$) functioning.

## 5 | OVERALL CONCLUSION AND FUTURE DIRECTIONS

- Circadian rhythm disorders are common in people living with cancer and have important associations with clinical outcomes of interest (increased symptomatology, poorer quality of life, shorter survival).
- Non-pharmacological, multimodal interventions are feasibility and demonstrate preliminary efficacy.
- Further work is required to understand the role of circadian disruption across cancer types and to explore the effectiveness of circadian-driven interventions at improving clinical outcomes.

Gouldthorpe C, Power J, Davies A. Circadian rhythm disorders in patients with advanced cancer: a scoping review. Frontiers in Oncology. 2023;13:1240284.
Gouldthorpe C, Ancoli-Israel S, Cash E, Innominato P, Jakobsen G, Levi F, Miaskowski C, et al. International e-Delphi Consensus Recommendations for the Assessment and Diagnosis of Circadian rest-Activity Rhythm Disorders (CARDs) in Patients with Cancer. Cancers. 2023;15(15):3784.
Gouldthorpe C, Davies AN. Circadian rest-activity rhythm disorders in advanced cancer: assessment, diagnosis and clinical correlates. BMJ SPC. 2026;16:162-169.
Gouldthorpe C, Davies A. REstoring Sleep and Energy using a mulTimodal non-pharmacological intervention in advanced Cancer: A feasibility study (RESET-C). Palliative Medicine. 2026;40(6):845-855.

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