

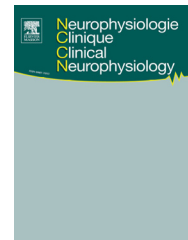


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COMPREHENSIVE REVIEW/REVUE GÉNÉRALE

Exercise, sleep and cancer-related fatigue: Are they related?



Exercice, sommeil, et fatigue liée au cancer: quels liens de causalité ?

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KEYWORDS

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Summary Cancer-related fatigue (CRF) is a commonly reported and debilitating side effect of cancer and/or cancer treatment. Sleep disorders are also highly reported in the cancer population; however it is unknown if sleep is associated with fatigue. In the general population, exercise has been shown to improve sleep, however in the cancer population this idea is under investigation. The primary purposes of this review were to: (i) review the prevalence and causes of sleep disorders in cancer patients and survivors, (ii) examine the relationship between sleep and CRF and (iii) review the impact of exercise interventions on sleep in cancer patients and survivors. A scoping review of the literature was conducted regarding exercise interventions in cancer patients and survivors with sleep as at least one outcome measure. A search of the literature revealed limited studies ($n = 21$) assessing the effect of exercise on sleep disorders in the cancer population. Methodological issues are evident because assessing sleep is often not the main outcome of interest. The reviewed studies revealed that exercise positively impacts sleep quality and quantity. There seems to be possible relationship between sleep disorders, exercise and CRF. Further investigation of this relationship is necessary, specifically using objective measurement tools, in large, controlled studies, focusing on sleep as the primary outcome. © 2017 Elsevier Masson SAS. All rights reserved.

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MOTS CLÉS

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Sommeil

Résumé La fatigue liée au cancer (CRF) est un effet secondaire du traitement et/ou de la maladie délétère communément reporté. Les troubles du sommeil sont aussi courants chez les personnes atteintes de cancer, toutefois il n'est pas connu si la qualité du sommeil est associée à la fatigue. Si les effets bénéfiques de l'exercice sont reconnus dans la population générale, ces effets restent à démontrer chez les patients atteints de cancer. Les buts principaux de cette revue étaient de (i) passer en revue la prévalence et les causes des troubles du sommeil chez les patients et survivants au cancer, (ii) examiner la relation entre la fatigue liée au cancer et le sommeil et (iii) passer en revue les études examinant l'effet d'un programme d'entraînement physique sur le sommeil de ces population. Une revue exploratoire de la littérature a été conduite sur les programmes d'entraînement chez les patients et survivants au cancer avec le sommeil comme une des variables d'intérêt. Cette recherche a révélé un nombre limité d'études ($n=21$) sur cette thématique. Les limitations méthodologiques sont évidentes, en particulier le fait que le sommeil n'est souvent pas la variable d'intérêt principale. Cette revue de littérature suggère cependant que l'exercice impacte positivement la qualité et la quantité de sommeil. Il semble y voir une possible relation entre les troubles du sommeil, l'exercice et la fatigue liée au cancer. De future expérimentations sont nécessaires pour le confirmer, spécifiquement utilisant des outils d'évaluation objectifs du sommeil dans de larges études contrôlées et ayant le sommeil comme principale variable d'intérêt.

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Introduction

Sleep, at the most basic level, is key for wellbeing, learning and memory, and improving energy [43,44]. Inadequate sleep is linked with numerous illnesses detrimental to health, including a predisposition to obesity, diabetes, heart disease, depression and cancer [44]. In the cancer population, the prevalence of sleep disturbance is reported to be 17–70% [22]. To put this into context, only 20% of the general population experiences poor quality of sleep [48,65], with women and the older population more likely to have insomnia and report sleep disturbances than young men in non-cancer populations [51,75]. In the present review, good quality of sleep will be defined as being associated with ease of sleep onset, positive sleep maintenance, adequate total sleep time (most humans require 7–8 h), and few early awakenings [32]. With such a high rate of incidence in cancer patients and survivors, it is striking that clinicians rarely take a sleep history and do not look further into impaired (self-reported) sleep disturbances [61,65]. Further research on the significance of sleep disorders when treating oncological patients must be conducted and provided to clinicians.

Sleep disorders have been noted as a possible mechanism contributing to the highly discussed phenomenon of cancer-related fatigue (CRF). Currently, it is unclear what the relationship is between sleep and CRF [31]. It is possible that sleep disorders directly affect the level of fatigue in patients with CRF, however it is also possible that sleep disorders may be separate from CRF. In order to comprehend the exact mechanisms contributing to CRF and identify the most appropriate methods to treat CRF, it is imperative that there is a clear understanding of the relationship between sleep and CRF.

Although various exercise interventions have been employed to decrease the severity of CRF [19,47], few interventions have focused on identifying how sleep disorders are changed through exercise interventions. Although the current body of literature summarizes that exercise is related to decreased severity of CRF, the potential indirect role of

exercise on the improvement of the severity and prevalence of sleep disorders, to explain the reduced severity of CRF, is poorly understood.

This review has three objectives: (i) to review the prevalence and causes of sleep disorders in cancer patients and survivors, (ii) to examine the relationship between sleep and CRF and (iii) to review the impact of exercise interventions on sleep in cancer patients and survivors.

Methods

A scoping review of the literature was performed using common databases: Pubmed, Medline, Google Scholar, as well as the reference list of 3 reviews on sleep in cancer populations published within the last 10 years [15,40,53]. Search terms included "cancer", "neoplasms", "cancer-related fatigue", "exercise", "exercise therapy", "sleep disorders", "insomnia", "sleep initiation and maintenance disorders".

Studies were included if (i) at least one outcome variable was sleep (quality and/or quantity), (ii) either an exercise intervention of any type of exercise was performed, or current level of physical activity/exercise was compared with sleep and (iii) subjects included had a diagnosis of any type or stage of cancer. All published studies were included, with year of publication ranging from 1997 to 2015. Articles written in English were searched for.

Results

Prevalence and etiology of sleep disorders in cancer patients and survivors

Sleep disturbances have been reported in 17–70% of those with cancer [22]. Sleep disorders can begin at diagnosis and continue into survivorship [65]. Currently, there is a lack of understanding of the relationship between sleep

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