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Association of Short Sleep Duration with Psychological Conditions in Cancer Survivors: From the Korea National Health and Nutrition Examination Survey

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Abstract

Background: Cancer survivors experience various psychological complications. This study aims to explore the concurrent association between short sleep duration and poor psychological conditions among adult cancer survivors in Korea.

Methods: Cross-sectional study using data from the fourth and fifth Korea National Health and Nutrition Examination Surveys (2007-2012) included 1,042 cancer survivors and 33,867 non-cancer controls. Psychological conditions (i.e., severe distress, depression, suicidal ideation and suicide attempt) were compared between cancer survivors and non-cancer controls. Based on logistic regression models controlling for age and sex, associations between short sleep duration and psychological status were evaluated among cancer survivors.

Results: Cancer survivors exhibited higher estimated proportions of depression, suicidal ideation, and suicide attempt than non-cancer controls. Short sleep duration was found to have a significantly increased likelihood for poor psychological outcomes such as severe distress, depression, and suicidal ideation in cancer survivors (OR=2.21, 95% CI 1.28-3.81; OR=3.14, 95% CI 1.47-6.72, and OR=2.32, 95% CI 1.70-3.78, respectively).

Conclusions: Our findings indicate that short sleep duration can place cancer survivors at a higher risk of adverse psychological conditions. Interventions focused on improving both sleep behavior and psychological stability among cancer survivors are needed.

Keywords: Short sleep; Psychological conditions; Cancer survivorship

Introduction

Currently, about 32.6 million people live with cancer worldwide [1]. Following the global phenomenon, Korea has a cancer prevalence of about 1.2 million cases, and a significant number of individuals with cancer have either been undergoing or completed treatment [2]. Emerging evidence has indicated that cancer survivors are particularly prone to sleep problems, i.e., symptoms of insomnia and sleep disturbance, with a greater prevalence rate than the general population [3,4]. These cancer-related sleep problems appear to impede survivors' daily life and are easily linked to an increased risk for physical and psychological complications [5]. Furthermore, in symptom clusters accompanied with cancer diagnosis, sleep problems and psychological disorders can concurrently occur among cancer survivors [5,6]. Their synergic effects may result and affect survivors' health outcome.

Despite its prevalence and importance, sleep problems of cancer survivors are not yet fully investigated: a large proportion still remains unknown. Few studies focused on the association of decreased sleep quantity with psychological complications among cancer survivors. This study thus aims to explore the concurrent relationship between short sleep duration and psychological conditions among adult cancer survivors from a nationwide population-based sample in Korea.

Method and Material

Study population

This study is based on the nationwide population-based sample from the Fourth and Fifth Korea National Health and Nutrition Examination Survey (KNHANES IV and V, 2007-2012). Described elsewhere in detail, the KNHANES is a nationally representative survey to investigate the health and nutritional status of Koreans [4,7]. Brief information on the KNHANES is summarized as follows: since 1998, this ongoing surveillance system has been carried out every year; non-institutionalized civilians aged one and over are selected by using a multi-stage clustered probability sampling design; and three component surveys-the Health Interview, the Health Examination, and the Nutrition Surveys are conducted by well-trained medical staff [7]. Among the 63,301 respondents who were targeted for KNHANES IV and V, about 79.6% participated in surveys [4], from an initial study

samples totaling from KNHANES IV and V cycles, people who were under 19 years of age or those with missing information on the history of cancer diagnosis, sleep duration, and psychological conditions (i.e., severe distress, self-reported prevalence of depression, suicidal ideation, and suicide attempt) were excluded. A final total of 34,909 subjects, including 1,042 cancer survivors and 33,867 non-cancer controls, were selected for analyses.

Variable collection

Information on individual characteristics including cancer history, sleep duration, and psychological conditions were collected based on the interview-based questionnaire survey according to the KNHANES protocol.

Cancer history: All study subjects were asked if they have ever been diagnosed with cancer or a malignancy of any kind by a doctor. Cancer survivors who concurred with the question further responded to sub-questions regarding the specific cancer type and the age at cancer diagnosis. In the case for survivors with multiple cancer diagnoses, the first cancer diagnosis was considered for the definition of the primary outcome.

Sleep duration: Average sleep duration was assessed with a single, open-ended question: 'How many hours of sleep do you usually get each day?' Short sleep duration referred to subjects who usually slept for less than 5 hours per day.

Psychological conditions: Mental health status was assessed by the domains of severe distress, depression, suicidal ideation, and suicide attempt. Severe stress group included subjects who reported their daily life stress level to be severe or high. Depression was evaluated based on the subjects' self-report on whether or not they 'currently suffer[ed] from depression'. Suicidal ideation and attempt was defined by the following questions: 'Have you ever thought about killing yourself during the past year?' and 'Have you ever attempted to commit suicide during the past year?'

Statistical analysis

In accordance with a stratified multi-stage clustered probability sampling method, to yield unbiased national estimates, data were weighted as described in the statistical analysis for the KNHANES. Based on the survey procedures available through SAS version 9.4 (SAS Institute, Cary, North Carolina), all analyses were conducted by using survey weightings to estimate the statistics. Using chi-squared test, estimated proportions and standard errors were calculated to compare the psychological conditions between cancer survivors and non-cancer controls. Associations between short sleep duration and psychological conditions were evaluated among cancer survivors: logistic regression analyses were performed and odds ratios (ORs) and 95% confidence intervals (CIs) were estimated accounting for sex and age.

Results and Discussion

Cancer survivors were more likely to be women and older compared to non-cancer controls (p<0.001). Among the cancer survivors, gastric cancer was the most common type and the mean survival time after cancer diagnosis was 7.7 ± 0.3 years (Data not shown).

Estimated proportions of depression and suicidal ideation were significantly higher in cancer survivors: 4.8% vs. 2.8% for depression and 22.5% vs. 14.9% for suicidal ideation (p<0.001). Suicide attempt, although marginally significant, was also higher in cancer survivors compared to non-cancer controls (1.6% vs. 0.8%, p=0.062; Figure 1).

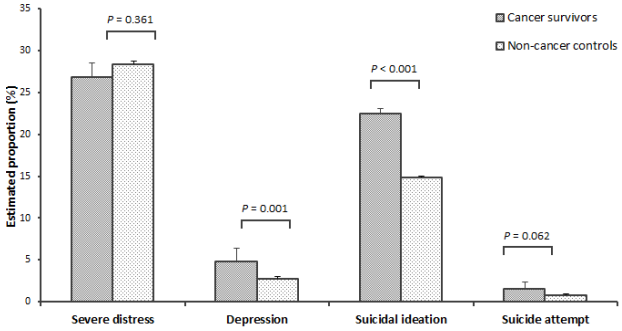

Figure 1: Comparison of psychological conditions between cancer survivors and non-cancer controls.

Short sleep duration exhibited a higher likelihood of poor psychological conditions among cancer survivors. Accounting for sex and age, cancer survivors who slept for less than 5 hours per day had a significantly increased odds of severe distress (OR=2.21, 95% CI 1.28-3.81), depression (OR=3.14, 95% CI 1.47-6.72), and suicidal ideation (OR=2.32, 95% CI 1.70-3.78; Table 1).

	Severe distress	Depression	Suicidal ideation	Suicide attempt
	OR (95% CI) a	OR (95% CI) a	OR (95% CI) a	OR (95% CI) a
Sleep duration (hours/day)				
5-9 hours	1 (reference)	1 (reference)	1 (reference)	1 (reference)
< 5 hours	2.21 (1.28-3.81)	3.14 (1.47-6.72)	2.32 (1.70-3.78)	2.91 (0.81-10.5)

Table 1: Association between short sleep duration and psychological conditions among cancer survivors.

In our study, adult cancer survivors appeared to be vulnerable to psychological complications such as severe distress, depression, and suicidal behaviors compared to the general population in Korea. This is in line with the previous findings [8-10]. Adding to the evidence, our results present the possibility that short sleep duration can act as a trigger to induce poor psychological conditions among cancer survivors. Given the high prevalence of short sleep in cancer survivors, it is presumed that more people will face psychological defects throughout their days fighting cancer, which may progress to morbid outcomes as well as poor prognosis.

Concurrent relationship between sleep problems and psychological symptoms in cancer survivors can be explained by the negative feedback loop with inflammatory responses; thus, understanding the inflammatory dynamics associated with cancer-related sleep problems and psychological outcomes is imperative to enhance survivors' health status [11]. Though this study is notable in that it is based on a large-scale, nationally representative data, considering the study limitations (i.e., cross-sectional design using self-reported information), further

studies will help to elucidate the chronological changes of sleep-related health outcomes in post-cancer trajectories.

Conclusion

Cancer survivorship does not mean disease-free status: these survivors may face disease- and treatment-related complications in both physical and/or psychological aspects. Furthermore, we now know that a substantial number of cancer survivors suffer from sleep disturbance, which may inflict negative consequence on mental health. Thus, greater emphasis in terms of public health and prevention is needed to develop concomitant, multimodal interventions aimed at improving both sleep behaviors and psychological stability in cancer survivors.

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