Moonki Hong[1], Si Won Lee[2], Shin Hye Yoo[3], Eun Hee Jung[4], Yu Jung Kim[4], Beodeul Kang[5]

[1] Division of Hemato-Oncology, Department of Internal Medicine, Yongin Severance Hospital, [2] Division of Medical Oncology, Department of Internal Medicine, Eunpyeong St. Mary's Hospital, [3] Center for Palliative Care and Clinical Ethics, Seoul National University Hospital, [4] Division of Hematology and Medical Oncology, Department of Internal Medicine, Seoul National University Bundang Hospital, [5] Division of Medical Oncology, Department of Internal Medicine, CHA Bundang Medical Center, Republic of Korea

BACKGROUND

Delirium is a common and severe neuropsychiatric syndrome in patients with advanced cancer, associated with high mortality and caregiver burden. Sleep–wake cycle disturbances contribute to delirium, but the relationship between sleep quality and delirium incidence in patients with cancer remains unclear.

To address this gap, we conducted a prospective multicenter study to examine the relationship between sleep quality and delirium in hospitalized patients with advanced cancer. Using the Pittsburgh Sleep Quality Index (PSQI), we aimed to determine the effect of pre-hospital sleep disturbances on delirium risk, timing, or duration.

METHODS

Design: A prospective multicenter observational cohort study.
Setting/participants: We analyzed the data of 170 inpatients with metastatic or recurrent cancer at four tertiary hospitals in South Korea (May 2021–May 2023). Sleep quality was assessed at admission using the Pittsburgh Sleep Quality Index. Delirium was evaluated using the DSM-5 criteria, Confusion Assessment Method, 4AT, and Memorial Delirium Assessment Scale.

Table 1. Baseline characteristics of patients (N=170)

	Delirium (N=30)	No Delirium (N=140)	p-value
Age, years (Mean ± SD)	71.6±8.8	66.1±11.33	0.005
Sex			0.201
Male	18	66	
Female	12	74	
ECOG performance status			0.013‡
0	1	31	
1	8	33	
2	13	25	
3	6	40	
4	2	11	
Sensory aids use			0.590
None	20	79	
Glasses (±hearing aid)	9	56	
Hearing aids (±glasses)	1	5	
History of Delirium			<0.001
Yes	8	6	
No	22	134	
Smoking			0.470
Never smoker	18	82	
Former smoker	11	56	
Current smoker	1	1	
Unknown/refused	0	1	
Chemotherapy during the admission			0.329
Yes	5	35	
No	25	105	
Primary cancer type			0.630
Hepatobiliary	8	32	
Gastric	4	20	
Colorectal	2	19	
Lung	4	12	
GU	2	14	
Pancreas	5	9	
Breast	1	8	
H&N	0	4	
Soft tissue	1	2	
GY	0	2	
Esophageal	0	1	
Others	2	8	
Double Primary cancer	1	9	

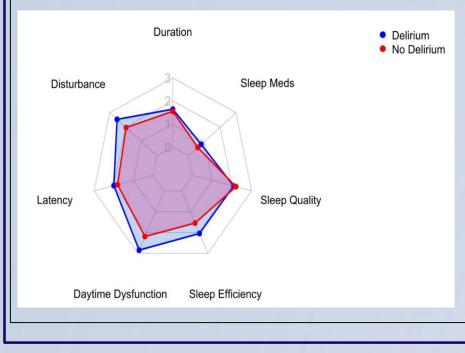|	Subjects with fulfilled PSQI (N=170)	Subjects could not fulfill PSQI (N=19)	p-value
Delirium	30	8	
No Delirium	140	11	0.012

RESULTS

1. Sleep quality and delirium incidence

The mean PSQI total score was higher in the delirium group (10.47 ± 3.45) than in the no-delirium group (8.92 ± 3.73), albeit significance (p = 0.07). Patients with extremely poor sleep quality (PSQI ≥15) had a significantly greater incidence of delirium than those with PSQI <15. Specifically, 6 of 18 patients (33%) with PSQI ≥15 developed delirium, compared to 24 of 152 (15.8%) with PSQI <15; this translates to an odds ratio of 3.30 (95% CI 1.00–10.9, p = 0.050) for delirium in the highest PSQI category.
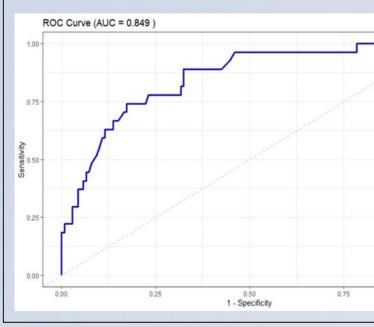
Figure 1. Relation between delirium and PSQI

Figure 2. Radar plot comparison for PSQI subscales

2. Multivariate analysis of delirium risk factors

Multivariate logistic regression confirmed that PSQI total score was an independent predictor of delirium. In the final multivariable model, PSQI score (OR 1.126, 95% CI 1.009–1.264, p = 0.038), age (OR 1.065 per year, 95% CI 1.017–1.121, p = 0.010), and a history of delirium (OR 9.612, 95% CI 2.602–38.130, p = 0.001) were independently associated with delirium occurrence. Female sex (OR 0.384, p = 0.066) and antidepressant use (OR 5.954, p = 0.057) were significant.

Table 2. Multivariate Logistic Regression on prediction of delirium, with PSQI total as a factor

Variable	OR	95% C.I.	p-value
(Intercept)	0.001	(0.000, 0.032)	<0.001
PSQI total score	1.126	(1.009, 1.264)	0.038
Age	1.065	(1.017, 1.121)	0.010
Female (over male)	0.384	(0.129, 1.024)	0.066
History of Delirium	9.612	(2.602, 38.130)	0.001
Antidepressants	5.954	(0.872, 37.750)	0.057

Figure 3. ROC curve

3. Sleep quality and delirium characteristics

Among the 30 patients who developed delirium, the average time to onset was 4.33 days (range 1–19, SD = 4.27). PSQI total score was not significantly correlated with onset timing (ρ = -0.295, p = 0.114), but lower PSQIHSE (sleep efficiency) was associated with earlier onset (ρ = -0.525, p = 0.003).

Delirium episodes lasted an average of 5.53 days (range 1–25, SD = 4.52). While the PSQI total score was not significantly correlated with duration; higher PSQISLPQUAL (subjective sleep quality) was linked to longer duration (ρ = 0.428, p = 0.018, respectively).

Poor sleep quality was significantly linked to diminished quality of life. As shown in Figure 4 , patients with higher PSQI total scores had lower EORTC summary scores (Spearman ρ = –0.46, p < 0.001).

Figure 4. Scatter Plot : EORTC and PSQI scores

CONCLUSIONS

Patients with cancer presenting with markedly impaired sleep may benefit from more proactive delirium monitoring and preventive interventions during hospital stay. These findings support a more comprehensive approach to inpatient palliative care: one that includes routine sleep evaluation and interventions as part of delirium risk management.
Future trials targeting sleep improvement in this population are warranted to determine if better sleep quality can indeed translate into less delirium and better outcomes for patients with advanced cancer.

FUNDING