Physical Activity and Sleep in Adolescent and Young Adults (AYA) With Cancer

Kethan Shirodkar, COL 2027
kshirod1@sas.upenn.edu

Background

- The positive relationship between physical activity (PA) and sleep quality has been demonstrated across a variety of healthy and patient populations including patients with sleep disorders, mental health disorders, and adult breast cancer survivors.[1]
- There is currently insufficient evidence on this relationship in pediatric oncology samples, particularly among adolescent and young adults (AYA).
- We aimed to fill this gap by exploring the relationship between device-assessed physical activity and sleep in a sample of AYA with cancer.

Methods

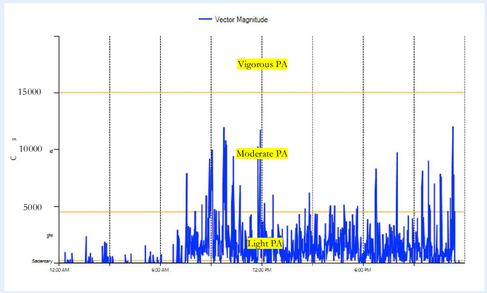
- Twenty AYA (aged 14-24) receiving cancer treatment were recruited from the Children's Hospital of Philadelphia Cancer Center (Table 1)
- Participants completed a baseline questionnaire and wore an accelerometer (ActiGraph GT9X) on their nondominant wrist for two weeks to assess physical activity and sleep.
- **Physical Activity (PA):** Average daily moderate-to-vigorous PA (MVPA) was quantified using the Lee cut points for young adults (>4514 activity counts per minute, see Fig 1).[2]
- **Sleep:** Sleep periods were first identified using the ActiLife algorithm and manually verified using sleep logs (See Fig 2) and then scored using the Sadeh algorithm to assess average nightly Total Sleep Time (TST) and Wake After Sleep Onset (WASO).[3]
- At baseline, patients self-reported on their sleep disturbance, sleep-related impairment and fatigue using the PROMIS measures.[4]
- **Analysis:** Pearson's correlations were used to examine the relationship between MVPA and directly-measured and self-reported sleep outcomes. Only participants who wore the device for >3 days/nights were included in the analyses.

Methods (cont.)

Table 1: Participant Characteristics (n=20)

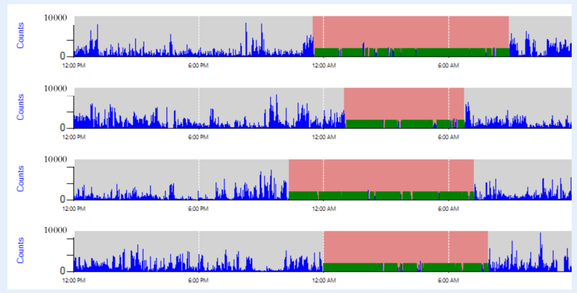
Age (yrs) M (SD)	18.2 (2.9)
Age at dx	16.5 (3.5)
Sex n (%)	
Female	11 (55%)
Male	9 (45%)
Diagnosis type n (%)	
Leukemia/lymphoma	10 (50%)
Solid Tumor	6 (30%)
Brain/CNS tumor	4 (20%)
Race and Ethnicity n (%)	
Non-Hispanic White	10 (50%)
Black/African American	4 (20%)
Hispanic/Latino	4 (20%)
Asian	2 (10%)

Figure 1: Sample PA Analysis



Moderate Activity (>4,514 counts/min)
Vigorous Activity (>15,044 counts/min)

Figure 2: Sample Sleep Analysis



Activity Counts (vector magnitude)
Sleep Periods

Results

- Patients engaged in an average of 161.6(64.8) min of MVPA/day and slept an average of 5.7(1.3) hours/night
- Overall, there was a non-significant negative correlation between MVPA and Total Sleep Time (r= -.23, p= .39)
  - Controlling for sex, this negative relationship became significant (r= -.55, p = .029), See Fig 3
- Total MVPA was not significantly correlated with WASO (r= .24, p= .35), See Fig 4
- MVPA was not significantly correlated with self-reported sleep disturbance or sleep-related impairment (See Table 2)

Figure 3: Correlation of MVPA and TST by Sex

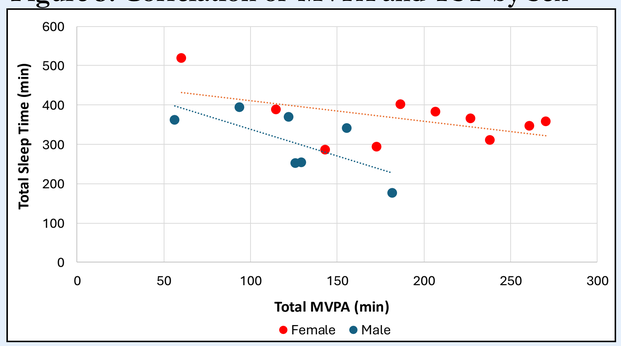


Figure 4: Correlation of MVPA and WASO

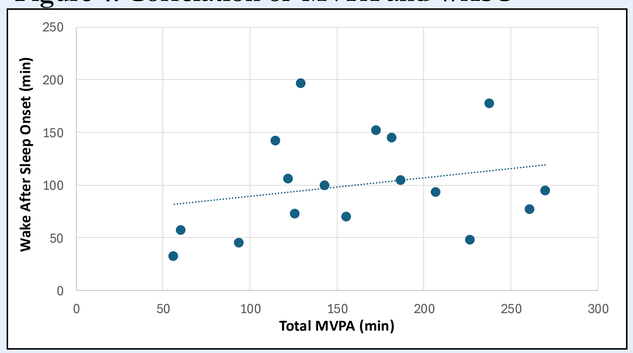


Table 2: Correlation of MVPA and Self-Reported Sleep Variables

		Sleep Disturbance	Sleep-related Impairment	Fatigue
Total MVPA	Pearson Correlation	.127	.245	.321
	Sig. (2-tailed)	.627	.342	.208
	N	17	17	17

Discussion

- Contrary to our hypothesis, patients (particularly males) who were more active spent less time asleep.
- Patients who are experiencing more treatment symptoms may have more barriers to engaging in MVPA and require more sleep.
- Further, cancer and its treatment can impact sleep both physically and psychologically, making it difficult to isolate the potential role of PA.
- Future work in a larger sample of AYA, controlling for potential confounders including types and intensity of treatment, is necessary to further understand these relationships.
  - Studies examining other physical activity intensities and quality of sleep measures such as number of awakenings or Sleep Fragmentation Index (SFI) are warranted.

References

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