



# The Self-Reported Practice of Light Exposure Recommendations in the Morning, Daytime, Evening, and Nighttime

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## Introduction

- While it is well known that ocular light strongly entrains the central circadian clock, there has been a lack of evidence-based recommendations for daytime, evening, and nighttime light exposure for healthy adults.
- A recent expert consensus report with recommendations for light exposure has been published<sup>1</sup>. We examined the self-reported practice of daily and nightly light exposure based on these published guidelines.

## Materials & Methods

### Data

- Online survey data were collected from 168 participants through convenience sampling (age range: 25-80, mean age: 58.9 + 12.6 years, 55% female). Survey data was then merged with objectively measured sleep data using the PSG-validated<sup>2</sup> and free to download SleepScore Mobile app.
- The practice of expert, consensus-based light recommendations was assessed with 7 items on an 8-point frequency scale ranging from “Never” to “Every day of the week”.

### Analysis

- Descriptive statistics were used to assess the prevalence of participants practicing indoor daytime light recommendations, indoor evening light recommendations, nighttime light recommendations for the sleep environment, and morning light recommendations.

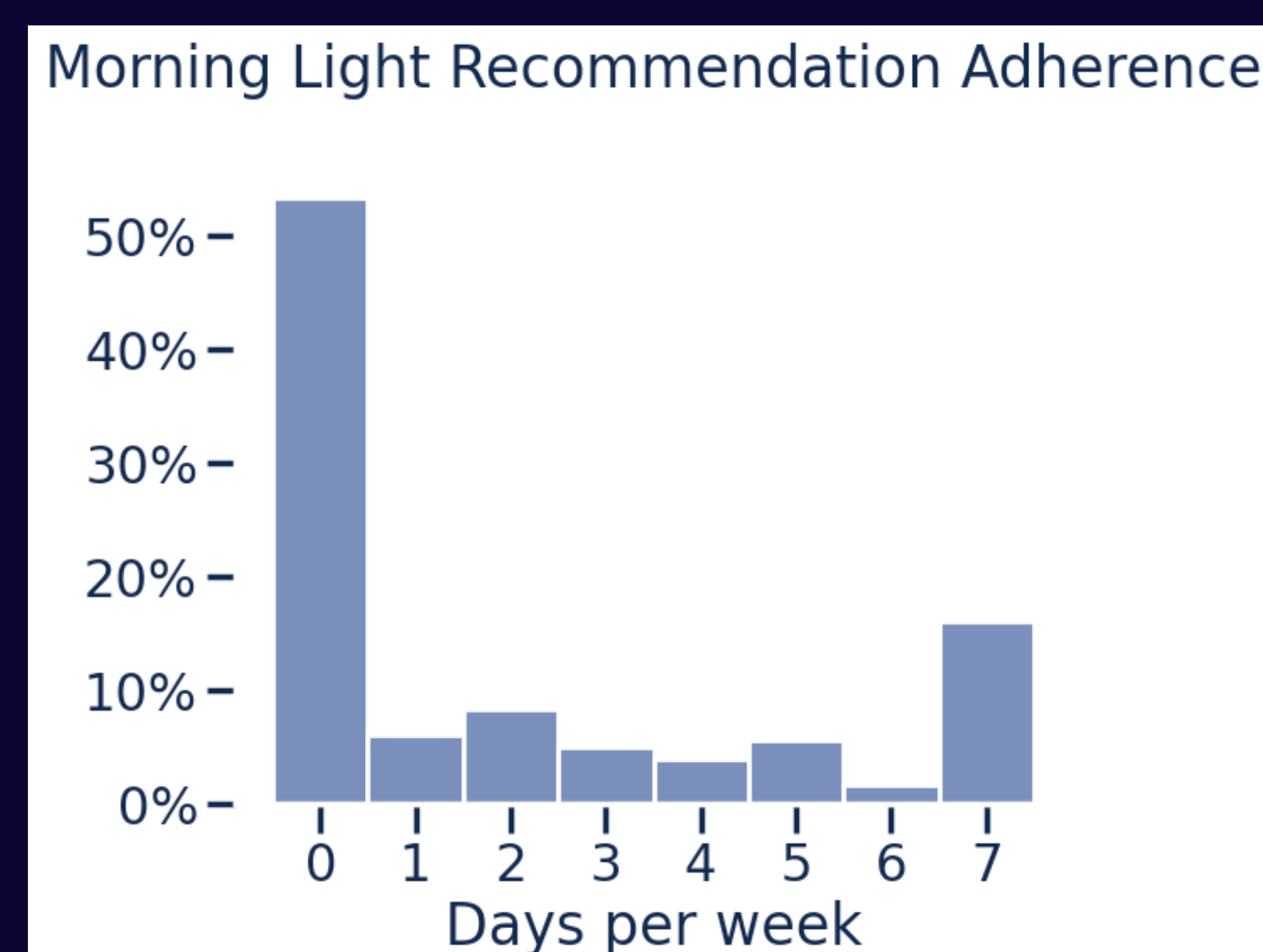
## Conclusion

- The practice of recently published light recommendations was poor for both morning and evening light exposure.
- These findings suggest that sleep and circadian health campaigns should focus on the importance of bright light in the morning upon awakening, and of dimmed light in the late evening before bedtime.

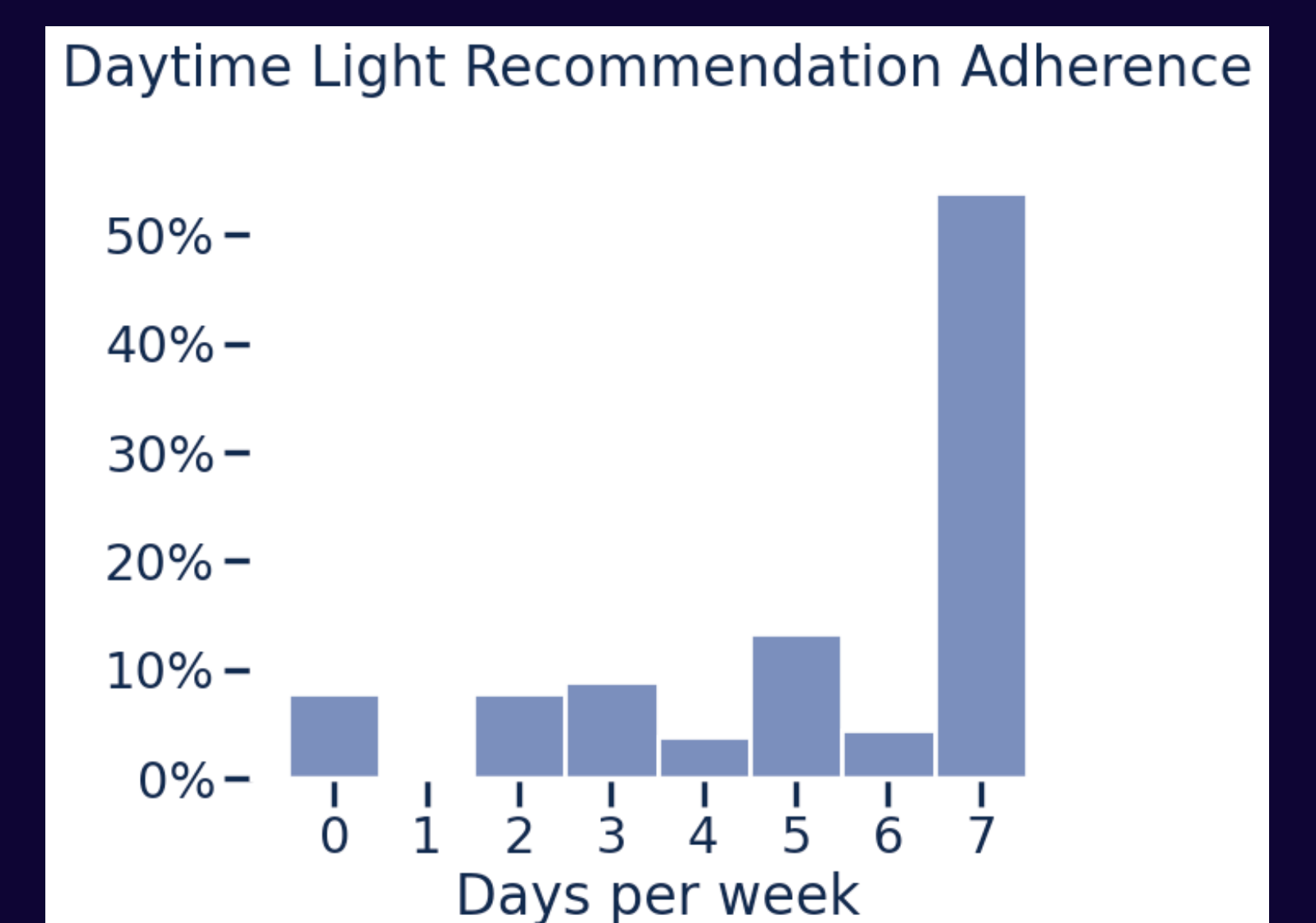
## Results

	Morning Light Adherence – Never	Morning Light Adherence – Every Day	Daytime Light Adherence – Never	Daytime Light Adherence – Every Day	Evening Light Adherence – Never	Evening Light Adherence – Every Day	Night-time Light Adherence – Never	Night-time Light Adherence – Every Day
<b>N</b>	86 (51.2%)	29 (17.3%)	12 (7.1%)	92 (54.8%)	79 (47.0%)	41 (24.4%)	15 (8.9%)	135 (80.4%)
<b>Female %</b>	57	65	75	56	56	51	73	51
<b>Age</b>	58.89 +/- 13.08	59.48 +/- 13.0	54.28 +/- 18.07	60.47 +/- 12.94	59.13 +/- 13.81	58.12 +/- 15.01	55.69 +/- 13.21	58.94 +/- 14.44
<b>Nights recorded</b>	17167	7694	4369	23300	22364	6282	1757	35054
<b>Bed Time</b>	23.5 +/- 1.54	23.18 +/- 1.58	23.62 +/- 2.82	23.43 +/- 1.22	23.41 +/- 1.25	23.41 +/- 1.98	23.99 +/- 2.28	23.37 +/- 1.3
<b>Wake Up Time</b>	7.15 +/- 1.53	6.94 +/- 1.15	8.06 +/- 2.28	7.14 +/- 1.28	7.27 +/- 1.29	7.19 +/- 1.77	7.67 +/- 2.07	7.17 +/- 1.29
<b>Total Sleep Time (min)</b>	338.84 +/- 63.49	328.11 +/- 59.21	369.12 +/- 52.72	340.25 +/- 57.53	341.06 +/- 55.23	341.92 +/- 73.57	332.12 +/- 65.64	339.09 +/- 59.54
<b>Sleep Efficiency (%)</b>	75.24 +/- 9.32	71.92 +/- 8.76	73.85 +/- 7.6	75.15 +/- 9.3	75.03 +/- 8.59	74.58 +/- 11.36	73.34 +/- 9.57	74.77 +/- 9.05
<b>Sleep Onset Latency (min)</b>	23.24 +/- 15.63	28.02 +/- 16.89	30.0 +/- 13.84	22.46 +/- 16.24	23.6 +/- 13.56	27.06 +/- 19.93	29.21 +/- 16.0	23.33 +/- 15.01
<b>Wake After Sleep Onset (min)</b>	73.65 +/- 31.88	83.22 +/- 35.03	88.34 +/- 35.42	77.28 +/- 33.75	77.11 +/- 31.8	73.47 +/- 35.96	76.31 +/- 22.04	77.11 +/- 34.28

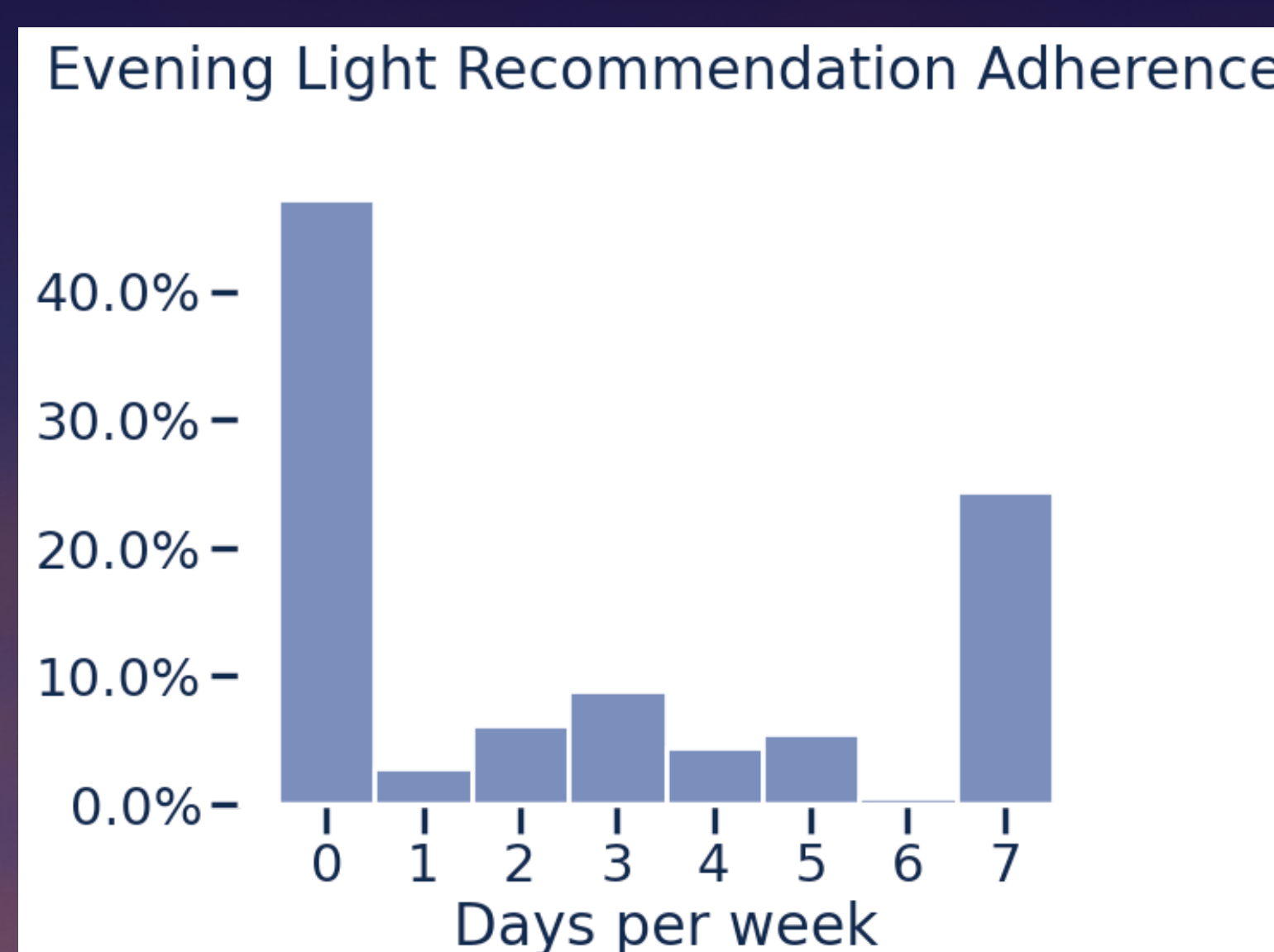
**Table 1.** Demographic and average sleep-wake characteristics for participants who reported never and always practicing light exposure recommendations.



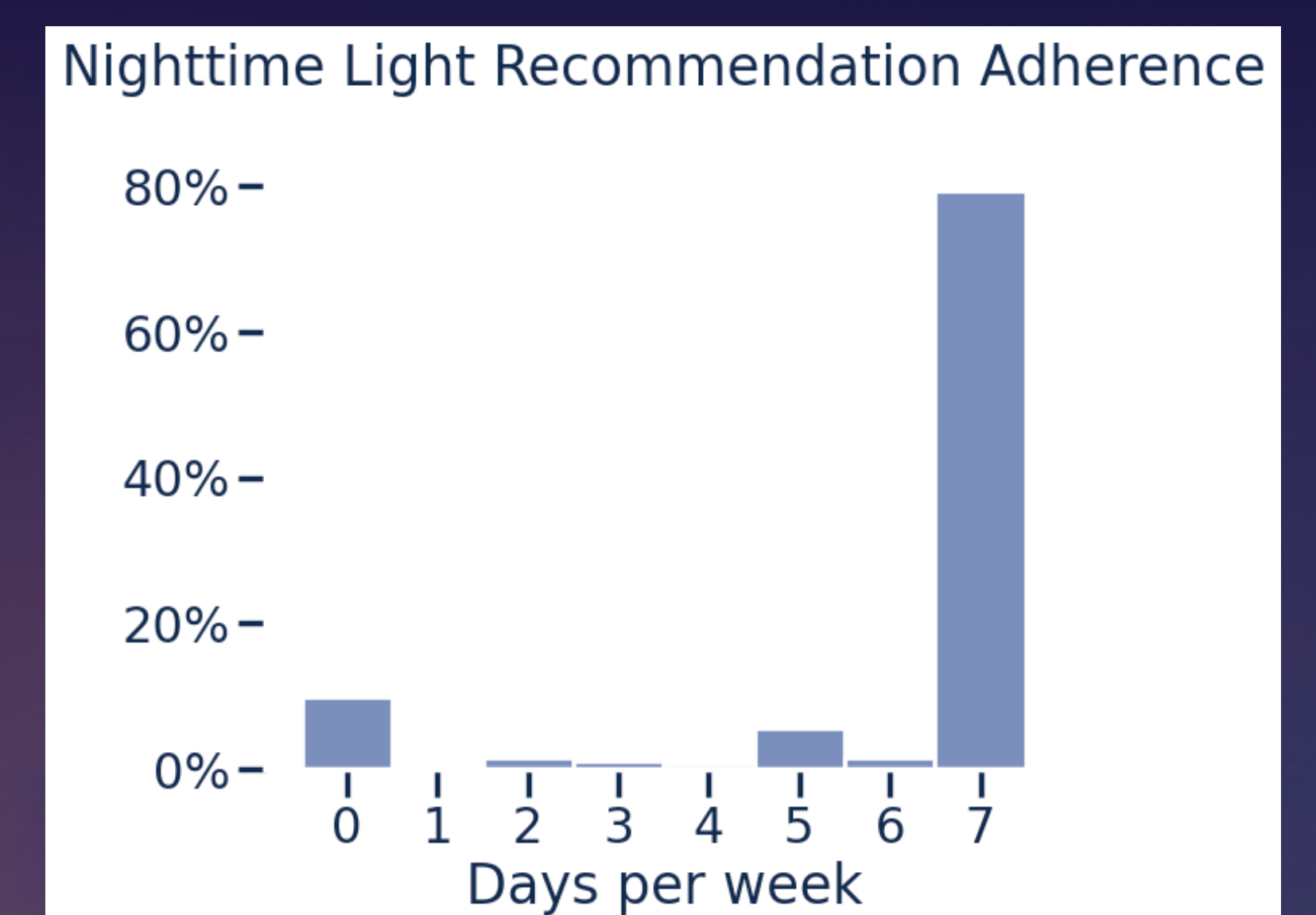
**Figure 1A.** Frequency histogram for morning recommendations. Within the first hour after waking up, the majority of respondents (53%) reported never receiving exposure to at least 15 minutes of sunlight or a simulated bright light source, with only 16% reporting exposure every day of the week.



**Figure 1B.** Frequency histogram for daytime light recommendations. Throughout the daytime, 54% of respondents reported receiving consistent natural indoor light or sunlight every day of the week, and 8% reported never receiving any.



**Figure 1C.** Frequency histogram for evening light recommendations. During the evening, 47% of respondents reported never dimming lights and avoiding bright light starting at least 3 hours before bedtime. However, 24% reported avoiding bright light sources before bedtime every day of the week.



**Figure 1D.** Frequency histogram for night-time light recommendations. While sleeping, nearly 80% of respondents reported keeping their bedroom as dark as possible, no brighter than natural moonlight, every day of the week, with only 10% reporting never doing so.



### Reference

<sup>1</sup>Brown, T. M., Brainard, G. C., Cajochen, C., Czeisler, C. A., Hanifin, J. P., Lockley, S. W., ... & Wright Jr, K. P. (2022). Recommendations for daytime, evening, and nighttime indoor light exposure to best support physiology, sleep, and wakefulness in healthy adults. *PLoS biology*, 20(3).  
<sup>2</sup>Zaffaroni, A., Coffey, S., Dodd, S., Kilroy, H., Lyon, G., O'Rourke, D., ... & Penzel, T. (2019, July). Sleep staging monitoring based on sonar smartphone technology. In 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBO) (pp. 2230-2233). IEEE.