Transcript Details
This is a transcript of an educational program. Details about the program and additional media formats for the program are accessible by visiting: https://reachmd.com/programs/frontlines-migraine/daily-light-habits-migraine-adolescents/48940/

ReachMD
www.reachmd.com
info@reachmd.com
(866) 423-7849

How Daily Light Habits Influence Migraine in Adolescents

Announcer:
You're listening to *On the Frontlines of Migraine* on ReachMD. And now, here's your host, Dr. Charles Turck.

Dr. Turck:
Welcome to *On the Frontlines of Migraine* on ReachMD. I'm Dr. Charles Turck, and joining me to share insights from her recent study on light exposure patterns in young people who suffer from migraines is Dr. Carlyn Patterson Gentile. She's a board-certified pediatric neurologist and headache specialist at the Children's Hospital of Philadelphia, where she serves as an attending physician in the Division of Neurology in the Pediatric Headache Program, as well as a physician scientist and Assistant Professor of Neurology and Pediatrics at the University of Pennsylvania.

Dr. Patterson Gentile, we're so glad to have you here today.

Dr. Patterson Gentile:
Such a pleasure to be here. Thank you.

Dr. Turck:
Well, let's start off with some background, Dr. Patterson Gentile. What motivated you to examine light exposure habits in young people with migraines?

Dr. Patterson Gentile:
So we know that appropriately timed light of sufficient intensity plays a critical role as a timekeeper in circadian biological processes, including sleep. Studies have shown that exposure to brighter days and darker nights have been linked to positive health outcomes, including lower all-cause mortality. However, in individuals with migraine, the very light needed to entrain the circadian rhythm can cause significant visual discomfort or photophobia, which can lead to avoidance of intense or busy light environments. We don't know, though, whether daily light exposure is reduced in those with photophobia, nor if it is beneficial to avoid light to reduce visual discomfort in the moment or if this ultimately has negative consequences in increasing light intolerance and disrupting the circadian rhythm. And on a practical level, this limits my ability as a headache specialist to provide my patients with evidence-based guidance on how to best manage their photophobia. This is particularly critical in the adolescent and young adult populations, where migraine attacks often start or worsen, and where individuals are forming their lifelong habits.

Dr. Turck:
Now, with that context in mind, would you walk us through how your study was designed and how light exposure was measured?

Dr. Patterson Gentile:
Absolutely. So we now know that we can use wearable devices to track daily light exposure in great detail. So we had 20 adolescents and young adults with migraine from our headache clinic wear light dosimeters as a pendant around their neck to measure their everyday light exposure for one week. Participants represented patients we typically see in our headache clinic, in that all but one had at least mild photophobia, with 90 percent reporting moderate-to-severe photophobia. And while they reported a range of headache frequency and headache-related disability, about half had daily or near-daily headache and at least moderate headache-related disability. And the light dosimeter we used was able to separate light that gives rise to image-forming color vision, called photopic illuminance, from blue light that stimulates the melanopic pathway, which is the primary driver of circadian photoentrainment. And during the week of recording, we also tracked their migraine symptoms using a daily text-based diary.

Dr. Turck:
Shifting gears to the results now, what were some of the key findings around daytime light exposure, and how did they compare to what's considered healthy?

Dr. Patterson Gentile:
So we were able to calculate the amount of time participants spent within light exposure levels that are recommended to optimally stimulate and suppress melatonin across the day to promote the appropriate timing of those circadian processes. So specifically, it's been recommended that for healthy adults—there haven't been actual guidelines recommended in the pediatric population yet—but for healthy adults to be receiving at least 250 lux during the day. This is easily achievable by being outside, but only some indoor light environments meet this light threshold. And then three hours pre-bed to be under 10 lux, where you want a more dim lighting, and to be under one lux at night, which is essentially dark. In our participants with migraine, we found that they were above the 250-lux threshold for daytime light exposure only 15 percent of the time, while they spent the majority of the time within recommended levels before bed and at night.

So it's important to note that multiple factors may contribute to these low daylight exposure levels. For comparison, in 2023, Didikoglu and colleagues made a similar measurement in healthy, mostly younger adults in the UK. Their participants spent about a third of the daylight hours at or above 250 lux, and they were also exposed to greater light levels in the evening and at night. And while case-control studies are needed—controlling for other variables like geographic location, social norms, indoor lighting standards, age, and time of year—I would interpret this that in modern lighting environments and spending a lot of time indoors, it can be difficult to achieve this recommended threshold, but that our participants with photophobia demonstrated even lower light exposure levels throughout the entire day. So this was not only during the daytime, but also evening and night, when it's more beneficial. And this may be due, at least in part, to light avoidance from photophobia. It's also important to note that there are still studies needed to determine what the health impacts are of not meeting the recommended 250 lux threshold. We're only meeting it part of the time.

Dr. Turck:
For those just tuning in, you're listening to *On the Frontlines of Migraine* on ReachMD. I'm Dr. Charles Turck, and I'm speaking with Dr. Carlyn Patterson Gentile about pediatric light exposure patterns and their impact on migraines.

So, Dr. Patterson Gentile, I'd like to talk now about the connection between delayed light exposure and migraine frequency. What did the results of your study tell you about that relationship?

Dr. Patterson Gentile:
So this was one of the most interesting findings I think we found in this study. So we saw a strong association between the timing of light exposure and migraine frequency, and specifically, if participants were exposed to light later in the day, they reported increased frequency of any headache as well as increased frequency of more severe migraine attacks. And so this was essentially that when they woke up, they were being exposed to light later in the morning, but they were also exposed to light later in the evening. So this relationship could be causative, where later light exposure disrupts circadian processes, including sleep, and this leads to increased headache frequency. But another possibility is that it's a consequence of having severe migraine, where those with more severe headache burden are starting their days later to help manage their symptoms. And finally, this may reflect that, in adolescents and young adults with a delayed chronotype, where their circadian clock is naturally later, that the structure of modern society, particularly in young people who are getting up early for school, may not be optimal, leading to increased headache frequency. It may be one of these, it may be a combination of these three factors, and further study is needed to parse out these possibilities. But our results do indicate that there's an important relationship between the timing of light exposure and headache burden.

Dr. Turck:
So, how might your study's findings inform migraine treatment or lifestyle recommendations in day-to-day practice?

Dr. Patterson Gentile:
So, while further study is needed to confirm light exposure is indeed lower in individuals with migraine and parse out the cause and effect between delayed light exposure and headache burden, I do think there are some practical recommendations that both prior work and our findings support. So, with my patients, I make them aware of the importance that light plays in maintaining overall health, including sleep, as well as that light exposure levels outdoors are a lot higher than indoors. And I encourage my patients to get morning light exposure, even if this means 10 to 15 minutes in the morning, particularly if they are having trouble falling asleep. Finally, I recommend that rather than avoiding all uncomfortable light, to take a more strategic avoidance approach. So this means incrementally increasing their light exposure over time as they can tolerate while using approaches to reduce visual discomfort when migraine symptoms are severe, more severe, or bothersome.

Dr. Turck:
Before we wrap up our program, Dr. Patterson Gentile, do you have any other final thoughts you'd like to leave with our audience?

Dr. Patterson Gentile:
I would love to end by saying this is an exciting time for understanding the role of everyday light exposure in health. There's growing international interest in this topic. So I recently participated in the International Day in Daylight Project that was headed by Manuel Spitschan to increase the awareness of daily light exposure, and this actually included a multidisciplinary team of researchers measuring their own daily light exposure across the globe over the fall equinox. Findings from this study are publicly available for those who are interested in learning more.

And while more study is needed, light exposure, like physical activity or a healthy diet, should be explored as a modifiable factor to improve neurologic health. This will continue to support a shift in headache management from reactive disease-based care to proactive preventive care and health maintenance.

Dr. Turck:
Well, with those insights in mind, I want to thank my guest, Dr. Carlyn Patterson Gentile, for joining me to discuss how light exposure patterns may influence migraine burden in young people.

Dr. Patterson Gentile, it was great having you on the program.

Dr. Patterson Gentile:
Thank you so much. It was a pleasure to be here. I appreciate the great discussion.

Announcer:
You've been listening to *On the Frontlines of Migraine* on ReachMD. To access this and other episodes in our series, visit *On the Frontlines of Migraine* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!