

Delaying school and office timings during Ramadhan: Boon or bane?

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Making little adjustments to meet tangible demands is often a pleasant experience. However, radical changes in daily routine are almost always fraught with harmful outcomes and often long-term adverse sequelae. Sleep and circadian clock/rhythm are some such biological processes that are sensitive changes. There is growing evidence to support the idea of maintaining a regular sleep/wake pattern and circadian rhythm synchrony to keep a healthy body and mind.^[1] Fiddling with the biological clock due to any social or socioeconomic reason results in deleterious physiological and metabolic effects.^[1] “Daylight saving time” (DST) and its close cohort “Delaying the starting times of school and office/work during Ramadhan” are the two adopted protocols that fall into this category. DST has been in debate for decades, and we need to put its cohort (Ramadan month sleep pattern) in the same seat.

The body’s circadian clock has central and peripheral components; the master-clock is the suprachiasmatic nucleus (SCN), and peripheral clocks are present at each organ, tissue, and even cellular level. Although they tend to work in tandem to calibrate repeatedly to maintain synchrony between the body and the environment, the cues or zeitgebers are different for the two. The main entrainment factor for the master SCN is light, while peripheral circadian clocks are affected by “neurohumoral modulation.”

In the countries, where DST has been in practice for decades, there is a growing

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desire and drive by various scientific organizations to repeal it; the European Union might abolish it soon.^[2] Although the clocks are turned just 1 h back in autumn during DST, the impact is immense.^[3] This acute alteration in timing causes misalignment between the internal body circadian biological clock and the external light/dark cycle, resulting in acute physiological disruptions and a significant increase in public health and safety risks.^[4] These physiological disruptions profoundly impact cardiometabolic and immune functions.^[4,5]

Light is the most potent exogenous cue to regulate the endogenous body circadian rhythm. DST decreases exposure to morning light and increases evening light exposure, resulting in an acute phase delay in the biological clock, practically mimicking a social jetlag or shift-work syndrome in terms of etiology and symptoms.^[4] This 1 h sudden shift delay has been linked to increased cardiovascular morbidity, including higher risk of myocardial infarction, stroke, hospitalizations due to acute atrial fibrillation, mood disturbances, suicidal ideations, and increased emergency room visits.^[6] Besides an increase in motor vehicle accidents in the first few days after the shift delay in timing, with increased fatal accidents to 6% in the U. S.^[6] Moreover, this acute disruption in the circadian rhythm results in cellular derangements, including alterations in gene expression, increased levels of pro-inflammatory markers, increased heart rate, and blood pressure due to reduced vagal tone.^[6]

Various scientific organizations have been speaking against DST for a long.^[2,4,6,7]

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Recently, the American Academy of Sleep Medicine issued a strong position statement proposing that the U. S. should eliminate seasonal time changes in favor of a national, fixed, year-round time.^[6] The current evidence best supports adopting a year-round standard time, which aligns best with human circadian physiology and adds clear benefits to public health and safety.

Ramadan is the month of Muslim fasting, where fast is observed from dawn to dusk, refraining from food and drink. Nevertheless, in practice, it is not about fasting only; the sudden delay in the starting times of work and school of around 2–3 h, in some Muslim countries, is analogous to the DST, but more severe.^[8] For example, in Saudi Arabia, schools' starting time is delayed during Ramadan from 7 AM to 10 AM, and work's starting time is delayed from 7:30/8 AM to 10 AM, and the work period is reduced to 5 h to end at 3 PM. This practice has been associated with a sudden shift in bedtime and wake time in countries that adopt a school and work time delays.^[8] Figure 1 illustrates the sleep pattern changes, working hours, and light exposure during standard time, DST, and Ramadan month in countries that delay the starting time of schools and work during Ramadan.

Ramadan school and office timing shift delay closely simulates DST; however, changes are more radical. As Ramadan month follows the lunar calendar, it is observed in a different season every 9 years, suggesting that this shift delay may have more impact on the circadian clock due to seasonal changes in the times of sunrise and sunset, particularly in summer when the sun rises early; hence the delay of the starting work/school times deprives individuals from the early morning light. Several studies in Muslim countries have demonstrated shift delay in the circadian rhythm of core body temperature and hormonal secretion during Ramadan.^[9]

Diurnal intermittent fasting *per SE* is a healthy practice; however, the health benefits could be lost or minimized by this shift delay in the body circadian clock.^[10-12] Office and school timing delay may theoretically allow more time to sleep, but practically, it is not, as studies have

shown that delaying the start of work and schools by 2–3 h was associated with an acute delay in bedtime by 2–3 h resulting in sleep duration comparable to that before Ramadan.^[13] This practice destabilizes the body's biological clock by decreasing light exposure in the early morning and allowing exposure to light in the evening, causing a significant delay in bedtime and rise time. Some may think that the body will adjust to the changes in circadian rhythm with time across the month of Ramadan; however, current evidence demonstrates that the body clock does not adapt to shift delay in time even after several months.^[14] To complicate the issue further, individuals are required to phase advance their biological clock back to the pre-Ramadan timings after Ramadan month to go back to the regular school and work starting times.

Current evidence encourages the removal of seasonal time changes in favor of a fixed time for the whole year. This recent evidence raises major concerns about the current practice of delaying school and work time during Ramadan and its impact on health and public safety, particularly in the first few days following its application. Based on the currently available evidence, a fixed time for starting work and schools is best aligned with human circadian biology. Therefore, the decision to delay work and school timings during Ramadan should be revisited based on the currently available evidence and recommendations of the international health organizations about DST.

Nevertheless, more studies are needed to assess the acute and chronic health effects and public safety-related consequences of this delay in time that accompanies Ramadan in some Muslim countries. Moreover, studies are needed to determine the impact of the season during which Ramadan occurs, eastward or westward position of countries in a time zone on health and safety sequels.

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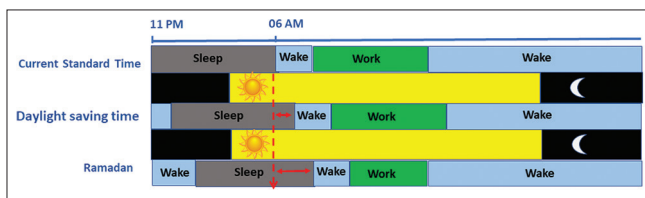


Figure 1: An illustration of the sleep pattern changes, working hours, and light exposure during standard time, daylight saving time, and Ramadan month in countries that delay the starting time of schools and work during Ramadan. Assuming a sleep period from 11 PM to 6 AM, and a work/school period that starts at 7/8 AM during the standard time. There is a shift delay in bedtime and wake time during Ramadan, which decreases light exposure in the morning and increases light exposure duration in the evening

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