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Podcast Title: Circadian rhythm and its imbalance

Department: **PHYSIOLOGY**

Category: (Select relevant category)Public awarness

### TRANSCRIPT

#### **00:00 – 00:30 | Engaging Introduction (30 seconds)**

Before we begin, let me ask you a simple question.

Have you ever stayed awake the whole night studying for an exam, only to feel exhausted, inattentive, and unable to recall even familiar answers the next morning?

Or have you noticed that despite sleeping during the day after a night duty, you still feel tired and irritable?

These effects occur because your body is functioning at the wrong biological time. Every cell in your body follows an internal clock known as the **circadian rhythm**.

#### **00:30 – 01:00 | Speaker Introduction (30 seconds)**

Hello everyone,

This is **Elakiya**, Tutor from the **Department of Physiology**.

Welcome to this podcast on **Circadian Rhythm and Its Imbalance**, a topic important for MBBS examinations and equally relevant to your daily academic life.

In the next ten minutes, we will understand what circadian rhythm is, how it is regulated, and what happens when it is disturbed.

#### **01:00 – 02:10 | Definition of Circadian Rhythm (1 min 10 sec)**

The term circadian is derived from the Latin words *circa*, meaning about, and *diem*, meaning a day.

Circadian rhythm refers to endogenous biological rhythms that follow an approximately 24-hour cycle.

These rhythms regulate sleep–wake cycle, body temperature, hormone secretion, blood pressure, and cognitive performance.

Circadian rhythm is internally generated, but it is synchronized with the external environment, mainly by the light–dark cycle.

#### **02:10 – 03:30 | Master Biological Clock – SCN (1 min 20 sec)**

The master regulator of circadian rhythm is the **suprachiasmatic nucleus**, or SCN.

It is located in the hypothalamus, just above the optic chiasma.

The SCN receives direct input from the retina through the retino-hypothalamic tract.

Light is the most powerful **zeitgeber**, or time cue, which helps synchronize the internal clock with the external environment.

This explains why exposure to light at inappropriate times can disturb circadian rhythm.

#### **03:30 – 04:50 | Hormonal Regulation (1 min 20 sec)**

Two important hormones regulate circadian rhythm.

**Melatonin**, secreted by the pineal gland, increases during the night and promotes sleep.

**Cortisol**, secreted by the adrenal cortex, peaks in the early morning hours and promotes wakefulness and alertness.

The coordinated secretion of melatonin and cortisol maintains a normal sleep–wake cycle.

#### **04:50 – 06:00 | Circadian Rhythm in Physiological Functions (1 min 10 sec)**

Circadian rhythm affects many physiological functions.

Body temperature is lowest in the early morning and highest in the evening.

Blood pressure normally shows a nocturnal dip during sleep.

Cognitive performance is better during daytime.

Gastric acid secretion is higher at night.

These rhythms explain why cardiovascular events are more common in the early morning hours.

#### **06:00 – 07:20 | Story + Interesting Facts (1 min 20 sec)**

Consider a medical student studying late at night using a mobile phone.

Despite feeling tired, sleep is delayed, and the next day begins with fatigue and poor concentration.

**Did you know that exposure to bright light at night can suppress melatonin within minutes?**

Even short-term exposure to mobile screens can delay sleep onset and alter sleep quality.

**Did you know that the Nobel Prize in Physiology or Medicine in 2017 was awarded for the discovery of molecular mechanisms controlling circadian rhythm?**

This highlights the importance of circadian biology in physiology and modern medical research.

**07:20 – 08:20 | Circadian Rhythm Imbalance (1 minute)**

Circadian rhythm imbalance occurs when the internal clock is misaligned with environmental cues.

Common causes include night shift duties, jet lag, sleep deprivation, excessive screen exposure, and irregular sleep schedules.

Such disturbances are common among medical students due to academic pressure and lifestyle habits.

**08:20 – 09:20 | Effects of Circadian Rhythm Disturbance (1 minute)**

Chronic circadian disruption can lead to insomnia, impaired memory and learning, mood disturbances, metabolic disorders, cardiovascular risk, and reduced immunity.

For MBBS students, this often results in fatigue, burnout, and poor academic performance.

**09:20 – 10:00 | Conclusion (40 seconds)**

To conclude, circadian rhythm is a vital physiological mechanism regulated by the suprachiasmatic nucleus and influenced strongly by light exposure.

Maintaining a regular sleep-wake schedule is essential for health and academic efficiency.

As future doctors, respecting your own circadian rhythm is the first step toward promoting healthy lifestyles in your patients.

Thank you for listening.

*M. Elakija*

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