published in Reader's Digest,
06 October 2022

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Your body—in its blood pressure, breathing, brain waves and dreams—whispers early signs of disease in the night-time, before later shouting out loud with distressing symptoms in the daytime. Like ripples on a still lake, these whispers prove easy to examine on a body lying motionless in bed, asleep. Some treatments also work best when taken at night. Sleep has never been more important for your health and wellbeing.

Diagnosing disease during sleep

Despite a decrease in average sleep duration [6] in recent times, we humans still spend approximately one third of our lives asleep.

Dr Joachim Behar from the Israel Institute of Technology coined the term “medicine during sleep”, highlighting the potential of sleep as “an auspicious time for diagnosis, management and therapy of non-sleep-specific pathologies”.

Let’s listen to the whispers, before they become a scream.

Blood pressure

In the Walt Disney movie, *The Land Before Time*, Littlefoot’s mother says, “let your heart guide you, it whispers, so listen closely”. Whispers are seen in blood pressure readings [7] and electrical recordings of the heart at night-time.

In healthy people, blood pressure dips at night, giving the heart a rest. So-called “non-dippers” (who don’t show the drop in blood pressure at night) may have underlying circulatory problems and are at greater risk of stroke [8], heart disease [9] and death.

In “reverse dipping”, blood pressure is higher at night than in the daytime, and may be an early warning sign for dementia.

Measuring your ECG (a trace of your heart’s rhythm and electrical activity), by attaching sensors to the skin, is easier at night when you are still—and palpitations [10] may actually be more frequent at night, making it the best time for early diagnosis.

Breathing

Heart failure [11] speaks in hushed tones during the night, when you begin to experience night-time breathlessness.

Congestion, or fluid overload, is a classic clinical feature of heart failure. Lying down shifts this fluid to the chest, making you struggle to breathe—and warning you that something is wrong.

Difficulty breathing at night can also disclose other disorders, such as chronic obstructive pulmonary disease (COPD) [12] and asthma [13], before other symptoms begin. Cough, wheezing, chest tightness, and breathlessness often worsen at night, whispering warning signs.

It is unclear why asthma and COPD are worse at night, but this may be due to natural night-time variations in lung function [14], inflammation, secretion of hormones [15], and influences from other health problems such as acid reflux [16] (which often flares up at night, with stomach acid irritating the lungs).

Being in bed also affects your breathing. Lying on your back increases pressure on your lungs and chest. “Strikingly, both asthmatic patients and COPD patients are more likely to die at night when compared to the general population,” writes lung doctor Michael Ezzie.

If your breathing stops and starts at night, in a condition known as sleep apnoea [17], don’t dismiss it as simply snoring, but pay attention to the snores, gasps and chokes—they could be early warning signs.

High blood pressure, heart attack, stroke, diabetes [18], cancers [19] and even sudden death are all associated with apneoa.

Brain waves

An EEG is a test in which sensors are attached to the scalp to monitor electrical waves of activity in the brain. Used at night, it can diagnose so-called “sleep-related epilepsy”—a type of epilepsy [20] where seizures only happen while sleeping.

Without listening to these whispers, the condition may go unnoticed, leaving the person tired and with concentration difficulties. Daytime seizures may develop, due to drowsiness.

Pressure waves in the brain can also be measured—by placing a sensor inside the skull. These readings can be essential in head injury, stroke, meningitis [21] and brain swelling.

Any increase in pressure can be serious and life-threatening, as the brain may be damaged and blood supply reduced.

Recordings from the sleeping brain are considered the “gold standard” by doctors, since the lack of movement or activity allows for long and consistent readings, in which abnormalities may emerge and average pressures can be measured.

Dreams

Onset of distressing dreams [22], particularly in older men, may be an early warning sign for the development of Parkinson's disease [23], according to doctors in a recent study from the University of Birmingham [24]. Acting out your dreams in your sleep may also indicate changes in the brain.

Left untreated, these could years later trigger other more classic symptoms, such as tremor, rigidity and slowness of movement.

While dreams can be disturbed by stressful life events, sickness, medicines and horror movies [25], a change in the nature of your nightmares is worth noting if it allows earlier diagnosis of Parkinson's, and treatment to begin when it has a higher chance of having an effect.

Researchers across the world in the Parkinson's Progressive Markers Initiative [26], sponsored by the Michael J Fox Foundation, are studying how different factors, including sleep disturbances, could increase risk of Parkinson's.

Treatments

Every 24 hours, your body cycles through physical and mental changes which are synchronised by a "master-clock" [27] in the brain. Cells in the brain, liver, heart, lungs and other organs are amazingly able to keep to time, regardless of what you are doing.

Scientists are testing whether different treatments may then work best at different times of day, with, for example, medicines for arthritis pain [28] commonly being taken before breakfast when inflammation is often at its worst.

Surprisingly though, blood pressure medicines are equally as effective when taken in the morning or the evening. It had been thought that they would work best when administered just before bedtime, promoting the night-time dip in pressure, and a period of rest for the heart.

According to experts, the best bedtime stories include those by Roald Dahl [29] and AA Milne. But the body is telling its own story at night, with you as the lead character and surprising sneak previews into possible future chapters.

With early diagnosis and medical intervention, the ending might, just sometimes, be different.

MEDICAL JOURNALISTS' ASSOCIATION

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