Patient 'chronotype' could impact best time to take blood pressure medication

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Research conducted by the University's School of Medicine, in collaboration with Helmholtz Munich, and in partnership with an international team of researchers from Italy, UK and the U.S., has

revealed that a person's chronotype—the time a person feels most suited to sleeping or being awake—can impact how they interact with their blood pressure medication.

More than 5000 participants from the Treatment in Morning versus Evening (TIME) randomized clinical trial completed an online questionnaire assessing their chronotype, with around half taking their usual antihypertensive medications in the morning, and the other half in the evening.

Scientists observed that so-called "morning larks" (earlier chronotypes) who took their prescribed blood pressure medication in the morning were less likely to experience a heart attack than those who were "misaligned" and took it in the evening. Meanwhile, study participants who were "night owls" (later chronotypes) and took their blood pressure medication in the evening were also less likely to be hospitalized for heart attack when compared to those who took their medication in the morning.

The results suggest that taking antihypertensive medication at a time aligned with personal chronotype could provide extra protection for the heart. The findings have been published in the journal *eClinicalMedicine*.

"These results are exciting because they could represent a 'paradigm shift' in the treatment of hypertension," said Dr. Filippo Pigazzani, clinical senior lecturer and honorary consultant cardiologist from the University's School of Medicine, who conceived the study.

"Our research has now shown for the first time that considering chronotype when deciding dosing time of antihypertensives—personalized chronotherapy—could reduce the risk of heart attack.

"However, before any patients change when they are taking their antihypertensive medications, our findings first need to be confirmed in new randomized clinical trials of personalized chronotherapy."

Dr. Kenneth Dyar, a circadian biologist from Helmholtz Munich, who helped design the study, added, "We all have an internal biological clock which determines our chronotype—whether we are more of a 'morning' or 'evening' person. This internal time is genetically determined and affects biological functions over 24 hours, including gene expression, blood pressure rhythms, and how we respond to medications.

"It's important for physicians to remember that not all patients are the same. Humans show wide inter-individual differences in their chronotype, and these personal differences are known to affect disease risk."

High blood pressure (arterial hypertension) has a significant impact on public health. People with hypertension are more likely than the general population to have a heart attack, stroke, and heart failure.

Blood pressure control and prevention of related complications remain an urgent public health need. This is despite significant progress from evidence-based lifestyle interventions, including diet, exercise, and drug therapies.

Chronotherapy—delivering therapies to patients at times when they will be more effective and tolerable—has been proposed to treat people with hypertension. However, the best time to take antihypertension medications, to improve blood pressure control and clinical outcomes, has been heavily debated.

Assessing a patient's chronotype does not impose a significant time burden and cost on health care professionals. Therefore, incorporating

these findings into clinical practice would be straightforward, cost-effective, and, most importantly, could prevent heart attacks in hypertensive patients using their existing therapies.

Meanwhile the authors stressed that for now patients should continue taking their medications in consultation with their physician.

More information: Filippo Pigazzani et al, Effect of timed dosing of usual antihypertensives according to patient chronotype on cardiovascular outcomes: the Chronotype sub-study cohort of the Treatment in Morning versus Evening (TIME) study, *eClinicalMedicine* (2024). DOI: 10.1016/j.eclinm.2024.102633

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