

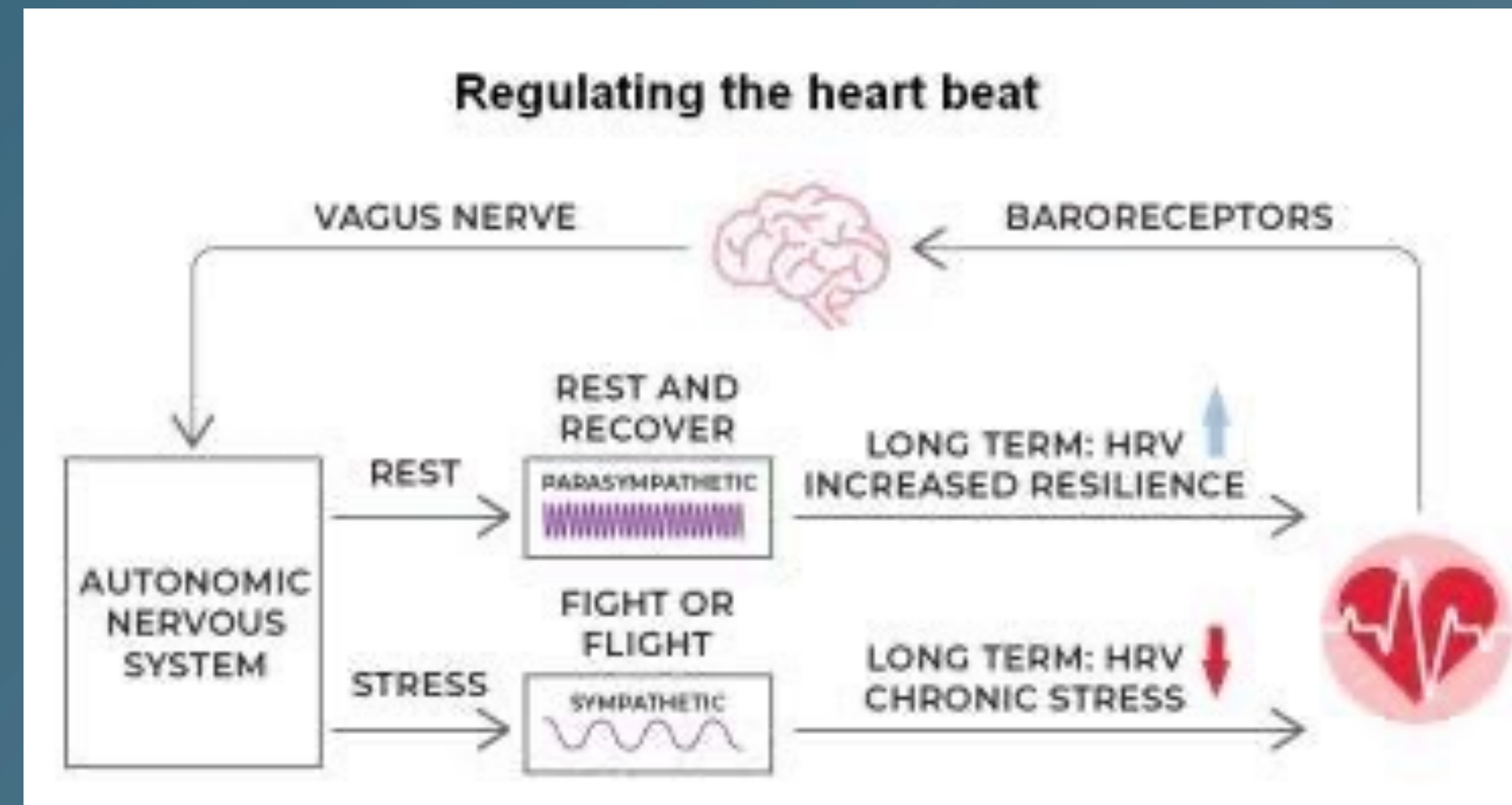
Tejasvi Kainth, MD, Komalpreet Kaur, MBBS, Garima Yadav, MD, Rehan Billoo, MBBS, Merina Das, MBBS, Pardeep Kumar Sajjani, MD, Anzu Giri, MBBS, Kaushal Shah, MD, MPH, Zeeshan Mansuri, MD, MPH, Shailesh Jain, MD, MPH

Background

- Major depression is a global health concern, and many patients who do not achieve remission experience only partial improvement despite various treatments.
- Research has supported that individuals with more resilience are better able to cope with symptoms of depression and are more likely to recover from the condition.
- Identifying biomarkers of resilience may have significant implications for the prevention and treatment of major depression. One potential approach is to target heart rate variability (HRV) as a potential biomarker of resilience, which refers to the ability to adapt and cope with stressors.
- We examine the relationship between HRV, resilience, and major depression in our review.

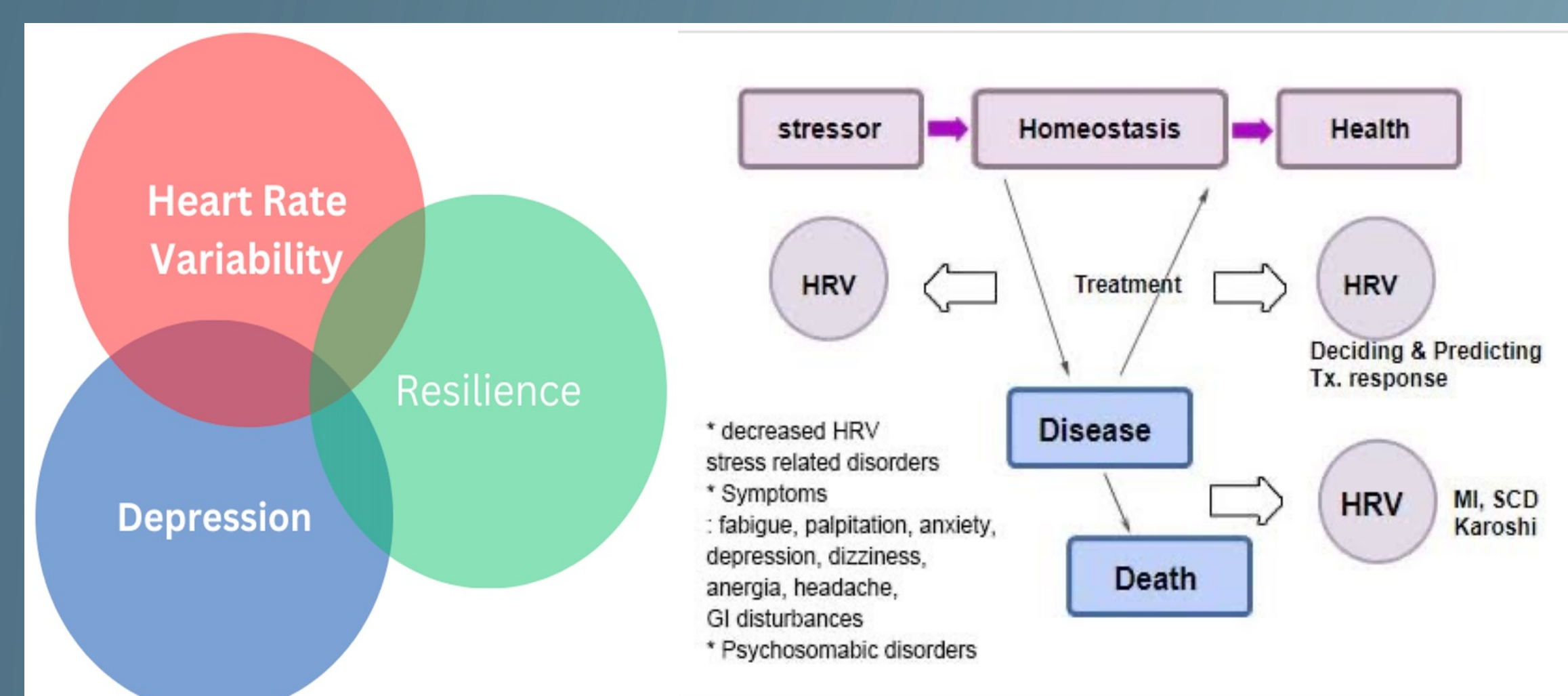
Pathophysiology

- Heart rate variability (HRV) measures the variation in time intervals between heartbeats, reflecting autonomic system activity.
- Higher HRV indicates greater cardiac vagal tone, offering flexibility in responding to stressors without relying solely on sympathetic arousal mechanisms.
- Parasympathetic activation slows heart rate via acetylcholine release, while sympathetic activation increases heart rate and contractility through catecholamines, affecting HRV differently.
- Factors like age, sex, genetics, lifestyle, exercise, mindfulness, social support, chronic stress, poor sleep, and unhealthy diet impact HRV.
- HRV analysis serves as a non-invasive method to assess cardiovascular autonomic modulation and explore its relationship with major depressive disorder.



Discussion

- Individuals with major depressive disorder (MDD) have lower HRV compared to healthy individuals, indicating decreased parasympathetic activity and increased sympathetic activity as the pathophysiology underlying depression.
- Individuals exhibiting diminished heart rate variability, indicating impaired parasympathetic function, are predisposed to experiencing inferior sleep quality amidst chronic stressors.
- Heightened susceptibility to compromised sleep quality elevates their risk of developing depressive symptoms, surpassing that of individuals with more significant heart rate variability.
- Additionally, interventions such as Yoga, Mindfulness, Music therapy, and Psychotherapy/CBT have been found to improve HRV, resulting in beneficial effects on depression.



Implications

- Kircanski et al. conducted a clinical trial that explored how pretreatment heart rate variability (HRV) predicted antidepressant outcomes in major depressive disorder, revealing that patients with anxious depression and higher HRV responded better to treatment, suggesting a potential personalized medicine approach.
- Targeting reduced vagal activity through physical activity or transcutaneous vagal nerve stimulation (tVNS) may add to current treatment options.
- In their meta-analysis, Kemp and colleagues (2010) investigated the impact of HRV on depression, finding lower HF-HRV (RSA) levels and increased LF/HF ratio in depressed individuals, indicating reduced physiological adaptability to stressors.

Conclusion

- HRV may have significant implications for preventing and treating major depression.
- The use of HRV analysis as a diagnostic/prognostic tool would require further research and validation due to the complexity of depression.
- Additionally, monitoring HRV as a biomarker of sleep quality may also be beneficial in managing major depression.
- Tailoring interventions based on HRV levels could optimize outcomes, offering a promising avenue for more effective and personalized depression treatments.

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