
**Abstract Type : Oral presentation**
**Abstract Submission No.: A-0527**
**Abstract Topic : Transplantation**

# Fluctuations in Summer Temperature Are Associated with Increased Mortality Risk in Kidney Transplant Recipients

**Seung Hyun Han**[1], Sohee Oh[3], Ara Ko[1], Jeonghwan Lee[1], Eunjeong Kang[2], Hajeong Lee[2], Yon Su Kim[2], Chun Soo Lim[1], Young Hoon Kim[4], Jung Pyo Lee[1]
[1]Department of Internal Medicine-Nephrology, Seoul National University Boramae Medical Center, Korea, Republic of
[2]Department of Internal Medicine-Nephrology, Seoul National University Hospital, Korea, Republic of
[3]Department of Medical Research Collaborating Center, Seoul National University Boramae Medical Center, Korea, Republic of
[4]Department of Surgery-Transplantation, Asan Medical Center, Korea, Republic of

**Objectives :** Environmental temperature fluctuations are linked to advere health outcomes, particularly in vulnerable populations. Kidney transplant (KT) recipients are at heightened risk due to impaired thermoregulation, and immunosuppressive therapy; however, the impact of temperature variability (TV) on post-transplant survival remains unclear. This study examines the association between seasonal TV and mortality, focusing on summer fluctuations as a potential stressor.
**Methods :** This retrospective cohort study analyzed 7,960 KT recipients from three tertiary hospitals in South Korea (2002–2020). Temperature data were obtained from the Korean Meteorological Administration, and summer (June–August) and winter (December–February) periods were analyzed separately. TV was assessed using multiple indicators, including 24-hour mean, minimum, maximum temperatures, and diurnal temperature range. A time-varying Cox proportional hazards model was applied to evaluate the association between TV and all-cause mortality.
**Results :** During summer, both intraday and interday TV were associated with increased mortality risk in KT recipients. In unadjusted models, higher intraday TV, measured by absolute real variability (ARV: hazard ratio [HR] = 2.17, 95% confidence interval [CI]: 1.31–3.61) and standardized variability (SV: HR = 1.95, 95% CI: 1.29–2.95), was associated with higher mortality. Similarly, interday TV, assessed by the difference in the coefficient of variation (CV: HR = 1.83, 95% CI: 1.20–2.81), was associated with a higher risk of mortality. After adjusting for clinical and demographic factors, SV (HR = 1.66, 95% CI: 1.02–2.70) and CV (HR = 1.94, 95% CI: 1.33–2.83) remained significant, while ARV was attenuated. In contrast, no significant associations were observed between TV and mortality during winter.
**Conclusions :** In KT recipients, increased summer temperature variability was significantly associated with higher mortality risk, suggesting that environmental temperature fluctuations contribute to post-transplant vulnerability. These findings underscore the need for targeted climate-related health interventions to mitigate risks in this population.