Daily Weather Conditions and Anticipated Death from Cancer

In Cheol Hwang¹ and Hee Kyung Ahn²

¹Department of Family Medicine; ²Division of Medical Oncology, Department of Internal Medicine, Gachon University Gil Medical Center, Incheon, Republic of Korea

This paper was published in *Iran J Public Health* at Apr 2018.

OBJECTIVE

The effect of weather conditions on human health has been documented. However, the role of daily weather on anticipated death remains unclear. This study aimed to evaluate the relationship between daily weather conditions and death in terminally ill cancer patients.

METHOD

We retrospectively searched a medical database of 935 consecutive terminally ill cancer patients who passed away in the palliative care unit from Oct 2009 to Sep 2013. We used Poisson regression to assess the relative risk of anticipated death based on various weather variables, using mean values calculated from the 10 d around the time of death.

INTERPRETATION

- Cold weather induces vasoconstriction and increases blood pressure via stimulation of the sympathetic nervous system. Low temperature also promotes thrombosis by increasing plasma clotting factor concentration and blood viscosity.
- The negative association between sunshine and cancer death could be related to the role that sunshine plays in serotonin production. Sunshine stimulates the production of serotonin by the brain, and serotonin levels in the brain increase significantly during the process of dying.

CONCLUSION

Weather conditions may be a predictor of death in terminally ill cancer patients.

RESULTS

Characteristics of participants

	No. (%)
Number	745
Age (years), mean±SD	65.9 ± 12.2
Female	308 (41.3)
Cancer site	
Gastrointestinal	175 (23.5)
Hepatobiliary	199 (26.7)
Lung	189 (25.4)
Genitourinary	85 (11.4)
Other ^a	97 (13.0)
PPI score ^b , mean±SD	8.0 ± 3.8
Seasonal deaths	
Spring	246 (33.0)
Summer	82 (11.0)
Fall	189 (25.4)
Winter	228 (30.6)
Weather conditions at the day of death	
Temperature	
< average ₁₀	373 (50.1)
≥ average ₁₀	372 (49.9)
Diurnal temperature range	
< average ₁₀	370 (49.7)
≥ average ₁₀	375 (50.3)
Humidity	
< average ₁₀	345 (46.3)
≥ average ₁₀	400 (53.7)
Sunshine	
< average ₁₀	312 (41.9)
≥ average ₁₀	433 (58.1)

Relative risk^c of death associated with various weather characteristics

Weather condition ^d	No.	Unadjusted	P	Adjusted	P
		RR (95% CI)		RR (95% CI)	
Low temperature	373	1.97 (1.65 to 2.36)	<0.0001	2.17 (1.48 to 3.18)	0.0001
Large diurnal temperature	375	2.05 (1.71 to 2.45)	<0.0001	2.53 (1.74 to 3.70)	<0.0001
Low humidity	345	1.89 (1.58 to 2.28)	<0.0001	2.20 (1.52 to 3.20)	<0.0001
Much sunshine	433	1.60 (1.32 to 1.93)	<0.0001	1.83 (1.27 to 2.64)	0.0012

SD, standard deviation; PPI, palliative prognostic index; RR, relative risk; CI, confidence interval.

Average₁₀ refers to a mean value of 10 days near death.

^aIncludes breast cancer, hematologic malignancies, etc.

^bFrom last week of life.

^cDerived from Poisson regression models with or without adjusting for age, sex, cancer type, and the last palliative prognostic index score.

^dBased on the mean value of 10 days near death.