

Lifestyle factors significantly impact survival of non-Hodgkin's lymphoma patients, study finds

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A new study led by researchers from Mayo Clinic in collaboration with six other U.S. institutions has found that patients with non-Hodgkin's lymphoma who smoked, consumed alcohol or were obese before their cancer diagnosis had poorer overall survival, compared to patients who did not have these risk factors. This association held after accounting for clinical and demographic factors, and also when considering only deaths due to this kind of lymphoma.

For example, non-Hodgkin's lymphoma patients with a 20-plus-year history of smoking had a 76 percent higher risk of death compared to never smokers; patients who consumed more than 43 grams of [alcohol](#) per week had a 55 percent higher risk of death compared to nondrinkers; and obese patients (defined as a [body mass index](#) of 30 or higher) had a 32 percent higher risk of death compared to patients with normal weight for their height.

While smoking and obesity had already been found to increase the risk of developing non-Hodgkin's lymphoma, this is the first U.S. study to look at their role on survival after being diagnosed with non-Hodgkin's lymphoma, the researchers say. For alcohol, they found that use was associated with poorer survival, which is opposite of the effect for developing non-Hodgkin's lymphoma, where alcohol appears to lower risk.

These findings, published in the March 30 online edition of *Cancer*, mirror conclusions found in three smaller studies, according to the study's lead investigator, James Cerhan, M.D., Ph.D., a Mayo cancer epidemiologist. These are the first data from North American patients, and the only study to simultaneously look at all three lifestyle factors, he says.

"This now raises the hypothesis that changing these behaviors after diagnosis might improve survival, but this needs to be tested in a clinical study," he says. "In the meantime, patients in active therapy should discuss any lifestyle changes with their health care provider. Long-term survivors outside of therapy should consider the general public health guidelines that recommend smoking cessation, moderate or no alcohol use, and attaining a healthy weight."

Non-Hodgkin's lymphoma is a cancer of the immune system. It is the fifth most common cause of cancer, and the most common hematologic malignancy in the United States.

In this study, information from 1,286 non-Hodgkin's lymphoma patients was collected from 1998 to 2000. Patients were identified from population-based cancer registries in Michigan, Iowa, California, and Washington, and they were interviewed shortly after diagnosis. Participants were asked to report their height and weight the year before they were diagnosed, and half of the participants also were asked information about use of alcohol and smoking history.

Through 2007, 442 (34 percent) patients had died, including 144 of 420 patients with diffuse large B-cell lymphoma and 93 of 328 of patients with follicular lymphoma, the two most common non-Hodgkin's lymphoma subtypes.

Of the 471 patients who provided information about smoking history, 34

percent were former smokers and 19 percent were current smokers at the time of diagnosis. Researchers calculated that both former and current smoking in these patients was associated with an approximately 50 percent higher risk of death. Poorer survival also was linked to longer smoking duration and greater numbers of cigarettes smoked per day.

But there was a piece of good news. "It is important to note that patients who had quit smoking 20 years or more before diagnosis had no higher risk of death than patients who had never smoked," Dr. Cerhan says.

Of the 458 patients with data on alcohol use, 49 percent consumed alcohol one year before diagnosis, and the median intake was 43.1 grams a week (about 3.3 cans of beer, 4.6 glasses of wine, or 2.7 shots of liquor weekly). Researchers found a 55 percent increased risk of death among those who drank more than 43 grams a week compared to never drinkers. In contrast, patients who drank 43 grams or less a week had a risk of death similar to nondrinkers.

Dr. Cerhan notes that the association between drinking and survival is the opposite of what was found for the development of non-Hodgkin's lymphoma. There, alcohol use appears to lower risk of non-Hodgkin's lymphoma. "We don't know why this is the case, but suggests alcohol may have different impacts on developing versus surviving non-Hodgkin's lymphoma, and this warrants further research," he says.

Of the 1,189 who provided usable data about their height and weight, about 5 percent were underweight, 31 percent were normal weight, 39 percent were overweight, and 26 percent were classified as obese. After adjusting for clinical and demographic factors, obese patients had a 32 percent higher risk of death compared to normal weight patients; the risk of death for overweight patients was similar to that for normal weight patients.

Even given these results for lifestyle factors, the strongest predictors of outcome in non-Hodgkin's lymphoma remain age and clinical measures that include issues such as cancer stage, the number of lymph nodes that are affected, and certain biochemical measurements, Dr. Cerhan says.

The study had limitations, such as the original data was designed to look at risk of developing [non-Hodgkin's lymphoma](#) and, in this study, those questionnaires were used to evaluate the impact of the same factors on survival. "This raises the concern that people may have changed their behaviors after diagnosis, and we would have missed these changes," Dr. Cerhan says. However, he notes that such a change would most likely bias the study to finding no association with the [lifestyle factors](#).

"Most importantly, we didn't answer the question of whether changing these factors after diagnosis would impact survival," he says. "That is best done with a clinical trial."

Provided by Mayo Clinic

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