



# Association Among Current Cigarette Smoking, Heavy Alcohol Consumption, Regular Exercise, and the Risk of Lower Extremity Amputation in Patients with Diabetic Foot: A Nationwide Population-Based Study

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## Purpose

The present study investigates whether modifiable behavioral factors including current cigarette smoking, heavy alcohol consumption, and regular exercise are associated with the risk of lower extremity amputation (LEA) in diabetic patients.

## Method

2,644,440 diabetic patients (aged ≥ 20 years) were analyzed by using the database of the Korean National Health Insurance Service. Cox proportional hazard regression was used to assess adjusted hazard ratios for the behavioral factors with the risk of LEA under adjustment for potential confounders.

## Result

The risk of LEA was significantly increased by current cigarette smoking and heavy alcohol consumption (HR 1.436; 95% CI, 1.367-1.508; HR 1.082; 95% CI, 1.011-1.158) but significantly decreased by regular exercise (HR 0.745; 95% CI, 0.706-0.786) after adjusting for age, sex, smoke, alcohol drink, exercise, low income, hypertension, dyslipidemia, body mass index, using insulin, oral antidiabetic drugs, and diabetic duration. (Table 1 & Figure 1) The synergistically increased risk of LEA was observed with the more overlap of each inappropriate behavior. The hazard ratio of LEA by current cigarette smoking, heavy alcohol consumption, and regular exercise increased with age, short diabetic duration, and 3 or less oral diabetic drugs.

## Conclusion

The modification of behaviors including current smoking, heavy alcohol intake, and regular exercise prevents LEA then improve physical, emotional, and social quality of life in diabetic patients.

Table 1. Risk factors and hazard ratios of the risk of amputation in the patients with diabetic foot

	N	Event	Duration	Incidence rate per 1,000 Person-years	Hazard ratio (95% CI)	
					Non-adjusted	Adjusted*
Current cigarette smoking						
No	1,961,924	5,802	13,512,000	0.4294	1(Ref.)	1(Ref.)
Yes	682,516	2,976	4,630,204	0.64274	1.503(1.438,1.571)	1.436(1.367,1.508)
Heavy alcohol consumption						
No	2,381,993	7,767	16,346,859	0.47514	1(Ref.)	1(Ref.)
Yes	262,447	1,011	1,795,345	0.56312	1.187(1.112,1.268)	1.082(1.011,1.158)
Regular exercise						
No	2,096,400	7,126	14,317,538	0.49771	1(Ref.)	1(Ref.)
Yes	548,040	1,652	3,824,666	0.43193	0.865(0.82,0.912)	0.745(0.706,0.786)
Score†						
0	389,891	1,052	2,734,435	0.38472	1(Ref.)	1(Ref.)
1	1,583,446	4,859	10,856,128	0.44758	1.168(1.092,1.248)	1.366(1.277,1.462)
2	555,392	2,347	3,767,964	0.62288	1.631(1.516,1.754)	1.752(1.562,1.966)
3	115,711	520	783,677	0.66354	1.739(1.566,1.932)	2.448(1.998,3.001)

Figure 1. Kaplan-Meier curves for cumulative incidence of lower extremities amputation in diabetic population at biennial intervals. A. Depending on current cigarette smoking B. Depending on heavy alcohol consumption C. Depending on regular exercise

