

## Supplementary Material

**Article Title:** Suicide Attempts in Patients With Amyotrophic Lateral Sclerosis: An Analysis of the Korean National Health Insurance Database

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### LIST OF SUPPLEMENTARY MATERIAL FOR THE ARTICLE

1. [Table 1](#) Operational definition of suicide attempts and categories of psychiatric disorders
2. [Table 2](#) List of psychotropics
3. [Table 3](#) Univariate analysis for the risk factors of suicide attempts among incident patients with ALS
4. [Figure 1](#) Kaplan-Meier survival curve for index suicide attempts

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Supplementary Table 1. Operational definition of suicide attempts and categories of psychiatric disorders

<b>Methods of suicide attempts</b>	<b>KCD-6 or KCD-7 codes</b>
Intentional self-harm	X60–X84
Event of undetermined intent	Y10–Y34 (with an F code <sup>a</sup> )
Sequelae of intentional self-harm	Y87.0 (with an F code)
Poisoning by nonopioid analgesics, antipyretics and antirheumatics	T39
Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs	T42
Poisoning by psychotropic drugs, not elsewhere classified	T43
Poisoning by drugs, medicaments and biological substances	T36–T38, T40–T41, T44–T50 (with an F code)
Toxic effects of substances chiefly nonmedicinal as to source except alcohol and food poisoning	T52–T57, T59–T60 (with an F code)
Toxic effect of carbon monoxide	T58 (with an F code)
Open wound of forearm	S51 (with an F code)
Open wound of blood vessels at forearm level	S55 (with an F code)
Open wound of other and unspecified injuries of forearm	S59 (with an F code)
Open wound of wrist and hand	S61 (with an F code)
Open wound of injury of blood vessels at wrist and hand level	S65 (with an F code)
Open wound of other and unspecified injuries of wrist and hand	S69 (with an F code)
<b>Categories of psychiatric disorders</b>	<b>KCD-6 or KCD-7 codes</b>
Schizophrenia, schizoaffective disorders, and other nonorganic psychoses	F2x
Bipolar affective disorder and other affective psychosis	F30, F31, or F34.0
Organic disorders and dementia	F0x
Depression and other mood disorders	F32, F33, or F34.1
Anxiety and stress disorders	F4x
Substance use disorders	F1x
Intellectual disability	F7x
Other mental health diagnoses	Other F

Abbreviation: KCD, Korean Standard Classification of Diseases.

<sup>a</sup> F code refers to mental and behavioral disorders.

Supplementary Table 2. List of psychotropics

Classes	Psychotropics
Antipsychotics	
Typical	chlorpromazine hydrochloride, haloperidol, levomepromazine maleate, perphenazine, pimozide, sulpiride
Atypical	aripiprazole, clozapine, olanzapine, risperidone, ziprasidone hydrochloride monohydrate, zotepine, quetiapine fumarate, amisulpride, paliperidone, blonanserin
Mood stabilizers	lithium carbonate, divalproex sodium particle, sodium valproate, valproate magnesium, valproic acid, lamotrigine, carbamazepine
Antidepressants	
SSRI	fluoxetine hydrochloride, fluvoxamine maleate, paroxetine hydrochloride, sertraline hydrochloride, escitalopram oxalate, citalopram
SNRI	hydrobromide
NaSSA	venlafaxine hydrochloride, milnacipran hydrochloride, duloxetine hydrochloride, desvenlafaxine succinate monohydrate
Serotonin modulator	mirtazapine
NDRI	vortioxetine hydrobromide
TCA	bupropion hydrochloride
Miscellaneous	amitriptyline hydrochloride, nortriptyline hydrochloride, clomipramine hydrochloride, imipramine hydrochloride, amoxapine, doxepin hydrochloride
	trazodone hydrochloride, sodium tianeptine, moclobemide, selegiline hydrochloride, agomelatine
Anxiolytics	
Benzodiazepine	triazolam, alprazolam, bromazepam, chlordiazepoxide hydrochloride, chlordiazepoxide, clonazepam, clobazam, clotiazepam, diazepam, etizolam, flunitrazepam, flurazepam hydrochloride, lorazepam, mexazolam
Non-benzodiazepine	buspirone hydrochloride, tandospirone citrate
Hypnotics	zolpidem tartrate
Cognitive enhancers	donepezil hydrochloride, rivastigmine tartrate, galantamine hydrobromide, memantine hydrochloride, choline alfoscerate
Psychostimulants	methylphenidate hydrochloride, modafinil, armodafinil

Abbreviations: SSRI, selective serotonin reuptake inhibitor; SNRI, serotonin-norepinephrine reuptake inhibitor; NaSSA, noradrenergic and specific serotonergic antidepressant; NDRI, norepinephrine-dopamine reuptake inhibitor.

Supplementary Table 3. Univariate analysis for the risk factors of suicide attempts among incident patients with ALS

Variables	Crude HR (95% CI)	p value	Adjusted HR <sup>a</sup> (95% CI)	p value
<b>Cox proportional hazards model</b>				
Heritability				
Familial ALS <sup>b</sup>	1		1	
Sporadic ALS <sup>c</sup>	1.22 (0.29 – 5.02)	0.79	1.12 (0.27 – 4.63)	0.88
Sex				
Male	1		1	
Female	1.64 (0.93 – 2.91)	0.09	1.60 (0.90 – 2.83)	0.11
Age, y				
≥ 80	1	0.21	1	0.24
70–79	0.32 (0.08 – 1.24)	0.10	0.35 (0.09 – 1.35)	0.13
60–69	0.58 (0.17 – 1.97)	0.38	0.65 (0.19 – 2.22)	0.49
50–59	0.35 (0.10 – 1.26)	0.11	0.39 (0.11 – 1.40)	0.15
40–49	0.30 (0.07 – 1.25)	0.10	0.33 (0.08 – 1.38)	0.13
< 40	0.18 (0.03 – 1.07)	0.06	0.20 (0.03 – 1.22)	0.08
Household income				
High (top 20%)	1	0.30	1	0.22
Middle (top 21–60%)	1.30 (0.60 – 2.81)	0.51	1.44 (0.66 – 3.14)	0.36
Low (bottom 40% or medical aid)	1.79 (0.83 – 3.86)	0.14	1.97 (0.91 – 4.28)	0.09
Region				
Metropolitan cities	1		1	
Rural areas	1.14 (0.64 – 2.03)	0.67	1.12 (0.63 – 2.00)	0.70
Psychiatric disorder before ALS diagnosis				
No	1		1	
Yes	1.86 (1.05 – 3.29)	<b>0.03</b>	1.23 (0.68 – 2.21)	0.49
Psychiatric pharmacotherapy before ALS diagnosis				
No	1		1	
Yes	1.44 (0.82 – 2.56)	0.21	1.29 (0.72 – 2.31)	0.39
Psychiatric hospitalization before ALS diagnosis				
No	1		1	
Yes	3.71 (1.57 – 8.73)	<b>&lt; 0.01</b>	2.85 (1.37 – 5.95)	<b>0.01</b>
Suicide attempt before ALS diagnosis				
No	1		1	
Yes	3.97 (0.96 – 16.36)	0.06	3.53 (0.85 – 14.62)	0.08

<b>Competing risk model</b>				
Diagnosis				
Familial ALS <sup>b</sup>	1		1	
Sporadic ALS <sup>c</sup>	1.18 (0.28 – 4.93)	0.82	1.10 (0.27 – 4.58)	0.89
Sex				
Male	1		1	
Female	1.68 (0.95 – 2.98)	0.08	1.60 (0.90-2.83)	0.11
Age, y				
≥ 80	1	0.36	1	0.37
70 – 79	0.38 (0.10 – 1.47)	0.16	0.42 (0.11 – 1.66)	0.21
60 – 69	0.81 (0.24 – 2.73)	0.73	0.92 (0.26 – 3.19)	0.89
50 – 59	0.52 (0.15 – 1.86)	0.31	0.58 (0.16 – 2.18)	0.42
40 – 49	0.47 (0.111 – 1.94)	0.29	0.52 (0.12 – 2.22)	0.38
< 40	0.30 (0.50 – 1.76)	0.18	0.34 (0.06 – 2.08)	0.24
Household income				
High (top 20%)	1	0.30	1	0.24
Middle (top 21–60%)	1.32 (0.61 – 2.85)	0.49	1.42 (0.65 – 3.10)	0.37
Low (bottom 40% or medical aid)	1.80 (0.84 – 3.88)	0.13	1.91 (0.90 – 4.08)	0.09
Region				
Metropolitan cities	1		1	
Rural areas	1.10 (0.62 – 1.97)	0.74	1.10 (0.62 – 1.96)	0.75
Psychiatric disorder before ALS diagnosis				
No	1		1	
Yes	1.79 (1.01 – 3.16)	<b>&lt; 0.05</b>	1.21 (0.68 – 2.14)	0.53
Psychiatric pharmacotherapy before ALS diagnosis				
No	1		1	
Yes	1.40 (0.79 – 2.48)	0.25	1.28 (0.73 – 2.25)	0.39
Psychiatric hospitalization before ALS diagnosis				
No	1		1	
Yes	3.60 (1.51 – 8.38)	<b>&lt; 0.01</b>	2.64 (1.26 – 5.53)	<b>0.01</b>
Suicide attempt before ALS diagnosis				
No	1		1	
Yes	3.84 (0.92 – 16.12)	0.07	3.50 (0.82 – 14.86)	0.09

Abbreviations: ALS, amyotrophic lateral sclerosis; HR, hazard ratio; CI, confidence interval.

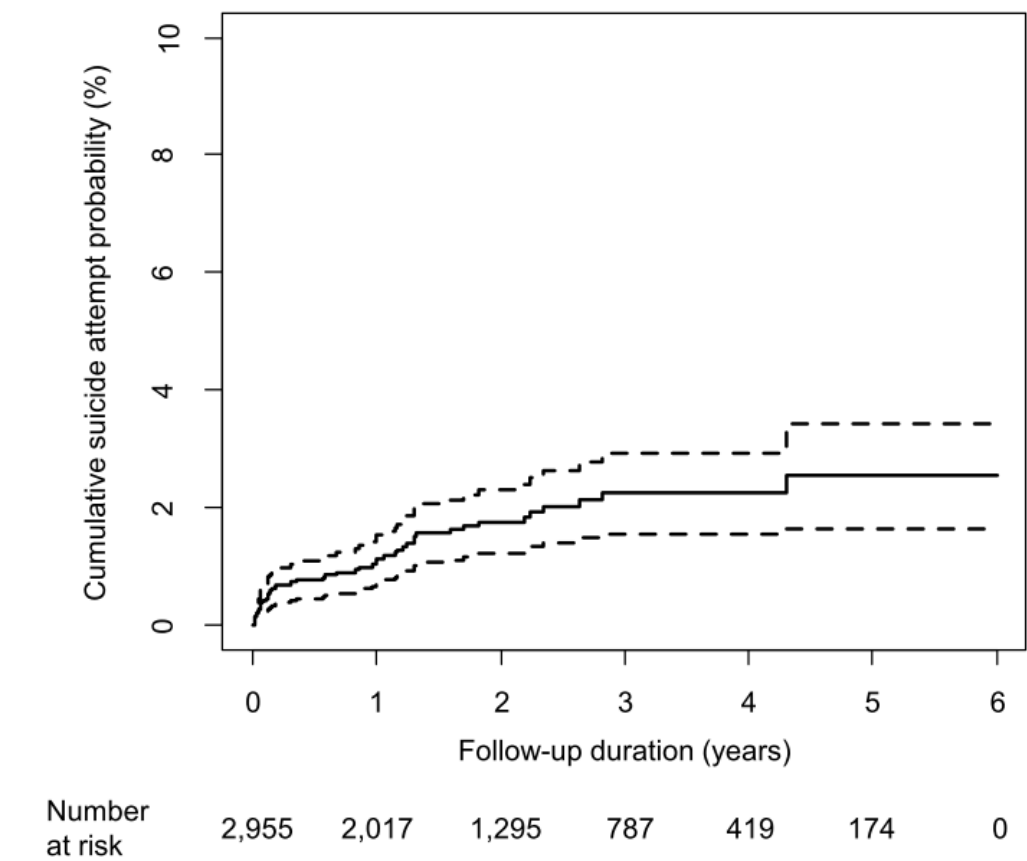
Significant findings with  $p < .050$  are in bold fonts.

<sup>a</sup> Adjusted for age and sex.

<sup>b</sup> Korean Standard Classification of Diseases-6 or -7 code: G12.20.

<sup>c</sup> Korean Standard Classification of Diseases-6 or -7 code: G12.21.

Supplementary Figure 1. Kaplan-Meier survival curve for index suicide attempts



The solid line indicates survival curve, and the dashed lines indicate 95% confidence interval.