

Risk of Mood Disorders in Elderly Patients with Kidney Impairment

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Background/Aims: It is known that the prevalence of mood disorders in patients with chronic diseases is higher than in the general population. This study aims to determine the risk of mood disorders in patients with chronic kidney disease (CKD) among the elderly population in Korea.

Methods: This study included a population over 50 years of age in the Korean Frailty and Aging Cohort Study from 2005 to 2019 and excluded the population with missing data on creatinine or urine dipstick measurements. CKD group included a population with estimated glomerular filtration rate (eGFR) < 60 ml/min/1.73 m² or urine dipstick protein ≥ 1+, and the control group included age, sex, and index year-matched population according to the CKD group, using propensity score matching (PSM) method. Primary outcomes were all-type mood disorders, major depressive disorder (MDD), and other mood disorders. Subgroup analyses were performed according to age and comorbidities.

Results: 79,248 participants for each group were included after 1:1 PSM. The mean age was 63 and 62.9% were male. In baseline characteristics, the proportions of patients with hypertension (HTN), diabetes mellitus (DM), and dyslipidemia were higher in the CKD group compared to the control group (Table 1). The CKD group showed a significantly higher risk for all-type mood disorders than the control group (adjusted HR 1.02, 95% confidence interval [CI] 1.00-1.05; p=0.024). Especially, the risk of MDD was significantly higher in the study group (adjusted HR 1.04, 95% CI 1.01-1.06; p=0.002), but not in the risk of other mood disorders (Table 2). Then, the subgroup analysis for comparing the elderly (age 50-69) and super-elderly (age ≥ 70) was performed. We found only the super-elderly with CKD showed significant risk elevation in all-type mood disorders and MDD compared to controls, while the elderly with CKD showed no difference in risk. In subgroup analysis with comorbidities including HTN and DM, the risk of MDD increased in CKD participants regardless of HTN or DM (Table 3).

Conclusions: CKD has a higher risk of suffering from mood disorders compared to the general population, and the increased risk ratio is particularly evident in elderly patients aged 70 years or older.

Table 1. Baseline characteristics of study cohort and matched control.

		Total			AGE < 70			AGE ≥ 70		
		control	study cohort	p	control	study cohort	p	control	study cohort	p
Age		79,248	79,248		61,977	61,028		17,271	18,220	
		62.76(±7.75)	63(±7.73)	<0.001	59.51(±4.99)	56.63(±4.94)		74.4(±3.55)	74.3(±3.57)	
	50-70	61977(78.21)	61028(77.01)	<0.001						
	≥ 70	17271(21.79)	18220(22.99)							
Index year	Sex(male)	49871(62.93)	49871(62.93)	1	39821(64.25)	39203(64.24)	0.9605	10050(58.19)	10668(51.49)	0.4904
	2005-2009	19735(24.90)	19735(24.90)		15609(25.19)	15503(25.40)		4126(23.89)	4232(23.23)	
	2010-2014	43543(54.95)	43543(54.95)	1	32619(52.63)	32251(52.85)	0.1758	10924(63.25)	11292(61.98)	<0.001
	2015-2019	15970(20.15)	15970(20.15)		13749(22.18)	13274(21.75)		2221(12.86)	2696(14.80)	
Past history	Hypertension	25259(31.87)	39290(49.58)	<0.001	17432(28.13)	27338(44.80)	<0.001	7827(45.32)	11952(65.60)	<0.001
	Diabetes mellitus	7624(9.62)	15520(19.58)	<0.001	5490(8.86)	11350(18.60)	<0.001	2134(12.36)	4170(22.89)	<0.001
	Dyslipidemia	11815(14.91)	21317(26.90)	<0.001	8964(14.46)	15985(26.19)	<0.001	2851(16.51)	5332(29.26)	<0.001
Smoking	Never	44291(56.03)	44865(56.76)		32958(53.32)	32968(54.17)		11333(65.77)	111897(65.42)	
	Ex	17051(21.57)	18937(23.96)	<0.001	13808(22.34)	15069(24.76)	<0.001	3243(18.82)	3868(21.27)	<0.001
	Current	1705(2.40)	15240(19.28)		15051(24.35)	12820(21.07)		2654(15.40)	2420(13.31)	
Drinking	Yes	35610(45.13)	34645(43.88)	<0.001	30155(48.88)	28878(47.50)	<0.001	5455(31.71)	5767(31.77)	0.8964
	No									
Laboratory data	Glucose (mg/dL)	103.43(±27.67)	110.95(±36.92)	<0.001	103.53(±28.01)	111.57(±38.21)	<0.001	103.06(±26.44)	108.88(±32.15)	0.0251
	Hb (g/dL)	14.02(±1.49)	13.96(±1.66)	<0.001	14.15(±1.46)	14.13(±1.62)	<0.001	13.53(±1.51)	13.37(±1.67)	<0.001
	AST (IU/L)	27.44(±20.08)	29.29(±40.14)	<0.001	27.63(±20.71)	29.69(±43.08)	<0.001	26.78(±17.64)	27.96(±28.15)	<0.001
	ALT (IU/L)	25.24(±20.85)	27.31(±38.96)	<0.001	26.2(±21.02)	28.52(±40.57)	<0.001	21.8(±19.82)	23.24(±32.7)	<0.001
	eGFR (ml/min/1.73m ²)	87.24(±14.09)	60.02(±25.19)	<0.001	88.79(±14.25)	61.3(±27.1)	<0.001	81.67(±11.93)	55.76(±16.65)	<0.001
	Urine dipstick protein									
Urine dipstick protein	Negative	77219(97.44)	47712(60.21)		60419(97.49)	34304(56.21)		16800(97.27)	13408(73.59)	
	±	2029(2.56)	1750(2.21)		1558(2.51)	1273(2.09)		471(2.73)	477(2.62)	
	+1	-	20598(25.99)		-	17675(28.96)		-	2923(16.04)	
	+2	-	7055(8.90)	<0.001	-	6002(9.83)	<0.001	-	1053(5.78)	<0.001
	+3	-	1725(2.18)		-	1451(2.38)		-	274(1.50)	
	+4	-	408(0.51)		-	323(0.53)		-	85(0.47)	

Table 2. Risk of mood disorders in the study group.

	Total				AGE < 70				AGE ≥ 70			
	unadjusted	p	adjusted	p	unadjusted	p	adjusted	p	unadjusted	p	adjusted	p
All-type mood disorders	1.07(1.04-1.09)	<0.001	1.02(1.00-1.05)	0.024	1.05(1.03-1.08)	<0.001	1.01(0.99-1.04)	0.322	1.09(1.05-1.13)	<0.001	1.05(1.01-1.09)	0.008
Major depressive disorder	1.08(1.06-1.11)	<0.001	1.04(1.01-1.06)	0.002	1.07(1.04-1.10)	<0.001	1.02(1.00-1.05)	0.100	1.11(1.06-1.15)	<0.001	1.07(1.02-1.11)	0.002
Other mood disorders	0.99(0.95-1.03)	0.602	0.97(0.93-1.01)	0.191	0.98(0.94-1.03)	0.418	0.97(0.92-1.02)	0.189	1.00(0.93-1.08)	0.915	0.99(0.91-1.07)	0.748

Table 3. Subgroup analysis of age and comorbidities related to the risk of mood disorders.

	Total				AGE < 70				AGE ≥ 70			
	unadjusted	p	adjusted	p	unadjusted	p	adjusted	p	unadjusted	p	adjusted	p
- All-type mood disorders	1.02(0.99-1.05)	0.120	1.03(1.00-1.06)	0.068	1.01(0.98-1.04)	0.447	1.01(0.98-1.04)	0.674	1.12(1.05-1.18)	<0.001	1.10(1.04-1.16)	0.002
+ HTN	1.03(1.00-1.06)	0.080	1.02(0.99-1.05)	0.249	1.04(1.00-1.08)	0.050	1.02(0.98-1.06)	0.414	1.02(0.97-1.07)	0.435	1.02(0.97-1.07)	0.464
- Major depressive disorder	1.03(1.00-1.06)	0.079	1.03(1.00-1.06)	0.043	1.02(0.99-1.06)	0.247	1.02(0.98-1.05)	0.366	1.11(1.04-1.18)	0.009	1.09(1.02-1.16)	0.007
+ HTN	1.05(1.02-1.09)	0.004	1.04(1.00-1.07)	0.036	1.06(1.02-1.11)	0.007	1.03(0.99-1.08)	0.196	1.05(0.99-1.10)	0.094	1.04(0.99-1.10)	0.112
- Other mood disorders	1.00(0.95-1.05)	0.914	0.99(0.94-1.05)	0.750	1.00(0.94-1.06)	0.978	0.99(0.93-1.05)	0.699	1.01(0.90-1.14)	0.831	1.00(0.89-1.13)	0.945
+ HTN	0.99(0.88-0.99)	0.027	0.94(0.89-1.00)	0.063	0.92(0.85-0.99)	0.031	0.92(0.85-1.00)	0.052	0.97(0.87-1.07)	0.518	0.97(0.88-1.08)	0.597
- All-type mood disorders	1.04(1.02-1.06)	0.001	1.02(0.99-1.04)	0.165	1.02(1.00-1.05)	0.082	1.00(0.98-1.03)	0.799	1.08(1.03-1.12)	<0.001	1.05(1.01-1.09)	0.025
+ DM	1.08(1.02-1.14)	0.008	1.07(1.01-1.13)	0.017	1.08(1.01-1.16)	0.025	1.06(0.99-1.14)	0.084	1.09(1.00-1.20)	0.062	1.09(0.99-1.19)	0.090
- Major depressive disorder	1.05(1.03-1.08)	<0.001	1.03(1.00-1.05)	0.034	1.03(1.01-1.07)	0.020	1.02(0.99-1.05)	0.328	1.09(1.04-1.14)	<0.001	1.06(1.01-1.11)	0.014
+ DM	1.10(1.03-1.16)	0.002	1.08(1.02-1.15)	0.008	1.09(1.02-1.17)	0.018	1.07(0.99-1.15)	0.084	1.13(1.02-1.24)	0.017	1.11(1.01-1.23)	0.039
- Other mood disorders	0.99(0.95-1.04)	0.764	0.97(0.93-1.02)	0.209	0.99(0.94-1.04)	0.553	0.97(0.92-1.02)	0.178	1.01(0.93-1.10)	0.780	0.99(0.91-1.08)	0.832
+ DM	0.97(0.87-1.09)	0.605	0.97(0.87-1.10)	0.660	0.98(0.85-1.13)	0.777	0.97(0.84-1.12)	0.631	0.97(0.80-1.17)	0.737	0.99(0.82-1.21)	0.934