

## Comorbid Mental Disorders Among the Patients with Alcohol Abuse and Dependence in Korea

This study investigated the patterns of alcohol disorder comorbidity with other psychiatric disorders, using Korean nationwide epidemiological data. By two-stage cluster sampling, 5,176 adult household residents of Korea were interviewed using the Korean version of the Diagnostic Interview Schedule. Psychiatric disorders strongly associated with alcohol disorders were, other drug abuse or dependence, major depression, simple phobia, antisocial personality disorder, tobacco dependence, and pathological gambling. Male alcoholics had a tendency to begin with tobacco dependence, and some male pathological gamblers first had alcohol disorders. The presence of comorbid psychiatric disorders was associated with a more severe form and the later onset of alcohol disorders, and associated with help-seeking for alcohol abuse/dependence.

**Key Words :** Alcoholism; Comorbidity; Mental Disorders; Epidemiology

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### INTRODUCTION

Alcohol use disorders tend to co-occur with other psychiatric disorders much more frequently than would be expected by chance (1-5). The most commonly reported comorbid disorders are other substance use disorders (2, 4, 6), nicotine addiction (7), antisocial personality disorder (2, 4, 6, 8), mood disorders (2, 4-6, 9), and anxiety disorders (2, 9).

The association between alcohol use disorders with other psychiatric disorders is important from both a research and a therapeutic point of view. Patients with alcohol use disorders combined with other psychiatric disorders are known to have a poorer clinical course (10, 11). To explain the mechanisms of these comorbidity disorders, a causal hypothesis and a shared etiologic model have received some attention. In causal hypotheses, alcohol disorders may cause other psychiatric disorders and problems (12, 13), or vice versa, i.e. alcohol is secondly used to self-medicate symptoms of other psychiatric disorders (14, 15). In shared etiologic model, common factors may contribute to the manifestation of alcoholism and other psychiatric disorders (16-19). The heterogeneity of these relationships and the characteristics of alcoholism itself make it difficult to identify a single mechanism of comorbidity (20).

In Korea, there has been only one nationwide epidemio-

logic survey of psychiatric disorders (21, 22), in which the Diagnostic Interview Schedule (DIS) (23), a standardized diagnostic instrument, was used to identify psychiatric cases in the community. In cross-cultural comparison study, it was found that both lifetime prevalence and the male-to-female ratio of alcohol abuse/dependence in Korea were the highest among several countries, at 22.4% (male 44%, female 2.4%) and 18.3, respectively (24). Generally, in alcohol use disorders, the higher the prevalence, the lower is the male-to-female ratio (24). The Korean findings are inconsistent with this pattern (24). In addition to the highest prevalence, this unusual male-to-female ratio in Korea has attracted international attention. In regard to the comorbidity of alcohol use disorders in Korea, the relative risks have been presented in a previous paper (25). This analysis, however, has a number of limitations in terms of interpreting the characteristics of Korean alcoholics combined with other psychiatric disorders, specifically: 1) the exclusion criteria were not applied when diagnosing disorders; 2) the odds ratio was not determined by logistic regression analyses; 3) the large rate difference between male and female might have obliterated gender-specific results.

After applying exclusion criteria to the above nationwide epidemiological data, we performed further analysis to clarify the characteristics of the comorbidity pattern of Korean

alcoholics. The points of interest, therefore, in this study were as follows: first, to examine the magnitude the comorbidity of alcohol disorders with other psychiatric disorders, according to gender; second, to determine the temporal relationships in the patterns of onset of comorbid disorders; third, to investigate the impact of comorbidity on the age of onset, duration, and the number of alcohol disorder symptoms; fourth, to examine how comorbidity influences help-seeking behavior for alcohol or other psychiatric disorders.

## METHODS

Nationwide epidemiological data (21, 22) were collected from community households selected by two-stage cluster sampling in 1984. All family members in the household, aged between 18 to 65, and those who had lived in a household for more than three months, were interviewed. A total of 5,176 respondents completed the interview (response rate 83.5%). The validated Korean version of the Diagnostic Interview Schedule (K-DIS) (21) was administered to each subject by trained lay interviewers. Detail methods have been described in the previous paper (21). The DIS is a standardized, structured diagnostic instrument for psychiatric epidemiologic study, generating 44 DSM-III psychiatric diagnoses and associated information.

In previous reports of this survey, the analysis of the data was committed by Dr. Yamamoto in UCLA (26). For this study, we re-analyzed the data used for generating diagnosis after applying exclusion criteria. We re-checked each variable to ensure legitimate values were entered, and if not, reason-

able corrections were made. Sixteen of the 5,176 respondents were excluded due to inappropriate data records. Sample weight was calculated by sex, age (five age groups), and area (Seoul and rural). It was adjusted to reflect the 1980 census data. Diagnostic scoring and statistical analyses were performed with SAS win 6.12 software. In the case of the lifetime prevalence rate of alcohol disorders, a minimum of two symptoms was necessary, and there was no requirement that they occurred simultaneously. Six-month and one-year prevalences of alcohol disorders were defined in terms of the appearance of at least one symptom, given that full criteria had been met at some time. The age of onset of disorders was defined as the age at which the first symptom appeared, and recency as the age of the most recent symptom. Duration was defined as the period between these two. The severity of alcohol disorders was based on symptom counts.

Logistic regression analyses were used to calculate the odds ratios, controlling for demographic variables (27). The magnitude of comorbidity, the temporal relationship of the age of onset between alcohol disorders and comorbid psychiatric disorders, impact of comorbidity on the age of onset, duration, and severity of alcohol disorders, and health service utilization were evaluated.

## RESULTS

### Comorbid rates of alcohol disorders with other psychiatric disorders

Table 1 shows comorbid rates of alcohol use disorders with

Table 1. Comorbidity of alcohol abuse/dependence with other psychiatric disorders

	Alcohol abuse				Alcohol dependence			
	Male		Female		Male		Female	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Lifetime diagnosis of								
Major depression	1.24	2.00 (0.75-5.35) <sup>†</sup>	17.02	9.02 (3.14-25.88)*	4.49	6.71 (3.06-14.69) <sup>†</sup>	7.04	3.37 (0.55-20.88)
Dysthymia	1.68	1.20 (0.55-2.65) <sup>†</sup>	5.69	1.73 (0.32-9.44)	2.87	2.03 (0.98-4.24) <sup>†</sup>	11.57	3.80 (0.90-16.05)
Drug abuse or dependence	0.54	7.78 (0.75-80.62) <sup>†</sup>	9.59	24.71 (5.39-113.35)*	1.13	20.95 (2.16-203.63)*	0.00	-
Schizophrenia	0.49	1.42 (0.33-6.09)	0.00	-	0.48	1.41 (0.28-7.11)	0.00	-
OCD	1.41	1.45 (0.60-3.53)	2.76	1.90 (0.18-19.71)	1.88	1.83 (0.75-4.47)	9.52	7.22 (1.31-39.95)*
Agoraphobia	1.12	1.90 (0.67-5.37) <sup>†</sup>	3.00	0.66 (0.07-6.58)	0.93	1.39 (0.42-4.66) <sup>†</sup>	2.80	0.61 (0.04-9.58)
Simple phobia	3.22	3.93 (1.88-8.19) <sup>†</sup>	19.27	2.81 (1.04-7.59)*	3.61	4.39 (2.02-9.54) <sup>†</sup>	8.54	1.09 (0.21-5.56)
Phobia (sum)	3.64	3.16 (1.65-6.05) <sup>†</sup>	19.27	2.36 (0.88-6.38)	4.19	3.66 (1.84-7.27) <sup>†</sup>	8.54	0.92 (0.18-4.70)
Panic disorder	0.10	0.44 (0.02-8.20) <sup>†</sup>	1.43	0.78 (0.03-20.28)	0.21	0.65 (0.06-6.69) <sup>†</sup>	6.04	3.40 (0.46-25.17)
ASPD	0.63	2.89 (0.62-13.36)	0.00	-	0.94	6.97 (1.55-31.43) <sup>†</sup>	0.00	-
Tobacco dependence	51.37	2.76 (2.24-3.39) <sup>†</sup>	19.04	7.77 (2.74-22.03)*	54.31	2.57 (2.05-3.21) <sup>†</sup>	42.57	30.50 (10.39-89.53)*
Pathological gambling	2.13	2.33 (1.03-5.26)*	0.00	-	3.83	3.31 (1.53-7.15)*	0.00	-
Any lifetime diagnosis	56.18	2.90 (2.36-3.55) <sup>†</sup>	43.70	3.62 (1.66-7.86)*	60.92	2.98 (2.39-3.73) <sup>†</sup>	61.78	7.77 (3.02-20.02) *
Any one-year diagnosis	47.19	2.60 (2.12-3.19) <sup>†</sup>	32.93	3.90 (1.71-8.88)*	53.09	2.94 (2.35-3.67) <sup>†</sup>	36.92	4.74 (1.81-12.37) *
Any six-month diagnosis	47.01	2.62 (2.13-3.21) <sup>†</sup>	32.93	4.22 (1.85-9.62)*	51.45	2.75 (2.20-3.44) <sup>†</sup>	36.92	5.13 (1.96-13.38) *

Multiple logistic regression analyses were performed using other psychiatric disorders as the dependent variable and alcohol abuse/dependence and age as the independent variable. OR: odds ratio, CI: confidence interval, OCD: obsessive compulsive disorder, ASPD: antisocial personality disorder. \*significant OR,  $p < 0.05$ , <sup>†</sup>significant difference between male and female,  $p < 0.05$ .

overall and individual psychiatric disorders. Overall, more than half of lifetime alcohol use disorders were comorbid with any other lifetime psychiatric disorder. Alcohol dependence, in general, showed a greater magnitude of comorbidity with other psychiatric disorders than alcohol abuse. Odds ratios were significantly larger for females than for males, and this trend was also observed for six-month and one-year diagnoses.

Other drug abuse/dependence, major depression, simple phobia, antisocial personality disorder, tobacco dependence, and pathological gambling were strongly associated with alcohol use disorders. Most of the disorders, except simple phobia and agoraphobia, showed a stronger association with alcohol use disorders in females than in males. The gender differences of these associations were particularly large for major depression, drug abuse/dependence, and tobacco dependence.

### Temporal ordering of onset of alcohol disorders and comorbid psychiatric disorders

The order of onset time of alcohol disorders in relation to other comorbid psychiatric disorders was examined (Table 2). Tobacco dependence usually preceded the onset of alcohol

use disorders in males. Phobias and obsessive compulsive disorder also tended to precede alcohol use disorders, while pathological gambling tended to occur later than alcohol disorders for males. No remarkable temporal relationships were observed between alcohol disorders and major depression and drug abuse/dependence.

### Comorbidity and age of onset, duration, and severity of alcohol disorders

As shown in Table 3, the presence of comorbid psychiatric disorders was associated with the later onset of alcohol disorders. There was no consistent or significant impact of comorbidity upon the duration of alcohol disorders. Symptoms of alcohol disorders were more severe in cases that were associated with other psychiatric disorders.

### Comorbidity and help seeking

To see the effect of the presence of other comorbid disorders on help seeking behavior, six-month prevalences were used. Tables 4 and 5 show the impact of comorbidity on help-seeking by patients for alcohol disorders and other psychiatric disorders. Presence of comorbid psychiatric disorders,

**Table 2.** Temporal relationship of age of onset between alcohol abuse (AA)/dependence (AD) and comorbid psychiatric disorders

Comorbid psychiatric disorders	Male								Female								Total (N)		
	AA (N)				AD (N)				AA (N)				AD (N)				PU	PR	SA
	PU	PR	SA	SE	PU	PR	SA	SE	PU	PR	SA	SE	PU	PR	SA	SE			
Major depression	595	1	2	3	515	9	0	9	35	1	2	1	23	0	0	0	1,170	11	4
Drug abuse or dependence	599	1	0	0	527	3	0	2	37	0	0	0	25	0	0	0	1,188	4	0
Obsessive compulsive disorder	593	1	0	5	526	3	0	5	38	0	0	1	23	1	0	1	1,180	5	0
Phobias (sum)	584	3	2	8	517	5	2	7	33	0	1	4	23	0	0	1	1,157	8	5
Tobacco dependence	313	17	19	189	239	15	18	242	32	2	1	4	14	0	2	6	598	34	41
Pathological gambling	590	6	3	3	514	14	2	4	40	0	0	0	25	0	0	0	1,169	20	5

PU: No comorbid psychiatric disorder, i.e. AA or AD only, PR: AA or AD occur antecedent to comorbid psychiatric disorder, SA: AA or AD and comorbid psychiatric disorder co-occur at the same year, SE: Comorbid psychiatric disorder occur antecedent to AA or AD.

**Table 3.** Effect of comorbid psychiatric disorders on age of onset, duration, and number of symptoms of alcohol abuse/dependence

Variables associated with alcohol abuse/dependence <sup>§</sup>	Alcohol abuse and/or dependence			Alcohol abuse			Alcohol dependence		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Age of onset									
≥30 yr	1.17* <sup>†</sup>	1.16	1.21	1.17	1.14	1.53	1.15	1.15	0.54
(ref: <30 yr)	1.00-1.36 <sup>†</sup>	0.99-1.36	0.53-2.80	0.93-1.47	0.91-1.44	0.48-4.81	0.93-1.42	0.93-1.43	0.09-3.15
Duration									
≥5 yr	1.02	1.03	0.77	0.97	0.98	0.53	1.07	1.07	1.02
(ref: <5 yr)	0.89-1.17	0.90-1.18	0.36-1.63	0.81-1.17	0.81-1.19	0.17-1.68	0.88-1.31	0.88-1.31	0.33-3.16
Number of symptoms									
≥6	1.30 <sup>†</sup>	1.30 <sup>†</sup>	1.51	1.27 <sup>†</sup>	1.25 <sup>†</sup>	2.68	1.38 <sup>†</sup>	1.40 <sup>†</sup>	1.13
(ref: <6)	1.15-1.48	1.14-1.47	0.73-3.15	1.03-1.56	1.01-1.54	0.48-14.81	1.13-1.68	1.14-1.71	0.37-3.40

<sup>§</sup>Multiple logistic regression analyses were performed using each variable associated with alcohol abuse/dependence as the dependent variable and comorbid psychiatric disorder, sex, age, and marital status as the independent variable.

\*First row of each cell indicates value of odds ratio, <sup>†</sup>Second row of each cell indicates 95% confidence interval, <sup>†</sup>p<0.05.

**Table 4.** Effect of six-month comorbid psychiatric disorder on help-seeking for six-month alcohol abuse/dependence

Alcohol abuse and/or dependence			Alcohol abuse			Alcohol dependence		
Total	Male	Female	Total	Male	Female	Total	Male	Female
1.36*	1.347		1.45	1.38		1.30	1.30	
0.98-1.89 <sup>†</sup>	0.96-1.86	-	0.86-2.44	0.82-2.33	-	0.85-1.98	0.85-1.99	-
0.064 <sup>‡</sup>	0.084		0.159	0.232		0.234	0.229	

Multiple logistic regression analyses were performed using help-seeking for alcohol abuse/dependence as the dependent variable and comorbid psychiatric disorders, sex, age, and marital status as the independent variable. \*First row of each cell indicates value of odds ratio, <sup>†</sup>Second row of each cell indicates 95% confidence interval, <sup>‡</sup>Third row of each cell indicates *p*-value.

**Table 5.** Effect of six-month comorbid alcohol abuse/dependence on help-seeking for six-month other psychiatric disorders

Alcohol abuse and/or dependence			Alcohol abuse			Alcohol dependence		
Total	Male	Female	Total	Male	Female	Total	Male	Female
0.98*	0.93		0.71	0.62		1.13	1.11	
0.74-1.28 <sup>†</sup>	0.70-1.23	-	0.44-1.13	0.36-1.07	-	0.84-1.54	0.81-1.51	-
0.860 <sup>‡</sup>	0.604		0.151	0.085		0.420	0.526	

Multiple logistic regression analyses were performed using help-seeking for psychiatric disorders as the dependent variable and comorbid alcohol abuse/dependence, sex, age, and marital status as the independent variable. \*First row of each cell indicates value of odds ratio, <sup>†</sup>Second row of each cell indicates 95% confidence interval, <sup>‡</sup>Third row of each cell indicates *p*-value.

though statistically non-significant, absolutely increased the odds of help-seeking for alcohol disorders. On the other hand, an alcohol disorder patient's help-seeking for other comorbid psychiatric disorders was very weak. Alcohol abusers were less likely to seek help for other psychiatric disorders, whereas alcohol dependence was weakly associated with increased help-seeking for other psychiatric disorders.

## DISCUSSION

In this study, the number of cases in several disorders was insufficient to analyze the comorbidity of alcohol disorders. Disorders with a very low prevalence, such as schizophreniform disorder and mania, were dropped from the statistical analyses. This limitation was more prominent in the female alcoholics. Other limitations were the onset and recency of each disorder were determined by retrospective reports, and those in institutions were not included in this survey.

Alcohol disorders were often associated with other psychiatric disorders. Generally, alcohol dependence had stronger associations than alcohol abuse with other disorders, and the odds ratios were larger for females than for males. These findings are consistent with other studies (2, 4). In terms of the individual comorbid disorders, while the findings were consistent in many ways with the prior article on this topic, the pattern of comorbidity showed differences according to sex and the type of alcohol disorder (alcohol abuse and dependence).

Although the present study is limited to some extent by the insufficient number of cases, some patterns of association between alcohol disorders and other disorders were observed.

Many male alcoholics tended to begin with tobacco, and some of these might succeed to gambling. These findings suggest the progression of addictive behavior in some risk group. Although attention has been focused on the role of anxiety disorders in alcohol or substance disorders, in fact the onset of anxiety disorders was found to be more likely to precede that of alcohol or substance disorders (6, 20, 28), the present study produced no confirmatory findings.

The impact of comorbidity on the later onset of alcohol disorders may be explained through the comorbidity mechanisms. Since several psychiatric disorders begin later than alcohol disorders, alcohol disorders caused by other psychiatric disorders may have a later onset than non-comorbid alcohol disorders. Additionally, it will take some time to progress from primary psychiatric disorders to secondary alcohol disorders. It is also possible that alcohol disorders in shared etiologic model may be expressed later than non-comorbid alcohol disorders.

Although there was no statistical significance, the impact of comorbidity on the duration of alcohol disorders was heterogeneous with respect to sex and the type of alcohol disorder. This result suggests the heterogeneity of the impact of comorbidity on the duration of alcohol disorders or it could be merely a result of the insufficient number of cases.

Our finding that the presence of comorbid psychiatric disorders was associated with increases in the symptoms of alcohol disorders is consistent with that of a previous study (9), and this impact was more prominent in females. Considering the higher comorbidity rate and symptom count among females than males, it would appear that alcohol disorders are more complicated in females than males, as suggested by Helzer et al. (4, 29).

Comorbidity is believed to be a major determinant of help-seeking (30, 31). Alcoholics who sought medical consultation for an alcohol-related problem were more likely to have other psychiatric disorders. This means that alcoholics are unlikely to seek medical consultation unless some other disorder is also present. This behavior may be explained by a lack of insight of alcohol problems. Another finding was that alcohol abusers were unlikely to seek medical consultation even though some other disorder was present. This behavior may be explained by an indifference to mental health. Moreover, these help-seeking behaviors are a major obstacle in the treatment of alcoholics.

This study indicates that the comorbidity of alcohol disorders and other psychiatric disorders is common and that comorbidity has an important role in the expression of alcohol disorders. These findings might also have implications in terms of investigating the etiology and treatment of alcohol problems. We would like to suggest that the nosological differences of alcohol disorders, according to the sex and type of alcohol disorder, are suitable areas for further investigation.

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