

The Nationwide Epidemiological Study of Mental Disorders in Korea

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The lifetime prevalences of DSM-III mental disorders using Korean version of DIS-III are presented. They were studied in 5,100 adults (aged 18 to 65) in household selected by two stage cluster sampling. Comparisons were made between regions, sex and age groups. International comparison with Epidemiologic Catchment Area program was also made.

Key Words: *Epidemiology of Mental Disorders in Korea*

INTRODUCTION

Epidemiological studies in psychiatry provide us with individual measurement values such as incidence, prevalence and morbidity risk and thereby contribute to the progress both in academic and clinical medicine as well as in public health aspects (Weissman and Klerman, 1978). The research data prior to World War II were primarily focused on the recognition of caseness and much of the information was obtained indirectly (Dohrenwend, 1982). After World War II, ICD (International Classification of Diseases) and DSM (Diagnostic and Statistical Manual of Mental Disorders) were published and they were followed by mass scale regional epidemiological studies such as Baltimore Morbidity Study (Pasamanick et al., 1956), Midtown Manhattan Study (Sroie et al., 1962), Stirling County Study (Leighton et al., 1963) and others. All those contributed to raising interests in community psychiatry.

The necessity of more definite diagnostic criteria was further emphasized by the accumulation of knowledge on psychopharmacology and neurobiol-

ogy. Also, the standardization of interview schedules was initiated. Diagnostic criteria such as St. Louis Criteria (Feighner et al., 1972), Research Diagnostic Criteria (Spitzer et al., 1978) DSM-I (APA, 1980) etc were prepared and structure interviewing tools such as Present Status Examination (PSE) (Wing et al., 1974), Renard Diagnostic Interview (RDI) (Helzer et al., 1981) Schedule for Affective Disorders and Schizophrenia (SADS) (Endicott and Spitzer, 1978) were developed thus the researches in psychiatric field came to a new turning point.

Epidemiological studies on mental illness in Korea began about four decades ago (Yoo, 1962; 1962 a.; Kim, 1965; Kim and Han, 1964; Kim et al., 1975; Kim et al., 1964; Kim and Rhi, 1965; Kim 1961; Kim 1983; Nam, 1973; Park, 1965; Sung 1965; Song and Yoo, 1977; Woo and Cho, 1975; Lee, 1966; Lee 1975; Yeon et al., 1982; Lee, 1974; Lee, 1965; Chung, 1977; Cho and Kim, 1983; Joo et al., 1973; Zin, 1973; Choi, 1979; Hahn, 1965; Huh 1981; Hong, 1980). Since the early comprehensive study by Choi and Yoo (1962), numerous studies over 2 dozens have been published on this subject. However, many aspects are found to be desired in those works. First, subjects of interview were selected not randomly. Second, lack of consistent diagnostic tool or discriminating examination introduced possible considerable degrees of interview-

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ers' bias. Third, the definition of prevalence is not well defined and a likelihood of error exists in cross comparing the data obtained by various authors. Fourth, illness subjected to investigation are limited in scope to major psychoses such as schizophrenia, manic depressive illness, mental retardation and epilepsy. Fifth, most of researches were performed in rural areas such as farming, fishing areas and islands, thereby causing shortage of information related to the urban areas.

Mental health issues are drawing increasing attentions nowadays in Korea. Therefore, it is of importance to perform an epidemiological study in order to recognize the precise pattern of mental illnesses occurring in Korea. It is necessary not only for the progress in clinical psychiatry but also for the establishment of public health policy including health care delivery system.

This study was designed to meet needs described above at the same time the applicability of Diagnostic Interview Schedule-III (Robins *et al.*, 1981) (DIS-III) in Korea was tested to contribute to the epidemiological research in psychiatric field. In order to accomplish those goals the Korean Version of DIS-III was constructed and the lifetime prevalences of mental disorders were studied both in urban (Seoul) and rural areas and the data were cross compared with those in Epidemiologic Catchment Area project of USA.

SUBJECTS AND METHODS

Selection of respondents

Two-stage cluster method was adopted as the sampling method and primary sampling unit was Jong in Seoul (the capital city of Korea) and Eub, Myeon in rural areas. Secondary sampling unit was determined as Ban in Seoul area and Ri and small

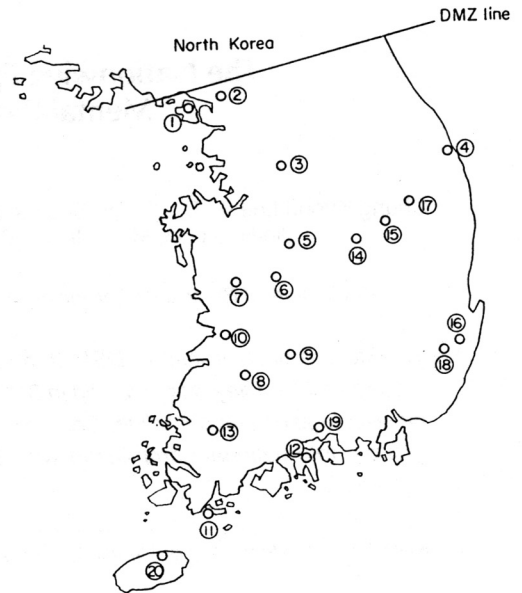


Fig. 1. Location of Sampling areas (rural)

village in rural areas. In order to maintain the sampling rate of primary sampling unit consistent, probability proportionate-to-size method was used. Five secondary sampling units were chosen randomly out of 1 primary sampling unit and out of 1 secondary sampling unit 7 to 10 households were selected.

This method is regarded as reducing standard errors and are easily applicable in field survey attaining more cooperation from community leaders and saving time due to the even assignment to each interviewer.

In each subject household, respondents were those aged 18 to 65 and the subject was defined as one who had resided more than 3 months in that house.

Table 1. Sampling method of Korean DIS field survey

Sampling Unit	Seoul	Rural	Selection method
PSU (primary sampling Unit); Subdistrict	(-Dong) 47	(-Eub, Myeon) 20	Probability-Proportionate-to-size Method
SSU (Secondary Sampling Unit); Sector or Segment	(-Ban) 235	(-Ri) 100	Systematic Random Sampling
Household	1,645	1,000	Systematic Random Sampling

Table 2. Completion rates

	Korean Study		ECA Study		
	Seoul	Rural	New Haven	Baltimore	St. Louis
Died, Language and other problem (%)	0.2	0.4	0.3	0.7	0.3
Refusal (%)	5.9	1.0	13.9	16.5	10.1
Never available (%)	5.4	7.0	1.1	0.7	2.2
Others* (%)	8.5	2.3	9.1	4.2	7.9
No. of interviewed	3,178	1,998	3,058	3,481	3,004
Interview completion (%)	80.5	89.3	75.6	77.9	79.5
No of Analysis	3,134	1,966	3,058	3,004	
Overall Completion (%)	79.4	85.9	75.6	77.9	79.5

*Included "household refusal"

Korean version construction and interviewer training

For this study, the Korean version of DIS-III (Lee et al., 1986) which is being adopted as research tool in Epidemiologic Catchment Area (ECA) project (Eaton et al., 1984, Eaton 1981, Regier et al., 1984) by NIMH, was constructed. DIS is a fully structured interviewing tool that can be used by lay interviewers and it includes Feighner criteria, Research Diagnostic Criteria and DSM-III (Robins et al., 1981). The result obtained is found to be comparable to those achieved by the professionals. With DIS, epidemiologic research in psychiatry is arriving at new level of precision and reproducibility.

The Korean version construction was carefully done both in Korean and in English. Initial translation was followed by back translation, bilingual respondents, pretests, preliminary field trial and revision. With the final draft, validity and reliability testing was performed with overall sensitivity about 60%, specificity about 90% and kappa value about 0.7. All lay interviewers were chosen from Seoul area and had college degrees. Persons with experience were rare and 78 out of 150 applicants were finally chosen as interviewers and among them 46 were medical students. 56 interviewers (28 males, 28 females) took part in studies in Seoul and 22 males participated in rural area project. Lay interviewers were trained carefully over a period of a week by psychiatrist who has been trained at UCLA. Prior to education, preliminary meetings were held and educational materials were distributed for preview. Lectures included demonstration explaining how to use questionnaire and role play and video demon-

stration. At the fifth day of training, practical application of interviewing and assessment of the result were instructed in a 1300 bed psychiatric hospital. Also, daily task were provided in order to practice the application of Prove Flow Chart and questionnaire utilization.

Field survey

Prior to field survey, a pilot study was performed in the 40 residents in a primary sampling unit. Based on the result of the pilot study, assessment were done on the practical issues that may be raised in field survey. The survey was done from January 4, 1984 to February 23, 1984 (50 days). In case of rural project, all interviewers stayed in the assigned area for the assigned period. Problems encountered in the field were discussed through letters and telephones. Fulltime researchers stayed in the department of college to help clarify any vagueness. In addition to that, all involved persons met every two weeks to reduce the variability among the interviewers and to maintain the consistency throughout the project. Items related to those in psychosexual disorders were excluded from the original items after having considered its possible effect as a resistant factor.

Data were computerized by the same program package used in ECA project. Diagnoses were primarily based on those in DSM-III but exclusion criteria were not adopted so that multiple diagnoses could be possible. By utilizing hierarchy-free diagnostic system general aspect of symptomatology were easily demonstrated, and this made it possible to compare our data with those in U.S. studies.

Table 3. Demographic characteristics of sample population

Age (yr)	Seoul			Rural		
	Male N (%)	Female N (%)	Total N (%)	Male N (%)	Female N (%)	Total N (%)
18-24	299 (20.1)	339 (20.6)	638 (20.4)	146 (15.0)	114 (11.5)	260 (13.2)
25-34	412 (27.7)	504 (30.7)	916 (29.2)	179 (18.4)	206 (20.8)	385 (19.6)
35-44	385 (25.8)	403 (24.5)	788 (25.1)	199 (20.4)	222 (22.4)	421 (21.4)
45-54	264 (17.7)	263 (16.0)	527 (16.8)	257 (26.4)	274 (27.6)	531 (27.0)
55-65	130 (8.7)	135 (8.2)	265 (8.5)	193 (19.8)	176 (17.7)	369 (18.8)
Total	1,490 (100.0)	1,644 (100.0)	3,134 (100.0)	974 (100.0)	992 (100.0)	1,966 (100.0)

Table 4. Comparison of sample with General population

	Seoul		Rural	
	Sample	Census ('80)	Sample	Census ('80)
Size	3,134	5,119,647	1,966	8,401,261
Sex				
M	47.5%	49.2%	49.5%	50.6%
F	52.5%	50.9%	50.5%	49.4%
Age, yr				
18-24	20.4%	29.1%	13.2%	24.2%
25-44	54.3%	51.8%	41.0%	48.8%
45-65	25.3%	19.1%	45.8%	33.0%

RESULTS

Demographic characteristics of sample population

The completion rates of this study were 79.4% and 85.9% in Seoul and rural area, respectively. They are somewhat higher compared with those in ECA project (Eaton *et al.*, 1984). Especially, in the rural area data, it is speculated that community leaders' cooperation and the timing of survey in winter, when no farming activity is present may be the two main factors responsible for high completion rates. Table 2 reveals the details of completion rates in our and ECA data.

Demographic characteristics of sample population is shown in Table 3. The number of subjects is 3134 in Seoul (1490 men and 1644 women) and the rural area sample population is 1966 (974 men and 992 women).

It is supposed that the subjects in our study is large enough to represent the total demographic distribution. Therefore, cross comparison with the general population is required. In Table 4 the demographic composition of general population and

sample population is compared. Generally, the sample population appears to represent the general population fairly well except that a fraction of the young adult group (18 to 24 in age) is relatively low both in Seoul and rural areas while fractions of middle and old age group are relatively higher in Seoul. Therefore, this aspect was taken into consideration during data analysis, and data were age-standardized.

Lifetime prevalence rates of specific mental disorders

Table 5 shows lifetime prevalences of diagnostic categories in DSM-III except psychosexual disorders. As previously mentioned, demographic characteristics of the study sample are relatively close to those of general population in Seoul and rural areas. But in age distribution, the old-aged is somewhat oversampled to warrant the age standardization. Those figures in parentheses are unweighted data.

In data interpretation, we should keep following points in mind. First, multiple diagnoses were al-

Table 5. Lifetime prevalence rate of DIS/DSM-III disorders in Korea

	Seoul (%) (N = 3,134)	Rural (%) (N = 1,966)	Total (%) (N = 5,100)
Any DIS disorder covered	39.81 (41.51)	41.05 (43.79)	40.27 (42.39)
Any DIS disorder except tobacco dependence	31.80 (33.22)	33.02 (35.09)	32.27 (33.94)
Any DIS disorder except substance use disorders	13.36 (13.40)	13.46 (14.24)	13.41 (13.73)
Substance use disorders	31.75 (32.83)	31.98 (34.49)	31.84 (33.47)
Alcohol abuse/dependence	13.84	11.63	13.00
Alcohol abuse	12.95 (13.59)	10.65 (10.63)	12.06 (12.45)
Alcohol dependence	8.76 (9.32)	11.74 (13.38)	9.92 (10.88)
Tobacco dependence	19.92 (20.80)	20.96 (22.74)	20.31 (21.55)
Drug abuse/dependence	0.88 (0.93)	0.49 (0.56)	0.74 (0.78)
Schizophrenic/Schizophreniform disorders	0.34 (0.35)	0.65 (0.56)	0.46 (0.43)
Schizophrenia	0.31 (0.32)	0.54 (0.46)	0.40 (0.38)
Schizophreniform disorder	0.03 (0.03)	0.11 (0.10)	0.06 (0.05)
Affective disorders	5.52 (5.49)	5.11 (5.39)	5.37 (5.45)
Manic episode	0.40 (0.35)	0.44 (0.36)	0.42 (0.35)
Major depression	3.31 (3.29)	3.47 (3.61)	3.37 (3.41)
Dysthymia	2.42 (2.48)	1.89 (2.09)	2.22 (2.33)
Anxiety disorders	9.19 (9.17)	9.85 (9.94)	9.45 (9.47)
Phobia (sum)	5.89 (5.87)	5.97 (6.31)	5.90 (6.04)
Agoraphobia	2.08 (2.17)	3.62 (3.71)	2.67 (2.76)
Social phobia	0.53 (0.51)	0.65 (0.56)	0.58 (0.53)
Simple phobia	5.35 (5.30)	4.67 (5.34)	5.09 (5.32)
Panic disorder	1.11 (1.21)	2.60 (2.90)	1.68 (1.86)
Agoraphobia with panic attack	0.65 (0.67)	1.27 (1.37)	0.89 (0.94)
Generalized Anxiety Disorder	3.56 (3.66)	2.89 (3.13)	3.30 (3.45)
Obsessive-compulsive	2.29 (2.23)	1.90 (1.88)	2.14 (2.10)
Somatoform disorder	0.03 (0.03)	0.18 (0.20)	0.09 (0.10)
Anorexia	0.03 (0.03)	0.00 (0.00)	0.02 (0.02)
Antisocial personality disorder	2.08 (2.07)	0.91 (0.76)	1.63 (1.56)
Gambling	1.02 (1.12)	0.98 (1.12)	1.00 (1.12)
Cognitive impairment mild	4.60 (5.42)	8.77 (10.58)	6.21 (7.41)
Cognitive impairment, severe	0.16 (0.19)	1.85 (2.14)	0.81 (0.94)

(): unweighted data

lowed. Second, exclusion criteria were not used so that the influence of preemptive diagnosis could be removed. Third, in some diagnostic categories such as affective disorder, antisocial personality and others, either severity criteria were not adopted or diagnostic criteria were somewhat modified. Fourth, the prevalence of cognitive impairment turned out to be point prevalence due to the limitation in methodology. These kinds of data manipulation were adopted to make comparison with ECA data (Robins et al., 1984) possible. Also, it should be noted that the study sample does not include those in institution or hospitals.

As described in the Table 5, among subjects studied, about 40% have experienced one of the mental disorders in DSM-III. Substance abuse/de-

pendence was the most prevalent and affected one third of sample population both in Seoul and rural areas. Among them, alcohol abuse/dependence was about 13% and tobacco dependence was about 20%. The prevalence of drug abuse/dependence was 0.5–0.9% and excluding substance use disorders, 1 out of 7 have suffered from a kind of mental disorders. The prevalence of schizophrenic disorders was low and was 0.34% in Seoul and 0.65% in rural area. The prevalence of affective disorder was around 5% and manic episode was 0.4% and 0.44%, in Seoul and rural areas, respectively. Major depression was 3.31% and 3.47% and dysthymia, 2.42% and 1.89% in Seoul and rural areas, respectively.

The prevalence rate of anxiety somatoform disorder

ders was around 9–10% and among them phobic disorder was 5.89% and 5.97% in Seoul and rural areas respectively. Phobic disorders became less prevalent in the order of simple phobia, agoraphobia, and social phobia. The frequency of panic disorder was 1.11% in Seoul and 2.6% in rural area. Generalized anxiety disorder was 3.56% and 2.89% in Seoul and rural area, respectively. Obsessive compulsive disorder was 2.29% and 1.9% and somatization disorder was less than 0.2% with anorexia nervosa showing a very low prevalence. The prevalence rate of antisocial personality disorder was 2.08% and 0.91% in Seoul and rural areas respectively and that of pathological gambling was 1.02% and 0.98%, respectively. The prevalence rate of cognitive impairment of mild degree was 4.6% and 8.77% and that of severe degree was 0.16% and 1.85% in Seoul and rural area, respectively.

Overall, the lifetime prevalence of major psychoses such as schizophrenia, major depression and bipolar disorder was around 3.5% and the prevalence of neurotic disorders including dysthymia was around 10%.

DISCUSSION

The indices used in epidemiological studies of mental disorders are incidence rate, point prevalence rate, period prevalence rate and lifetime prevalence rate (Regier and Burke, 1985). In studies of mental disorders, which is likely to repeat remission and exacerbation, lifetime prevalence, which is meaningful in quantifying the possible problems in general population, is preferred (Robins *et al.*, 1984; Regier and Burke, 1985).

In such case like DIS where lifetime prevalence is

investigated through a single interview, it is quite important to assess the individual's memory function (Robins *et al.*, 1984). An illness of mild intensity, a disease with a short duration, and less socially stigmatized illnesses are likely to be forgotten by the interviewers. That is the reason why the subjects of this study were limited to those under 65 in age. In the follow-up study using DIS of the samples who were included in the WHO's International Pilot Study of Schizophrenia, the frequent failure in subject recall was found. There seems a problem of underestimation when DIS is adopted in studying psychotic patients (Kramer *et al.*, 1980). However, the recall problem does not appear to be a fundamentally serious issue, considering the relative sensitivity and the high specificity of the DIS (Andreasen *et al.*, 1981; Mazure and Gershon, 1979; Keller *et al.*, 1981).

In comparing the result of this study with the previous ones in Korea, we should carefully consider the differences in research methodology and study samples.

The overall prevalence

DIS-III as a tool of this study includes diagnoses of relatively common disorders and the subject of the adult age. Therefore, it seems that the real overall prevalence of mental illnesses is higher than the one observed.

The lifetime prevalence of mental disorders included in DSM-III is around 40% in our study and is in a high level. When we omit the substance use disorder, the prevalence falls down to around 13% and it can be said that 1 out of 7–8 persons suffered a mental disorder. This figure does not include those staying in hospitals and institutions and if they are included, the prevalence of mental disorders would

Table 6. Further specifications of drug abuse and dependence*

	Male, %		Female, %		Total, %	
	Seoul	Rural	Seoul	Rural	Seoul	Rural
Barbiturate & Other Tranquilizers	0.37	0.32	0.65	0.42	0.51	0.37
Opioids	0.11	0.11	0.20	0.10	0.16	0.11
Cocaine	0.05	0.11	0.10	0.00	0.08	0.06
Amphetamine & Other Stimulants	0.24	0.07	0.06	0.08	0.14	0.07
Cannabis	0.27	0.30	0.22	0.10	0.24	0.20
Drug (sum)	0.78	0.50	0.97	0.49	0.88	0.50

*Both Age and Sex were adjusted to general population

rise to a higher level.

Individually, alcohol-related mental disorders (alcohol abuse/dependence) is high in prevalence (13%) and in this study it was separately treated and described. The prevalence of alcoholic disorders is likely to be altered according to research methodology, diagnostic criterion and cultural background. The high prevalence of alcohol abuse/dependence is partially attributed to the fact that lifetime prevalence was used and the alcohol abuse was included. Besides, the cultural background such as the easy accessibility to alcohol and the public attitudes toward alcohol consumption (Tseng and McDermott, 1981, Cho et al., 1975, Kim and Lee, 1975) should be carefully examined.

Tobacco dependence is the highest in prevalence and so far it has been rarely examined. It was meaningful to describe its prevalence. Diagnostically, it meets the requirements with the inclusion of amount, duration and withdrawal symptom. It still remains to be discussed whether we define the tobacco dependence as an illness.

The prevalence of drug abuse and dependence is less than 1%. Table 6 shows the prevalences categorized by the drug classification included in DIS. Considering the fact that there is a strict regulation of habituation drugs, it is understandable that the prevalence of drug use disorder is low.

The lifetime prevalence of schizophrenia is 0.34–0.65% and it is somewhat higher than those described in the other papers published in Korea. It is expected that if we included the refusal cases, the

prevalence of schizophrenia would be around 0.5% in Seoul and around 0.8% in rural area. An Affective disorder is more than 5%. Table 7 describes the result in a more detailed way.

In interpreting the result of this study, it would be more reasonable to show the prevalence adopting "severity criteria" (2.40% in Seoul and 3.26% in rural area) in case of major depression. However, in this study, it was not treated that way so that cross comparison with ECA data (Robins et al., 1984) could be done. It appears to be higher than any other data in Korea and it may be the result of intensified research methodology.

Neurotic disorders are around 8% and other data on that for comparison are quite rare in Korea. The high prevalence of phobia, panic disorder and obsessive compulsive disorder reveals pervasiveness of these neurotic disorders and the severity of the problem. The prevalence of somatization disorder is somewhat low, reflecting on the clinical experiences and it may suggest the strictness of the diagnostic criteria for somatization disorder in DSM-III and further examination and research on the diagnostic criteria are required to find out clinically underdiagnosable symptomatology.

Little is known about the prevalence of antisocial personality disorder and it is speculated to be biased to adopt the diagnostic criteria used in Western countries. Also, the data suggests the need for further investigation, because it is contrary to the public belief that the antisocial personality is relatively rare in Korea.

The cognitive impairment should be interpreted as including both mental retardation and senile dementia.

Interregional comparisons of prevalence

One of the significant results shown in this study is that there is no marked difference in overall preva-

Table 7. Further specifications of affective disorders

	Seoul (%)	Rural (%)
Major Depression (sum)	3.31	3.47
Maj. Dep. with severity criteria	2.40	3.26
Maj. Dep., Single episode*	0.65	1.05
Maj. Dep., recurrent*	1.50	1.52
Bereavement†	0.16	0.44
Manic Episode (sum)	0.40	0.44
Bipolar disorder (I)	0.05	0.20
Bipolar disorder (II)	0.21	0.13
Dysthymia	2.42	1.89
Any Affective Disorders	5.52	5.11

* met severity criteria

† met criteria for major depressive episode, but explained it as bereavement

Table 8. Comparison of lifetime prevalence rate by urban/rural setting

	Higher in	P-value*
Alcohol abuse	Seoul	0.01
Alcohol dependence	Rural	0.001
Agoraphobia	Rural	0.01
Panic disorder	Rural	0.001
Antisocial personality disorder	Seoul	0.001
Cognitive impairment	Rural	0.001

* by χ^2 test

lences of mental disorders between Seoul and rural areas despite the regional and living environmental differences. In Table 8 the specific mental disorders with significantly different lifetime prevalence between Seoul and rural areas are described.

Among the mental disorders related to alcoholic beverages, the alcohol abuse is higher in Seoul while the alcohol dependence is higher in rural area. It is speculated that the difference may be due to the difference in living environment and alcohol consumption pattern. People in Seoul are likely to have an episodic excessive drinking pattern while those in rural area tend to drink in small amount almost daily.

In agoraphobia or panic disorders, it is not certain why they are more prevalent in rural area. The finding that the antisocial personality disorder is more

prevalent in Seoul is in line with results of other foreign authors and the common expectation. It may be attributed to the inhumane and competitive living environment in metropolitan area of Seoul.

The prevalence of cognitive impairment is markedly different between Seoul and rural area and can be attributed to the recent migration of active young working age group into Seoul, resulting in relative accumulation of old and less active population in rural area who tend to have some cognitive impairment.

Prevalence difference by sex

In Table 9 and 10, the lifetime prevalences of mental disorders in Seoul and rural areas are categorized by sex. Generally, prevalences of substance use disorders including alcoholic mental dis-

Table 9. Lifetime prevalence rate of DIS/DSM-III disorders in Seoul by sex

	Male (%) N = 1,490	Female (%) N = 1,644
Any DIS disorder covered ***	63.05 (65.70)	18.78 (19.59)
Any DIS disorder except tobacco dependence ***	47.51 (49.73)	17.60 (18.25)
Any DIS disorder except substance use disorders ***	10.53 (10.33)	15.68 (16.18)
Substance use disorders ***	60.04 (62.82)	5.15 (5.66)
Alcohol abuse ***	25.63 (26.64)	1.59 (1.76)
Alcohol dependence ***	17.23 (18.46)	1.04 (1.03)
Tobacco dependence ***	39.09 (40.60)	2.63 (2.86)
Drug abuse/dependence	0.78 (0.81)	0.97 (1.03)
Schizophrenic/Schizophreniform disorders	0.47 (0.47)	0.24 (0.24)
Schizophrenia	0.41 (0.40)	0.24 (0.24)
Schizophreniform disorder	0.07 (0.07)	0.00 (0.00)
Affective disorders ***	4.31 (4.09)	6.62 (6.75)
Manic episode	0.56 (0.47)	0.26 (0.24)
Major depression **	2.43 (2.35)	4.07 (4.14)
Dysthymia *	1.80 (1.74)	2.99 (3.16)
Anxiety disorders ***	5.26 (5.18)	12.78 (12.96)
Phobia (sum) ***	2.87 (2.68)	8.64 (8.76)
Agoraphobia ***	0.70 (0.74)	3.34 (3.47)
Social phobia ***	0.00 (0.00)	1.03 (0.97)
Simple phobia ***	2.58 (2.35)	7.90 (7.97)
Panic disorder ***	0.31 (0.34)	1.80 (2.01)
Agoraphobia with panic attack ***	0.07 (0.07)	1.17 (1.22)
Generalized anxiety disorder	2.40 (2.46)	4.32 (4.53)
Obsessive-compulsive	2.21 (2.01)	2.38 (2.43)
Somatoform disorder	0.00 (0.00)	0.05 (0.06)
Anorexia	0.00 (0.00)	0.06 (0.06)
Antisocial personality disorder ***	3.54 (3.49)	0.78 (0.79)
Gambling ***	1.87 (2.08)	0.22 (0.24)
Cognitive impairment, mild ***	2.89 (3.49)	6.31 (7.18)
Cognitive impairment, severe	0.05 (0.07)	0.26 (0.30)

* P < 0.05 ** P < 0.01 *** P < 0.001 (X² test) (): unweighted data

orders (alcohol abuse and alcohol dependence) and tobacco dependence are predominant in males while the prevalence of affective disorders including major depression and dysthymia is somewhat higher in females.

Anxiety/somatization disorders composed of various neurotic disorders are generally higher in females while antisocial personality disorder, pathologic gambling and others are higher in males. The cognitive impairment is higher in females. It is not certain whether this is due to the lower level of education in females or due to the higher vulnerability of female to mental disorders causing cognitive impairment.

Overall prevalences are predominant in males but if substance use disorder is excluded mental disorders in strict sense have higher incidence among

females and it may be due to an increased vulnerability of females to mental illnesses. The predominances of females are marked in affective disorders such as major depression and neurotic disorders. It may be attributed to psychosocial factors in females such as social status and expected roles, some endogenous process or some other factors unknown.

Interestingly, while the tobacco dependence is predominant among males, about 2.7% of female adults are found to be habitual smokers in Korea.

Table 11 shows whether there exist significant differences between regions. When compared with the finding in Table 8, it is found that regional differences in prevalence are in fact attributable to sex differences.

Prevalence differences by age

Table 10. Lifetime prevalence rate of DIS/DSM-III disorders in rural Korea by sex

	Male (%) N = 974	Female (%) N = 992
Any DIS disorder covered ***	61.61 (66.74)	19.35 (21.27)
Any DIS disorder except tobacco dependence ***	46.94 (50.72)	18.83 (19.76)
Any DIS disorder except substance use disorders ***	8.97 (9.66)	17.83 (18.75)
Substance use disorders ***	59.44 (64.58)	4.27 (4.94)
Alcohol abuse ***	20.54 (20.53)	0.90 (0.91)
Alcohol dependence ***	22.39 (26.18)	0.67 (0.81)
Tobacco dependence ***	39.07 (42.51)	2.76 (3.33)
Drug abuse/dependence	0.50 (0.51)	0.49 (0.60)
Schizophrenic/Schizophreniform disorders	0.93 (0.83)	0.38 (0.30)
Schizophrenia	0.70 (0.62)	0.38 (0.30)
Schizophreniform disorder	0.22 (0.21)	0.00 (0.00)
Affective disorders ***	4.18 (4.41)	6.05 (6.35)
Manic episode	0.78 (0.62)	0.10 (0.10)
Major depression **	2.90 (2.98)	4.06 (4.23)
Dysthymia *	1.29 (1.44)	2.51 (2.72)
Anxiety disorders ***	5.22 (5.46)	14.85 (15.11)
Phobia (sum) ***	2.25 (2.46)	9.72 (10.08)
Agoraphobia ***	1.21 (1.23)	6.09 (6.15)
Social phobia *	0.22 (0.21)	1.09 (0.91)
Simple phobia ***	1.84 (2.05)	8.12 (8.57)
Panic disorder ***	0.83 (0.92)	4.38 (4.84)
Agoraphobia with panic attack ***	0.22 (0.21)	2.35 (2.52)
Generalized Anxiety disorder	2.10 (2.13)	4.01 (4.08)
Obsessive-compulsive	1.78 (1.85)	2.00 (1.92)
Somatoform disorder	0.22 (0.21)	0.16 (0.20)
Anorexia	0.00 (0.00)	0.00 (0.00)
Antisocial personality disorder **	1.55 (1.33)	0.28 (0.20)
Gambling ***	1.92 (2.26)	0.00 (0.00)
Cognitive impairment, mild ***	6.35 (7.91)	11.29 (13.21)
Cognitive impairment, severe ***	1.11 (1.23)	2.64 (3.02)

* P < 0.05 ** P < 0.01 *** P < 0.001 (x² test) () : unweighted data

Generally, lifetime prevalence increases with aging under the consistent presence of morbidity risk except when specific variables are intervening (Kramer *et al.*, 1980)

Table 12 and 13 present the age distribution of lifetime prevalences of mental disorders in Seoul and rural areas. The prevalence is the highest between 45 and 65 in age, in other words, the rising pattern shown is typical of lifetime prevalence in nature. These patterns are observed in alcohol abuse, alcohol and tobacco dependence, dysthymic disorders, pathological gambling and others. The prevalence of cognitive disorder is rapidly rising in the old age group and with aging they are found to become exposed to morbidity risk situation. On the other hand, panic disorder is thought to carry the morbidity risk in the middle-age group.

In drug abuse, the prevalence rises after middle

age and it is seen that the prevalence in the young age group is no more negligible. The antisocial personality disorder in the young adulthood is also conspicuous. These findings are supposed to reflect the changes in social environment and its value system.

In phobic disorders, agoraphobia becomes prevalent with aging while the opposite phenomenon occurs in social phobia.

The prevalence is not high enough in major psychoses such as schizophrenia and mania to arrive at a certain conclusion. In fact, many of the senile psychotic patients are staying in nurseries or various kinds of institutions. Also, the prevalence variability with aging is low in obsessive compulsive disorders and it is reflecting the consistency of symptoms throughout the age groups after onset in late adolescence. Other mental disorders remain to

Table 11. Comparison of Lifetime prevalence between Seoul and rural by sex-predominance

	Male	Female
Any DIS disorder covered	n.s.	n.s.
Any DIS disorder except tobacco dependence	n.s.	n.s.
Any DIS disorder except substance use disorders	n.s.	n.s.
Substance use disorders	n.s.	n.s.
Alcohol abuse	(S)*	n.s.
Alcohol dependence	(R)*	n.s.
Tobacco dependence	n.s.	n.s.
Drug abuse/dependence	n.s.	n.s.
Schizophrenic/Schizophreniform disorders	n.s.	n.s.
Schizophrenia	n.s.	n.s.
Schizophreniform disorder	n.s.	n.s.
Affective disorders	n.s.	n.s.
Manic episode	n.s.	n.s.
Major depression	n.s.	n.s.
Dysthymia	n.s.	n.s.
Anxiety disorders	n.s.	n.s.
Phobia (sum)	n.s.	n.s.
Agoraphobia	n.s.	(R)*
Social phobia	n.s.	n.s.
Simple phobia	n.s.	n.s.
Panic disorder	n.s.	(R)*
Agoraphobia with panic attack	n.s.	(R)*
Obsessive-compulsive	n.s.	n.s.
Somatoform disorder	n.s.	n.s.
Anorexia	n.s.	n.s.
Antisocial personality disorder	(S)*	n.s.
Gambling	n.s.	n.s.
Cognitive impairment, mild	(R)*	(R)*
Cognitive impairment, severe	(R)*	(R)*

(S): Seoul (R): Rural * P < 0.05, n.s.: non-significant (χ^2 test)

be the subject of further research because of the inconsistency in age or geographic distribution.

Cross comparisons with U.S. data

The difficulties encountered in comparing the data with those in Korean literature has been mentioned and there still remains much to be solve in comparison with other data. One of the problem solving measures is to compare results of the studies performed in a similar way employing the equivalent methodology. Therefore, ECA project performed by NIMH was adopted by the authors for the international comparison.

However, in comparing data and coming to a certain conclusion, attention should be paid to the fact that population studied in U.S. is of heterogeneous

ancestries and the total population composition is skewed in age to middle- and old-aged (above 18 with no upward limitation) and in sex to female predominance (Robins et al., 1981). In our study, sample population is relatively homogenous and subject age is limited to those between 18–65. In this study, sampling procedure was somewhat different from area sampling which was adopted in ECA project.

These factors are expected to cause higher prevalences in U.S. data and especially those specific mental disorders with female predominance could be oversampled. Therefore, it is not satisfactorily meaningful simply to compare the prevalence values and it is rather significant to observe the overall pattern of prevalences.

Table 14 and 15 describe the results in Seoul and

Table 12. Lifetime prevalence rate of DIS/DSM-III disorders in Seoul by age group

	18–24, yr N=638 (%)	25–44, yr N=1,704 (%)	45–65, yr N=792 (%)
Any DIs disorder covered ***	28.21	42.25	50.63
Any DIS disorder except tobacco dependence ***	22.10	34.09	40.27
Any DIs disorder except substance use disorders	13.32	13.20	13.88
Substance use disorders ***	20.22	33.16	42.30
Alcohol abuse ***	7.37	15.20	15.15
Alcohol dependence ***	5.96	8.45	13.89
Tobacco dependence ***	14.58	20.42	26.64
Drug abuse/dependence	0.78	0.70	1.52
Schizophrenic/Schizophreniform disorders	0.31	0.35	0.38
Schizophrenia	0.31	0.29	0.38
Schizophreniform disorder	0.00	0.06	0.00
Affective disorders	6.27	4.87	6.19
Manic episode	0.78	0.29	0.13
Major depression	3.76	2.99	3.54
Dysthymia	2.04	2.35	3.16
Anxiety disorders	9.97	9.01	8.92
Phobia (sum)	6.27	5.63	6.06
Agoraphobia	1.57	2.11	2.78
Social phobia	0.78	0.41	0.51
Simple phobia	6.11	4.87	5.55
Panic disorder	0.16	1.53	1.39
Agoraphobia with panic attack	0.47	0.70	0.76
Generalized anxiety disorder	2.85	3.69	4.29
Obsessive-compulsive	2.82	2.11	2.02
Somatoform disorder	0.00	0.00	0.13
Anorexia	0.00	0.06	0.00
Antisocial personality disorder	2.04	2.23	1.77
Gambling	0.47	1.06	1.77
Cognitive impairment, mild ***	1.41	3.11	13.64
Cognitive impairment severe	0.00	0.12	0.51

* $P < 0.05$ ** $P < 0.01$ *** $P < 0.001$ (χ^2 test)

Table 13. Lifetime prevalence rate of DIS/DSM-III disorders in rural Korea by age group

	18-24, yr N=260 (%)	25-44, yr N=806 (%)	45-65, yr N=900 (%)
Any DIS disorder covered ***	26.92	41.69	50.56
Any DIS disorder except tobacco dependence ***	21.54	34.37	39.67
Any DIS disorder except substance use disorders *	8.85	14.27	15.79
Substance use disorders ***	19.62	32.01	41.00
Alcohol abuse *	8.85	12.78	9.22
Alcohol dependence ***	5.00	10.30	18.56
Tobacco dependence ***	12.31	20.84	27.44
Drug abuse/dependence	0.38	0.25	0.89
Schizophrenic/Schizopreniform disorders	0.77	0.99	0.11
Schizophrenia	0.77	0.74	0.11
Schizopreniform disorder	0.00	0.25	0.00
Affective disorders	3.85	4.96	6.22
Manic episode	0.77	0.50	0.11
Major depression	2.69	3.60	3.89
Dysthymia	1.15	1.61	2.78
Anxiety disorders *	5.14	11.02	11.90
Phobia (sum)	3.85	6.45	6.89
Agoraphobia	3.08	3.72	3.89
Social phobia	1.15	0.62	0.33
Simple phobia	2.69	5.46	6.00
Panic disorder	0.77	2.98	3.44
Agoraphobia with panic attack	0.77	1.24	1.67
Generalized anxiety disorder	1.56	2.94	3.80
Obsessive-compulsive	1.54	2.36	1.56
Somatoform disorder	0.00	0.25	0.22
Anorexia	0.00	0.00	0.00
Antisocial personality disorder	1.54	0.99	0.33
Gambling	0.38	0.87	1.56
Cognitive impairment, mild ***	1.15	7.32	16.22
Cognitive impairment, severe *	0.77	1.49	3.11

* $P < 0.05$ ** $P < 0.01$ *** $P < 0.001$ (χ^2 test)

New Haven, and Korean rural area and St. Louis. ECA project is being done in 5 sites and recently a part of data in 4 sites except in Los Angeles has been published (Robins *et al.*, 1984, Myer *et al.* 1984, Shapiro *et al.*, 1984, Boyd *et al.*, 1984, Blazer *et al.*, 1985). Among these, it was decided that New Haven is regarded as most inner city sample and St. Louis is expected to represent the rural sample for the international comparison.

The significance level designated by asterisk(*) in the tables is from chi-square test. Chi-square test tends to be more sensitive in large sample and it contributed to those with high prevalence having significant differences. In order to overcome this, the direct comparison of prevalences is limited to several mental disorders. Also, relatively decreased figures of "any DIS disorders covered" in Table 14 and 15 in

comparison with those in Table 5 are attributed to the fact that Korean data has been adjusted to U.S. data because the latter is less inclusive in diagnoses.

In Table 16 mental disorders showing large differences of prevalences in absolute values between Korea and U.S. are tabulated. Alcohol abuse/dependence is similar to the other countries.

In drug abuse/dependence, the prevalence is markedly different and the strict regulation of drug causing habituation may be one of the causes. In U.S. it is higher in young age group while in Korea it is prevalent in the old, possibly resulting in the variability of drugs abused.

Among the neurotic disorders, phobia is consistently high in ECA project and especially in Baltimore region and it was above 10% (Robins *et al.* 1984). On the other hand, panic disorder is relative

Table 14. Comparison of lifetime prevalence between Seoul and New Haven

	Seoul (%) (N = 3,134)	New Haven (%) (N = 3,058)
Any DIS disorder covered ***	31.7	28.8
Any DIS disorder except phobia ***	28.3	24.9
Any DIS disorder except substance use disorder	13.3	19.3
Substance use disorders ***	22.2	15.0
Alcohol abuse/dependence ***	13.8	11.5
Drug abuse/dependence ***	0.9	5.8
Schizophrenic/Schizopreniform disorders ***	0.4	2.0
Schizophrenia ***	0.3	1.9
Schizopreniform disorder	0.0	0.1
Affective disorders ***	5.5	9.5
Manic episode ***	0.4	1.1
Major depression ***	3.3	6.7
Dysthymia	2.4	3.2
Anxiety disorders **	9.2	10.4
Phobia **	5.9	7.8
Panic	1.1	1.4
Generalized anxiety disorder	3.7	—
Obsessive-compulsive	2.3	2.6
Somatoform disorder	0.0	0.1
Anorexia	0.0	0.0
Antisocial personality disorder	2.1	2.1
Cognitive impairment (severe) ***	0.2	1.3

* P < 0.05 ** P < 0.01 *** P < 0.001 (x² test)

Table 15. Comparison of lifetime prevalence between Korean rural area and St. Louis

	Rural Korea (%) (N = 1,966)	St. Louis (%) (N = 3,004)
Any DIS disorder covered ***	32.9	31.0
Any DIS disorder except phobia ***	30.1	26.2
Any DIS disorder except substance use disorders ***	13.4	18.6
Substance use disorders ***	22.7	18.1
Alcohol abuse/dependence ***	11.6	15.7
Drug abuse/dependence ***	0.5	5.5
Schizophrenic/Schizopreniform disorders ***	0.7	1.1
Schizophrenia	0.5	1.0
Schizopreniform disorder	0.1	0.1
Affective disorders ***	5.1	8.0
Manic episode **	0.4	1.1
Major depression ***	3.5	5.5
Dysthymia ***	1.9	3.8
Anxiety disorders **	10.0	11.1
Phobia ***	6.0	9.4
Panic	2.6	1.5
Generalized anxiety disorder	3.1	—
Obsessive-compulsive	1.9	1.9
Somatoform disorder	0.2	0.1
Anorexia	0.0	0.1
Antisocial personality disorder ***	0.9	3.3
Cognitive impairment (severe) ***	1.9	1.0

* P < 0.05 ** P < 0.01 *** P < 0.001 (x² test)

Table 16. Major mental disorders with variance in lifetime prevalence between Korea and U.S.A.

	Seoul / New Haven, %	Rural Korea / St. Louis, %
Alcohol abuse/dependence	13.8/11.5	11.6/15.7
Drug abuse/dependence	0.9/ 5.8	0.5/ 5.5
Phobia	(-)	6.0- 9.4
Panic disorder	(-)	2.6/ 1.5
Antisocial personality	(-)	0.9/ 3.3
Cognitive impairment (severe)	0.2/ 1.3	1.9/ 1.0

high in Korea. The antisocial personality disorder is generally known to be low in the Orient but in Seoul it is not much different from that in New Haven and some kind of modernization processes may be involved. The cognitive impairment is lower in Seoul than in New Haven and is higher in Korean rural area than in St. Louis. Rapid expansion of Seoul area involving the migration of highly educated persons might be a contributing factor.

The prevalence of schizophrenia in New Haven reaches 2.0% and there seems a large difference between Seoul and New Haven. But, considering the institutionalized patients were not included in Seoul there appears no significant difference between the two regions.

Other mental disorders in these data are lower in prevalence than in U.S. data but the patterns of prevalence are quite similar. Considering the difference in population studied and its composition it may be argued that there exist no no marked differences in prevalences.

CONCLUSIONS

Lifetime prevalences of specific mental disorders have been studied using Korean version of DIS-III for adult household samples in Seoul and rural areas. In construction of Korean version, efforts were made to improve its avidity and reliability.

5100 subjects were selected with two stage cluster sampling and about 40% of subjects were found to have experienced one of the 20 diagnoses in DSM-III. Two most prevalent diagnoses in both areas were tobacco dependence and alcohol abuse/dependence. The overall prevalence excluding substance use disorder was about 13%. In both areas, there existed similar sex and age differences in prevalences. The most predominating ones for men were alcohol abuse/dependence, tobacco dependence and antisocial personality disorder

while most of the neurotic disorders, affective disorders and cognitive impairment were predominant among women. When correlated with the age, most of the disorders were shown to be increasing in prevalence with aging. Compared between areas, the discrepancy was thought to reflect the difference caused by sexual difference rather than to represent the geographic factors.

In international comparison with ECA data, it was found that the data is comparable to those in ECA project although there exist some differences between the two and the comparison is somewhat difficult.

Future probing into the data produced in this study would enable us to recognize some determinants in mental illnesses and this would contribute to the improvement of mental health delivery system.

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