

Prevalence Studies of Substance-Related Disorders: A Systematic Review of the Literature

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This is the third in a series of papers that present systematic reviews of the prevalence and incidence of psychiatric disorders drawn from studies published between the years January 1, 1980, and December 31, 2000. The series discusses the implications of these epidemiologic findings for mental health policy and practice.

Objective: To present the results of a systematic review of literature published between January 1, 1980, and December 31, 2000, that reports epidemiologic estimates of substance-related disorders.

Method: We conducted a literature search of substance-related epidemiologic studies, using medline and HealthSTAR databases and applying a set of predetermined inclusion and exclusion criteria to identify relevant studies. We extracted and analyzed prevalence and incidence data for heterogeneity.

Results: A total of 19 prevalence studies of substance-related disorders met inclusion criteria for this review. Heterogeneity analyses revealed significant variability across 1-year and lifetime prevalence of both alcohol and other substance use disorders. The corresponding 1-year and lifetime pooled rates were 6.6 per 100 and 13.2 per 100, respectively, for alcohol use disorders and 2.4 per 100 and 2.4 per 100, respectively, for other substance use disorders. We observed variability among countries and also among regions within the same country. In contrast to other drug problems, alcohol use disorders were substantially more common, were more likely to occur among male subjects, and were more likely to be associated with abuse symptoms. For other drugs, dependence was consistently more prevalent than abuse.

Conclusions: Studies using rigorous and comparable methodologies report significant variability in rates of alcohol and other substance use disorders. These data suggest that different policies and regional practices are associated with variability in rates of disorders. Policy-makers and health planners require regular, regionally sensitive estimates of prevalence rates to respond effectively to unique patterns of need in their constituencies.

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Clinical Implications:

- Prevalence rates for substance use disorders appear to vary markedly among samples drawn from different countries or regions.
- Population-level factors are implicated as playing an important role in the prevalence and pattern of different substance use disorders within large samples.
- Informed health planning requires the undertaking of planned comparative studies among regions, as well as updated 1-year prevalence estimates and estimates of the incidence of substance use disorders.

Limitations:

- Subtle differences among studies may have contributed an unknown degree of variance to the observed rates.
- Cultural factors may influence the validity of self-reported substance use information in a manner that biases these data.
- We did not evaluate several factors that could influence prevalence rates, including the legal status of substances, cost and availability of drugs, mortality associated with substance use, systematic underreporting, prevention programs, social norms, economic conditions, and psychiatric comorbidity.

Key Words: *substance-related disorders, alcohol abuse, alcohol dependence, drug abuse, drug dependence, epidemiology, prevalence*

The worldwide use of alcohol and other drugs is associated with a substantial burden of illness (1). Historically, trends in substance use and associated harms vary considerably among regions and across time. Various environmental factors have been identified as mediators of these differences, including economic conditions, cultural traditions, historical practices, social policies, and access to drugs. Individual differences are also operative in conferring risk of harm or in providing protection against the development of substance-related problems. The findings of contemporary epidemiologic investigations may help to determine the relevance of different factors within a biopsychosocial framework and may help to identify opportunities to diminish the burden of illness associated with substance use. In turn, this information could assist in guiding health policy decisions and could add constructively to the knowledge base of clinicians and researchers. Differences in prevalence rates across geographic regions or populations may help to identify variables that contribute to or protect against the development of substance use disorders. Period prevalence rates (for example, 1-year prevalence) may assist planners in allocating and distributing resources according to the needs of a cohort and in deploying resources in a targeted, rather than inclusive, manner. Incidence rates can be interpreted in association with local risk and protective factors and can provide a means of assessing the strength of relations between substance use problems and their putative causes. In theory, one can envision maps detailing the relative role of environmental factors in the formation of substance use problems. These maps may be studied in concert with individual gene maps to clarify patterns of interaction that result in substance abuse or substance dependence among particular individuals (2).

This review integrates the findings of high-quality epidemiologic studies that used comparable methodologies to estimate the prevalence and incidence of substance use disorders in different jurisdictions. We interpreted results as they concern the above-noted areas of ongoing investigation, with the objective of achieving evidence-based health planning.

Methods

In the first article of this series, we present a detailed description of the methods used in this review (3). In brief, we searched the Medline and HealthSTAR databases for relevant epidemiologic studies, using the key indexing terms epidemiology, prevalence, and incidence, which we exploded and combined with the terms mental disorders, substance-related disorders, alcohol abuse or dependence, and drug abuse or dependence. We limited the search to English-language

studies published between January 1, 1980, and December 31, 2000. We also searched reference lists of all relevant primary and review articles identified.

We selected only community surveys using probability sampling techniques and having sample sizes of 450 or more. Studies were eligible for inclusion if they examined age ranges covering the adult population. We included only those using recognized diagnostic criteria and case identification based either on standardized instruments or on clinician diagnosis. We extracted prevalence data including overall sex-specific and age-specific rates from eligible studies.

To summarize the estimated rates and to elucidate any observed differences among rates, we conducted qualitative analyses of variables related to study population, sample characteristics, and diagnostic assessment. As well, we pooled each set of rates according to a Bayesian approach to metaanalysis, using the Fastpro software program (version 1.7) by Eddy and Hasselblad. Readers interested in a more detailed discussion of this approach should refer to Eddy and others (4). We calculated the pooled or best-estimate of effect values using Jeffrey's prior (4) and a hierarchical model. We then analyzed each of the pooled rates for heterogeneity, using chi-square tests according to Fleiss' method (5). For pooled rates demonstrating heterogeneity, we employed a systematic method to explore variables of interest (for example, geographic location) that might have contributed to the variation in rates. We then pooled rates from individual studies according to the variables found to be contributing to heterogeneity.

Results

Description of Studies

The initial electronic search identified 30 prevalence studies and 4 incidence studies potentially meeting inclusion criteria, in addition to 8 review papers. In reviewing reference lists, we identified an additional 9 potential prevalence studies (but no incidence studies), for which we obtained full-text articles.

Of the 39 prevalence studies for which we reviewed full-text articles, a total of 15 studies were excluded: 7 studies did not meet eligibility criteria and 8 presented duplicate data. Thus, 24 prevalence studies of substance-related disorders met inclusion criteria (6–29), resulting in a total of 19 unique primary investigations of substance use disorders. We present the 7 studies not fulfilling inclusion criteria and their reasons for exclusion in Table 1 (30–36). Of the 4 potential incidence studies, 2 did not meet full eligibility criteria (37–39). We document their reasons for exclusion in Table 1. We excluded incidence data from the review because we could only identify 2 appropriate incidence studies (38,40).

Table 1 Substance-related disorder studies excluded at article review stage

Study reference	Reason for exclusion	Comments
Prevalence studies		
Weisner and others (33)	Unclear whether case definition meets criteria for substance-related disorder	Assesses problem drinkers and drug users
Bucholz and others (34)	Prevalence data not reported	Data taken from ECA study
Fournier and Kovess (36)	Unclear whether diagnostic criteria used	Comparison of mail and telephone interview
Hughes (35)	Case definition does not meet criteria for substance-related disorder	Assesses illicit drug use only
Stefansson and others (32)	Does not include entire adult age group	Presents rates applicable to subjects aged 55 to 57 years
Surtees and Sashidharan (31)	Limited to population of women	Comparison of 2 community samples
Dilling and Weyerer (30)	Uses ICD-8 diagnostic criteria	Community sample
Incidence studies		
Sejda and others (39)	Assesses treated population	Those who sought treatment for first time at health care or other facility dealing with drug addiction
Gfroerer and Brodsky (37)	Case definition does not meet criteria	Assesses illicit drug use only
ECA = Epidemiologic Catchment Area		

Prevalence Rates

We present findings for the 17 studies reporting 1-year and (or) lifetime prevalence rates only (Tables 2 to 4) because relatively fewer studies reported data for 6-month prevalence (7,9,15,22,24,28) and point prevalence (24,27,28). Also, we present findings separately for alcohol abuse or dependence, alcohol abuse, alcohol dependence, drug abuse or dependence, drug abuse, and drug dependence because these were the diagnostic categories for which prevalence rates were most commonly reported. We carried out data analyses only when 3 or more rates were reported.

All studies shown in Tables 2 to 4 are community surveys with samples ranging in size from approximately 500 (15) to 43 000 (17). While most studies involved household surveys only, a few also examined institutionalized populations (7,22,41). Because separate rates were reported for household and institutional samples in the Farrell and others study (41), we present only the household rate, for the sake of comparability. For each of these studies, the percentage CI width or error rate for estimated prevalence at a 95%CI may be calculated using the formula provided by Kelsey and colleagues (42, p 282). Studies predominantly used the diagnostic interview schedule (DIS) or the composite international diagnostic interview (CIDI), administered by trained lay interviewers using algorithms to derive diagnoses (Tables 2, 3).

Qualitative Analysis

One-Year Prevalence. For alcohol abuse or dependence, the 1-year prevalence rates ranged from 4.4 per 100 in the study conducted in Ontario (13) to 9.3 per 100 in Christchurch, New Zealand (28), for a variation of 2.1-fold (Table 2). One-year prevalence of alcohol abuse ranged from 1.3 per 100 in Taipei, Taiwan (10) to 4.7 per 100 in small towns in Taiwan (10), a difference of 3.6-fold. All studies used the CIDI as the assessment instrument, except for the Taiwan study, which used the DIS. Also, except for the Taiwan study that examined different types of communities separately (for example, city, town, or rural area), most of the remaining studies were based on national samples; therefore, their prevalence figures likely reflect a combination of different urban rural communities. One-year prevalence of alcohol dependence ranged from 0.6 per 100 in rural villages in Taiwan (10) to 7.2 per 100 in the US National Comorbidity Study (NCS) (11), a difference of 12-fold. If the Taiwan study is excluded as having outlying values, the 1-year prevalence rates vary from 2.9 to 7.2 per 100, a difference of 2.5-fold. Taiwan is the only study that used the DIS and DSM-III criteria.

The 1-year prevalence of drug abuse or dependence ranged from 2.2 per 100 in Australia (20) to 2.6 per 100 in Edmonton (25), a slight variation of only 1.2-fold (Table 2). Prevalence rates for the subcategory of drug abuse ranged from 0 per 100

Table 2 One-year prevalence rates of substance-related disorders								
Study details	Study site	n	Response rate (%)	Case-finding method	Prevalence rate (per 100 persons)			
					Alcohol abuse and (or) dependence	Drug abuse and (or) dependence	Any substance abuse and (or) dependence	
Hall and others (20)	Australia - national	10 641	78.0	Census; CIDI/ICD-10; lay interviewers; method of diagnosis unclear	6.5 ^a	2.2 ^a	—	
					3.0 ^b	0.2 ^b	—	
					3.5 ^c	2.0 ^c	—	
Bijl and others (6)	Netherlands - national	7 146	69.7	Census; CIDI/DSM-III-R; lay interviewers, algorithm diagnosis	— ^a	— ^a	—	
					4.6 ^b	0.5 ^b	—	
					3.7 ^c	0.8 ^c	—	
Farrell and others (41)	Great Britain - national	10 108	79.4	DIS, US National Alcohol Survey; lay interviewers	— ^a	— ^a	—	
					— ^b	— ^b	—	
					5.0 ^c	2.0 ^c	—	
Grant (17)	US - national	42 862	90.0	Census; AUDADIS/DSM-IV; type of interviewers not clear	— ^a	— ^a	—	
					— ^b	— ^b	—	
					— ^c	0.48 ^c	—	
Offord and others (13)	Ontario	8 116	67.4	Census; UM-CIDI/DSM-III-R; lay interviewers; algorithm diagnosis	4.4 ^a	— ^a	5.2	
					— ^b	— ^b	—	
					— ^c	— ^c	—	
Ross (19)	Ontario	8 116	67.4	Census; UM-CIDI/DSM-III-R; lay interviewers; algorithm diagnosis	— ^d	— ^a	—	
					1.5 ^b	— ^b	—	
					2.9 ^c	— ^c	—	
Kessler and others (11)	US (NCS) - national	8 098	82.6	Census; UM-CIDI/DSM-III-R; clinical reinterview and diagnosis	— ^a	— ^a	11.3	
					2.5 ^b	0.8 ^b	—	
					7.2 ^c	2.8 ^c	—	
Bourdon and others (22)	US (ECA) - 5 sites, mainly urban	20 291	68.0–80.0	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	— ^a	— ^a	7.5	
					— ^b	— ^b	—	
					— ^c	— ^c	—	
Hwu and others (10)	Taiwan	11 004	95.0	Census; DIS-CM/DSM-III; lay interviewers; method of diagnosis unclear	—	—	—	
	Metropolitan Taipei	5 005			— ^a	— ^a	—	
					1.3 ^b	0.02 ^b	—	
					0.66 ^c	0.04 ^c	—	
	Small towns	3 004				— ^a	— ^a	—
						4.7 ^b	0.0 ^b	—
Rural villages	2 995				1.1 ^c	0.13 ^c	—	
Oakley-Browne and others (28)	New Zealand - area of Christchurch, mostly urban	1 498	70.0	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	9.3 ^a	2.3 ^a	10.5	
					— ^b	— ^b	—	
					— ^c	— ^c	—	
Bland and others (24)	Edmonton metropolitan	3 258	71.6	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	7.9 ^a	2.6 ^a	9.1	
					— ^b	— ^b	—	
					— ^c	— ^c	—	
Best-estimate (95%CI)					6.6 (5.1–8.3) ^a	2.4 (2.2–2.6) ^a	8.4 (6.4–10.9)	
					2.8 (2.0–3.8) ^b	0.18(0.05–0.42) ^b		
					2.4 (1.3–3.8) ^c	0.58 (0.23–1.2) ^c		

^aTotal; ^bAbuse; ^cDependence; ^dExisting follow-up publication based on same data; — = not reported

AUDADIS = Alcohol Use Disorders and Associated Disabilities Interview; CIDI = Composite International Diagnostic Interview; DIS = diagnostic interview schedule; NCS = National Comorbidity Survey; UM-CIDI = University of Michigan Composite International Diagnostic Interview

Table 3 Lifetime prevalence rates of substance-related disorders (continued on next page)

Study details	Study site	n	Response rate (%)	Case-finding method	Prevalence rate (per 100 persons)		
					Alcohol abuse and (or) dependence	Drug abuse and (or) dependence	Any substance abuse and (or) dependence
Bijl and others (6)	Netherlands - national	7 146	69.7	Census; CIDI/DSM-III-R; lay interviewers, algorithm diagnosis	— ^a	—	—
					11.7 ^b	1.5	—
					5.5 ^c	1.8	—
Fournier and others (26)	Montreal-city	893	63.6	Telephone survey; CIDIS/DSM-III-R; lay interviewers; algorithm diagnosis	11.5	5.4	14.1
Grant (17)	US - national	42 862	90.0	Census; AUDADIS/DSM-IV; type of interviewer not clear	— ^a	— ^a	—
					— ^b	— ^b	—
					— ^c	2.91 ^c	—
Ross (19)	Ontario	8 116	67.4	Census; UM-CIDI/DSM-III-R; lay interviewers; algorithm diagnosis	12.0 ^a	— ^a	—
					6.1 ^b	— ^b	—
					5.9 ^c	— ^c	—
Kessler and others (11)	US (NCS) - national	8 098	82.6	Census; UM-CIDI/DSM-III-R; clinical reinterview and diagnosis	—	—	26.6
					9.4	4.4	—
					14.1	7.5	—
Canino and others (21)	Puerto Rico - entire island-nation	912	92.9	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	— ^a	1.2 ^a	—
					— ^b	— ^b	—
					— ^c	— ^c	—
Chen and others (8)	Hong Kong - national	7 229	77.8	Census; DIS-III-CM/DSM-III; lay interviewers; algorithm diagnosis	4.5 ^d	0.24 ^d	—
					3.0 ^d	—	—
					1.6 ^{d,e}	—	—
Wittchen and others (15)	Germany - former West Germany	483	73.5	Census; DIS/DSM-III and ICD-9; clinical interview and diagnosis	13.0 ^a	1.2 ^a	13.5
					— ^b	— ^b	—
					— ^c	— ^c	—
Bourdon and others (22)	US (ECA) - 5 sites, mainly urban	20 291	68.0– 80.0	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	13.5 ^a	6.1 ^a	16.7
			— ^b		— ^b	—	
			— ^c		— ^c	—	
Wells and others (14)	New Zealand - area of Christchurch, mostly urban	1 498	70.0	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	18.9 ^a	5.7 ^a	21.0
					— ^b	— ^b	—
					— ^c	— ^c	—
Hwu and others (10)	Taiwan	11 004	75.0	Census; DIS-CM/DSM-III; lay interviewers; method of diagnosis unclear	—	—	—
	Metropolitan Taipei	5 005		— ^a	— ^a	—	
				3.4 ^b	0.02 ^b	—	
				1.5 ^c	0.08 ^c	—	
	Small towns	3 004			— ^a	— ^a	—
					8.0 ^b	0.0 ^b	—
1.8 ^c					0.2 ^c	—	
Rural villages	2 995			— ^a	— ^a	—	
				6.3 ^b	0.0 ^b	—	
				1.2 ^c	0.0 ^c	—	

^aTotal; ^bAbuse; ^cDependence; ^dOverall rate calculated from raw data (only sex- and age-specific rates reported); ^eSum of 2, categories alcohol dependence and alcohol abuse and dependence; — = not reported

CIDIS = Composite International Diagnostic Interview Schedule; DIS-CM = Diagnostic Interview Schedule—Composite Manual;

Table 3 Lifetime prevalence rates of substance-related disorders (continued from previous page)

Study details	Study site	n	Response rate (%)	Case-finding method	Prevalence rate (per 100 persons)		
					Alcohol abuse and (or) dependence	Drug abuse and (or) dependence	Any substance abuse and (or) dependence
Bland and others (25)	Metropolitan Edmonton	3 258	71.6	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	18.0 ^a — ^b — ^c	6.9 ^a — ^b — ^c	20.6
Lee and others (12)	Korea - Dong, Seoul (urban) and Eub, Myeon (rural)	5 100	81.8	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	22.0 ^{a*} 12.1 ^b 9.9 ^c	0.74 ^a — ^b — ^c	31.8
Canino and others (7)	Puerto Rico - entire island-nation	1 513	91.0	Census; DIS/DSM-III; lay interviewers; algorithm diagnosis	12.6 ^a 4.4 ^b 8.2 ^{c,e}	— ^a — ^b — ^c	—
Best-estimate (95%CI)					13.2 (9.7–17.2) ^a 6.5 (4.8–8.8) ^b 4.0 (2.3–6.4) ^c	2.4 (0.95–4.2) ^a 0.29 (0.05–0.93) ^b 0.76 (0.20–1.9) ^c	20.2 (15.8–25.1)

^aTotal; ^bAbuse; ^cDependence; ^dOverall rate calculated from raw data (only sex- and age-specific rates reported); ^eSum of 2 categories, alcohol dependence and alcohol abuse and dependence; *Prevalence figure differs from that reported in Lee and others(12) as we were informed by the authors of an error in the reported estimate; — = not reported

in small towns and rural villages in Taiwan (10) to 0.8 per 100 in the US NCS (11). Excluding the rates from the Taiwan study as outliers, the prevalence rates for drug abuse vary from 0.2 to 0.8 per 100, decreasing the variation to 4-fold. For drug dependence, 1-year prevalence rates ranged from 0 per 100 in rural villages in Taiwan (10) to 2.8 per 100 in the US NCS (11). In the Taiwan study, the prevalence rates for drug dependence vary from 0.5 to 2.8 per 100, a difference of 5.6-fold. Finally, for persons with any substance abuse and (or) dependence disorder, the 1-year prevalence varied from 5.2 per 100 in Ontario (13) to 11.3 per 100 in the US NCS (11), for a difference of over 2-fold.

Lifetime Prevalence

Lifetime prevalence rates for alcohol abuse or dependence ranged from 4.5 per 100 in Hong Kong (8) to 22.0 per 100 in Korea (12), a variation of approximately 5-fold (Table 3). Excluding the outlying value reported in the Hong Kong study, the variability dropped to 1.9-fold. Alcohol abuse prevalence rates ranged from 3.0 per 100 in Hong Kong (8) to 12.1 per 100 in Korea (12), a variation of 4.0-fold. As shown in Table 3, 2 studies using DSM-III criteria (7,8) reported rates for a separate category, alcohol abuse and dependence (that is, in addition to the 2 categories, alcohol abuse and alcohol dependence, for which there are no exclusion rules in DSM-III). For these studies, we combined the category alcohol abuse and dependence with the category alcohol dependence to allow comparisons with studies using DSM-III-R or later criteria, where the diagnosis of substance dependence preempts a diagnosis of substance abuse. Although the

Korean study also used DSM-III criteria, exclusion rules (similar to DSM-III-R or later criteria) were applied to the diagnosis of alcohol abuse, so there was no separate category for both alcohol abuse and dependence. Lifetime prevalence of alcohol dependence ranged from 1.2 per 100 in rural villages in Taiwan (10) to 14.1 per 100 in the US NCS (11), an 11.8-fold variation. We observed a clustering of low prevalence rates among Asian studies (that is, Hong Kong and Taiwan), ranging from 1.2 per 100 to 1.8 per 100.

Lifetime prevalence rates for drug abuse or dependence ranged from 0.24 per 100 in Hong Kong (8) to 6.9 per 100 in Edmonton (25), an over 28-fold difference. Studies reporting such rates were similar, in that DIS and DSM-III criteria were used and the diagnosis was derived from computer algorithm. The prevalence rates for drug abuse ranged from 0 per 100 in small towns and rural villages in Taiwan (10) to 4.4 per 100 in the US NCS (11). Similarly, prevalence rates for drug dependence ranged from 0 per 100 in rural villages in Taiwan (10) to 7.5 per 100 in the US NCS (11). For those with any substance abuse and (or) dependence disorder, lifetime prevalence rates varied from 13.5 per 100 in Germany (15) to 31.8 per 100 in Korea (12), a difference of 2.4-fold.

Sex-Specific Lifetime Prevalence

Table 4 includes findings from studies reporting sex-specific 1-year and lifetime prevalence rates for the various substance-related disorder categories. For alcohol abuse or dependence disorders, 1-year and lifetime prevalence rates were generally found to be 2 to 5 times higher for male subjects than for female subjects. However, this was not the case for some

Study details		Prevalence rate (per 100 persons)												
		Alcohol abuse or dependence		Alcohol abuse		Alcohol dependence		Drug abuse or dependence		Drug abuse		Drug dependence		
		M	F	M	F	M	F	M	F	M	F	M	F	
1-year prevalence														
Hall and others (20)	Australia	9.4	3.7	4.3	1.8	5.2	1.8	3.2	1.3	0.3	0.1	2.9	1.2	
Bijl and others (6)	Netherlands	—	—	7.3	1.8	6.1	1.1	—	—	0.6	0.3	1.0	0.7	
Jenkins and others (6)	UK	—	—	—	—	7.5	2.1	—	—	—	—	2.9	1.5	
Grant (17)	US	—	—	—	—	—	—	—	—	—	—	0.61	0.35	
Ross (19)	Ontario	7.1	1.8	2.5	—	4.6	1.2	—	—	—	—	—	—	
Kessler and others (11)	US	—	—	3.4	1.6	10.7	3.7	—	—	1.3	0.3	3.8	1.9	
Lifetime prevalence														
Bijl and others (6)	Netherlands	—	—	19.3	3.9	9.0	1.9	—	—	2.0	1.1	2.1	1.5	
Grant (17)	US	—	—	—	—	—	—	—	—	—	—	3.7	2.2	
Ross (19)	Ontario	19.2	4.8	9.6	2.6	9.5	2.3	—	—	—	—	—	—	
Kessler and others (11)	US	—	—	12.5	6.4	20.1	8.2	—	—	5.4	3.5	9.2	5.9	
Canino and others (21)	Puerto Rico	—	—	—	—	—	—	2.2	0.4	—	—	—	—	
Chen and others (8)	Hong Kong	8.9	0.62	6.0	0.19	2.8 ^a	0.44 ^a	0.33	0.16	—	—	—	—	
Wittchen and others (15)	Former West Germany	21.0	5.1	—	—	—	—	1.4	2.0	—	—	—	—	
Wells and others (14)	Christchurch, New Zealand	32.0	6.1	—	—	—	—	7.2	4.1	—	—	—	—	
Hwu and others (10)	Taiwan	—	—	6.4	0.4	2.9	0.1	—	—	0.0	0.04	0.09	0.08	
				Small towns	14.7	0.6	3.7			0.3	0.0	0.0	0.4	0.0
				Rural villages	11.3	0.2	2.1			0.0	0.0	0.0	0.0	0.0
Bland and others (24)	Edmonton	29.3	6.7	—	—	—	—	10.6	3.2	—	—	—	—	
Lee and others (12)	Korea	—	—	25.6	1.6	17.2	1.0	0.78	0.97	—	—	—	—	
				Rural Korea	20.5	0.9	22.4	0.7	0.5					0.49
Canino and others (7)	Puerto Rico	24.6	2.0	9.0	0.3	15.5 ^a	1.7 ^a	—	—	—	—	—	—	

— = not reported; F = female subjects; M = male subjects; ^aSum of 2 categories, alcohol dependence and alcohol abuse and dependence.

studies (7,8,10,12) that found the rates for alcohol abuse and alcohol dependence to be between 10- and 30-fold higher for male subjects than for female subjects.

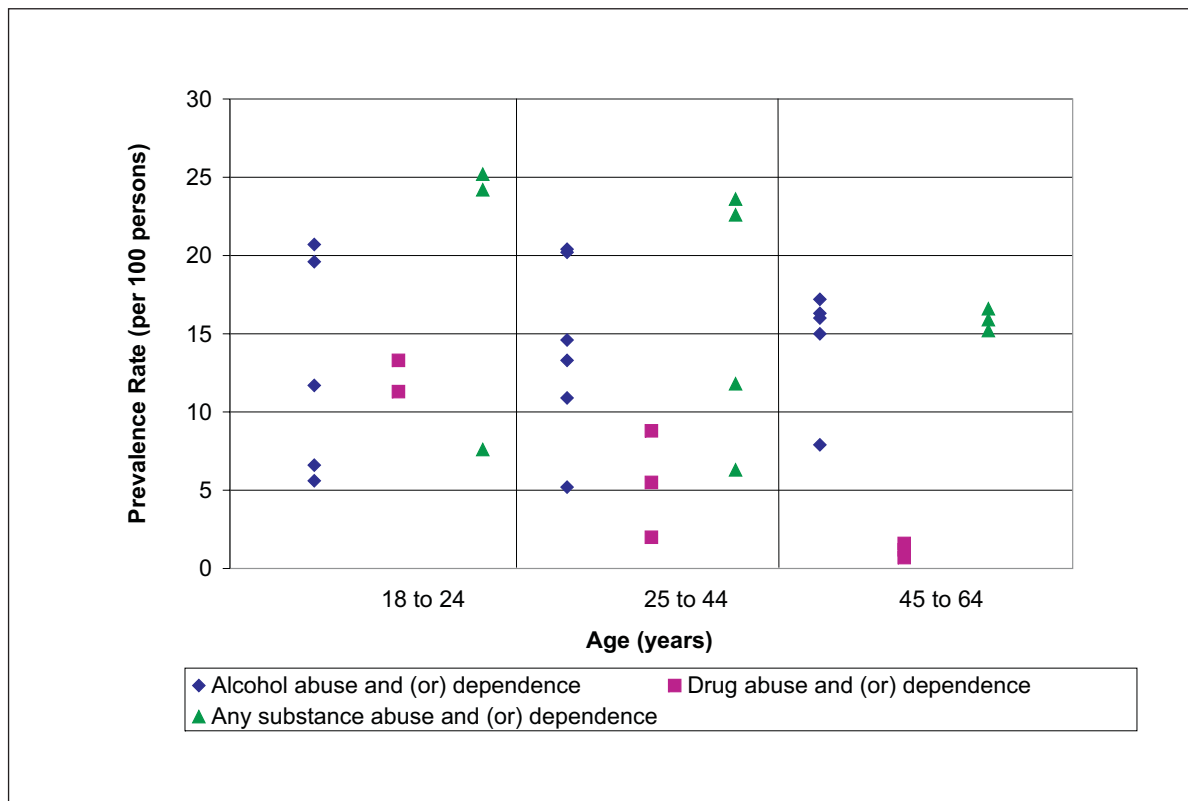
For drug abuse or dependence, 1-year and lifetime prevalence rates for male participants and female participants were more comparable than for alcohol-related disorders. In general, studies reported rates for male subjects that were around 1.4- to 2.0-fold higher than rates for female subjects. Some studies reported higher rates for female subjects, compared

with male subjects (10,12,15), but the differences in rates were very small.

Age-Specific Lifetime Prevalence

Figure 1 presents data from each study reporting age-specific lifetime prevalence rates for substance-related disorders. Lifetime prevalence rates for alcohol abuse or dependence appear fairly stable throughout ages 18 to 64 years. However, the prevalence of drug abuse or dependence declines with increasing age.

Figure 1 Age-specific lifetime prevalence rates of substance-related disorders



Estimation and Heterogeneity Analysis of Pooled Best-Estimate Rates

One-Year Prevalence. The best-estimate rates for alcohol abuse or dependence, drug abuse or dependence, and any substance abuse and (or) dependence were 6.6 per 100, 2.4 per 100, and 8.4 per 100, respectively (Table 2). Heterogeneity analysis of 1-year prevalence rates for all substance disorder categories revealed significant differences across each set of proportions, except for the category drug abuse or dependence.

Variables associated with the greatest magnitude of difference across 1-year prevalence rates of alcohol or drug abuse or dependence included the country studied (for example, Asian vs non-Asian), the assessment year, and the type of community sampled (that is, national vs city, town, or rural). Table 5 shows the pooled rates according to these and other variables. The pooled 1-year rates for Asian studies (for alcohol dependence, drug abuse, and drug dependence) were approximately 5 to 17 times lower than the rates for studies conducted in non-Asian countries. The pooled 1-year rates for studies conducted on or prior to 1989 were 5 to 17 times lower than the rates for studies carried out after 1989.

Lifetime Prevalence. The best-estimate rates for alcohol abuse or dependence, drug abuse or dependence, and any substance abuse and (or) dependence were 13.4 per 100, 2.1 per 100, and

21.3 per 100, respectively (Table 3). We found heterogeneity across lifetime prevalence rates of all substance disorder categories.

Variables found to have the greatest magnitudes of difference across lifetime prevalence rates of alcohol or drug abuse or dependence included the country studied (that is, Asian vs non-Asian) and the type of diagnostic instrument and criteria used (that is, DIS and DSM-III vs other) (Table 5). Pooled lifetime rates for Asian studies (for alcohol dependence, drug abuse, and drug dependence) were approximately 3 to 30 times lower than that for studies conducted in non-Asian countries. The pooled lifetime rates for studies using the DIS and DSM-III were approximately 3- to 30-fold lower than rates for studies using other types of diagnostic instruments or criteria.

Discussion

Across the 18 studies satisfying our inclusion criteria, 1-year and lifetime estimates of the prevalence of alcohol and other drug use disorders were heterogeneous. We selected studies for inclusion according to their adherence to similar rigorous methods of assessment and reporting. We assumed that using common approaches across studies would minimize the proportion method variance. Hence, the observed variation may reflect true differences plus error variance, including the

Table 5 Pooled 1-year and lifetime prevalence rates of substance-related disorders, according to variables possibly contributing to heterogeneity

Variable	1-year prevalence rate (per 100 persons) (95%CI)				Lifetime prevalence rate (per 100 persons) (95%CI)			
	Alcohol abuse	Alcohol dependence	Drug abuse	Drug dependence	Alcohol abuse	Alcohol dependence	Drug abuse	Drug dependence
Country studied								
Asian	—	0.79 (0.55–1.1)	0.03 (0.005–0.08)	0.08 (0.03–0.18)	—	2.3 (1.1–4.1)	0.03 (0.005–0.08)	0.12 (0.03–0.28)
Non-Asian	—	4.3 (3.2–5.7)	0.46 (0.22–0.82)	1.4 (0.75–2.3)	—	7.9 (5.3–11.6)	0.46 (0.22–0.82)	3.5 (1.6–6.4)
North American	2.0 (1.2–3.1)	—	—	—	—	—	—	—
Non-North American	3.2 (2.1–4.7)	—	—	—	—	—	—	—
Type(s) of community sampled								
National	—	4.7 (3.4–6.3)	0.46 (0.22–0.82)	1.4 (0.75–2.3)	—	—	0.46 (0.22–0.82)	3.5 (1.6–6.4)
Non-national	—	1.1 (0.58–2.0)	0.03 (0.005–0.08)	0.08 (0.03–0.18)	—	—	0.03 (0.005–0.08)	0.12 (0.03–0.28)
Year of assessment								
≤ 1989	—	0.79 (0.55–1.1)	0.03 (0.005–0.08)	0.08 (0.03–0.18)	—	—	0.03 (0.005–0.08)	0.12 (0.03–0.28)
> 1989	—	4.3 (3.2–5.7)	0.46 (0.22–0.82)	1.4 (0.75–2.3)	—	—	0.46 (0.22–0.82)	3.5 (1.6–6.4)
Type of diagnostic instrument/criteria								
DIS/DSM-III	—	—	0.03 (0.005–0.08)	—	—	2.9 (1.4–5.0)	0.03 (0.005–0.08)	0.12 (0.03–0.28)
Other	—	—	0.46 (0.22–0.82)	—	—	7.9 (4.4–12.6)	0.46 (0.22–0.82)	3.5 (1.6–6.4)
Response rate								
< 75%	—	—	—	—	8.6 (4.5–14.5)	—	—	—
≥ 75%	—	—	—	—	6.0 (4.2–8.6)	—	—	—

— = not reported; DIS = Diagnostic Interview Schedule

margin of error that is an inevitable feature of all studies estimating population prevalence rates. Although we cannot determine the precise width of this error margin, it was minimized by the rigorous inclusion and exclusion criteria used in selecting manuscripts for the review.

Despite the significant variability in the magnitude of prevalence estimates, we observed several consistencies. Across studies, the prevalence of alcohol problems always exceeded the corresponding rates for other drug-related disorders. Male sex and youth were associated with higher rates of disorders across studies, and estimates from Asian countries were typically lower than those derived from non-Asian samples.

Alcohol-related disorders were 2 to 5 times more common among male subjects than among female subjects, while other

drug use disorders were more equitably observed between the sexes. A cluster of studies reported rates of alcohol-related disorders 10- to 30-fold higher among male subjects than among female subjects. Notably, 3 out of 4 of these studies were conducted in Asian countries (that is, Hong Kong, Taiwan, and Korea).

We observed differences in the relation between rates of abuse and rates of dependence for alcohol and other drugs. With few exceptions, studies reported that the prevalence of alcohol dependence was less than that of abuse. This pattern was reversed for other drugs, with the prevalence of dependence being noticeably greater than the prevalence of abuse for all 1-year and lifetime rates. This contrast may suggest that different substances tend to stimulate different styles of use, or that the conversion rate from abuse to dependence is lower

for alcohol than for other drugs. It is difficult to assess the extent to which these differences reflect pharmacologic properties of substances or are a function of shared international legislation and norms regarding licit and illicit substances.

Three studies, each conducted in Western, English-speaking nations (that is, Australia, the US, and Canada) reported that the prevalence of alcohol dependence was greater than that of abuse (11,19,20). It has been estimated that the burden of illness associated with alcohol dependence is 5 times greater in wealthier countries, compared with less wealthy nations, and that in all cases this burden is significantly greater than the corresponding impact of all illicit drugs (1). From a population health perspective, these studies underscore the priority of effective policies and practices to address alcohol dependence in affluent Western countries, including Canada.

We found discrepancies based on community type (that is, urban vs rural) to be relevant in 1 national survey (10), but not in another (20). These observations suggest sources of appreciable variability that are unique to particular countries and other sources that are unique to regions within nations. Sources of observed variability may include cultural, historical, religious, and agricultural factors, or other factors political in nature. For policy-makers, our review suggests that prevalence rates be understood within the context of local variables influencing patterns of use.

Considerable attention has been dedicated to analyzing the contrasting drug policies adopted by different nations, sometimes exemplified by the divergent approaches undertaken in the Netherlands and the US. Among the studies reviewed, we observed the highest rates of 1-year and lifetime alcohol dependence, drug abuse, and drug dependence in the US (11). With the exception of Taiwan, lifetime prevalence rates of drug-related disorders estimated in the Dutch National survey were the lowest among studies. Such findings are sometimes interpreted as evidence that drug policies in the US are ineffective. However, we are unable to determine whether the observed rates are related to each country's respective drug-related policies or whether other factors play a larger role in influencing these prevalence differences.

The absence of sufficient incidence studies satisfying our inclusion criteria signals an important omission in the epidemiologic literature. Of the large proportion of individuals that use alcohol or other drugs, only a subset will develop disorders associated with these substances. Incidence data are essential so that health planners, clinicians, and scientists can better understand the risk and protective factors associated with stability or change in substance use within particular geographical regions and populations. Incidence rates offer further assistance when gathered at repeated intervals. They provide insight into the impact of factors introduced either by

design or through natural history, as they bear on the emergence of substance use problems.

The literature under review presents a few limitations and sources of potential bias. Despite restricting our review to studies meeting high and comparable methodological standards, we cannot eliminate method variance as a potential source of error, including differences in diagnostic criteria among studies. For example, the application of criteria regarding substance use to non-Western populations may in itself constitute a source of bias. As a group, there is reason to believe that epidemiologic studies produce underestimates of alcohol and drug prevalence, both for levels of use and for levels of disorders. One reason for this is that individuals with severe substance use disorders are often homeless or transient and may be missed by survey methods. Further, the tendency to minimize or deny substance use problems is a notorious and common feature of these disorders. Significant underreporting may explain a portion of the large discrepancy between US alcohol production and population survey estimates of alcohol consumption in that country (43). In addition, certain subcategories of substance use are often omitted from standard reviews, including misuse of prescription medications among seniors.

This review underscores the need to gather and collate relevant epidemiologic data to support effective health planning and service deployment related to alcohol and other drug use disorders. International investigations using common methodologies to compare prevalence rates are needed to highlight environmental or policy variables that contribute to the large degree of variability suggested by current research. Comparative investigations among nations will further clarify the robust magnitude of variability observed here. Studies at a local level are also needed to better understand the context-specific risk factors that may appropriately become the focus of efforts to prevent and treat these common disorders. Repeated measurements are needed to substantiate the effectiveness of factors such as large-scale interventions. Within Canada, some jurisdictions may use administrative data as a source of epidemiologic information, and these data could meaningfully augment the findings of surveys such as those reviewed above.

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Résumé : Études de prévalence des troubles liés à une substance : une analyse méthodique de la documentation

Objectif : Présenter les résultats d'une analyse méthodique de la documentation publiée entre le 1^{er} janvier 1980 et le 31 décembre 2000, qui comporte des estimations épidémiologiques des troubles liés à une substance.

Méthode : Nous avons mené une recherche documentaire des études épidémiologiques liées à une substance à l'aide des bases de données Medline et HealthSTAR, en appliquant un ensemble de critères d'inclusion et d'exclusion prédéterminés pour repérer les études pertinentes. Nous avons extrait et analysé les données de prévalence et d'incidence en ce qui a trait à l'hétérogénéité.

Résultats : Un total de 19 études de prévalence des troubles liés à une substance satisfaisaient aux critères d'inclusion pour cette étude. Les analyses d'hétérogénéité ont révélé une variabilité significative de la prévalence sur un an et de durée de vie des troubles liés tant à l'alcool qu'à une autre substance utilisée. Les taux regroupés correspondants d'un an et de durée de vie étaient de 6,6 % et 13,2 % respectivement, pour les troubles liés à l'alcool, et de 2,4 % et 2,4 % respectivement, pour les troubles liés à une autre substance. Nous avons observé une variabilité entre les pays et entre les régions d'un même pays. Contrairement aux autres problèmes de drogues, les troubles liés à l'alcool étaient substantiellement plus fréquents, étaient plus susceptibles de se produire chez les sujets masculins, et étaient plus susceptibles d'être associés à des symptômes d'abus. Pour les autres drogues, la dépendance était uniformément plus prévalente que l'abus.

Conclusions : Les études utilisant des méthodologies rigoureuses et comparables déclarent une variabilité significative des taux de troubles liés à l'alcool ou à une autre substance. Ces données indiquent que différentes politiques et pratiques régionales sont associées à la variabilité des taux des troubles. Les décideurs et les planificateurs de la santé nécessitent des estimations régulières et sensibles aux régions des taux de prévalence, afin de répondre efficacement aux modèles uniques des besoins de leurs circonscriptions.