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Prevalence, Patterns, and Correlates of Co-Occurring Substance Use and Mental Disorders in the US: Variations by Race/Ethnicity

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Abstract

Objective: This study examines racial/ethnic differences in the prevalence, patterns, and correlates of co-occurring substance use and mental disorders (COD) among Whites, Blacks, Latinos, and Asians using data from the Collaborative Psychiatric Epidemiology Studies. **Method:** We first estimated the prevalence of various combinations of different co-occurring depressive and anxiety disorders among respondents with alcohol, drug, and any substance use (alcohol or drug) disorders in each racial/ethnic group. We then estimated the prevalence of different patterns of onset and different psychosocial correlates among individuals with COD of different racial/ethnic groups. We used weighted linear and logistic regression analysis controlling for key demographics to test the effect of race/ethnicity. Tests of differences between specific racial/ethnic subgroups were only conducted if the overall test of race was significant. **Results:** Rates of COD varied significantly by race/ethnicity. Approximately 8.2% of Whites, 5.4% of Blacks, 5.8% of Latinos, 2.1% of Asians met criteria for lifetime COD. Whites were more likely than persons in each of the other groups to have lifetime COD. Irrespective of race/ethnicity, the majority of those with COD reported that symptoms of mental disorders occurred before symptoms of substance use disorders. Only rates of unemployment and history of psychiatric hospitalization among individuals with COD were found to vary significantly by racial/ethnic group. **Conclusions:** Our findings underscore the need to further examine the factors underlying differences between minority and non-minority individuals with COD as well as how these differences might affect help seeking and utilization of substance abuse and mental health services.

KEY WORDS: Substance abuse, mental disorders, co-occurring disorders, comorbidity, dual diagnosis, minorities, health disparities, CPES

Prevalence, Patterns, and Correlates of Co-Occurring Substance Use and Mental Disorders in the US: Variations by Race/Ethnicity

The problem of co-occurring substance use and mental disorders (COD) is common. The largest study of co-occurring disorders to date, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), found that approximately 20% of all persons in the general population with a current substance use disorder had at least one current independent (i.e., non-substance-induced) mood disorder, and 18% had at least one current independent anxiety disorder (1, 2). Individuals with COD tend to be worse off than those with substance use or mental disorders alone on a variety of dimensions (3-6). Persons with COD have been found to suffer from poor health (7-10), high unemployment (9), unstable housing (10, 11), and a history of suicide attempts (12). Despite heightened awareness and guidelines for treatment (13, 14), many with COD fail to receive appropriate care (9, 15).

Racial and ethnic minorities represent a growing segment of the US population, currently accounting for 28% and 16% of the US population, respectively. More than half of the increase in the US population from 2000 to 2010 was a result of the increase in number of Latinos (i.e., individuals identifying as Hispanic or Latino). With a 43% increase from 2000 to 2010, Asians represent the fastest growing racial population in the US (16). Unfortunately, research has consistently shown that racial/ethnic minorities face greater barriers to care than non-minorities (17, 18) and are more likely to underutilize mental health services (19, 20).

These disparities in care may leave racial/ethnic minorities with COD particularly vulnerable. Unfortunately, research on racial/ethnic differences among individuals with COD is sparse. Studies of the prevalence and co-occurrence of substance use and independent mood and anxiety disorders using the NESARC data indicate that co-occurring disorders are pervasive among all racial/ethnic subgroups and that dramatic differences exist among certain racial and ethnic subgroups (21). For example, Huang et al. (22) found that the association between alcohol and drug disorders and any mood disorders among Blacks was stronger than among Whites.

Research is also limited in identifying differences in the temporal ordering and correlates of COD among different racial/ethnic groups, knowledge which may yield important clues about the factors underlying differences in the prevalence of COD and could lead to more informed treatment for various racial/ethnic groups. Most of our knowledge about the temporal ordering in the general population comes from the NESARC

study and the National Comorbidity Survey (NCS) (23). Unfortunately research from these studies is limited in that it has heretofore considered only certain disorders, such as alcohol dependence and social anxiety disorders (24), cannabis dependence and mental disorders (25), marijuana use and major depressive episodes (26), and has not specifically examined differences among various racial/ethnic groups (24-27).

This study examines racial/ethnic differences in the prevalence, patterns, and correlates of COD using data from the Collaborative Psychiatric Epidemiology Studies (CPES). The CPES is comprised of three surveys: the National Comorbidity Survey Replication (NCS-R) (28), the National Study of American Life (NSAL) (29), and the National Latino and Asian American Study (NLAAS) (30). To date, only one study from the CPES has addressed the prevalence and patterns of COD (31), and it was limited to Latinos participating in the NLAAS study. The information gathered from this study is critical to guiding future research on the etiology of COD and developing culturally-sensitive prevention and treatment programs for a variety of racial/ethnic groups.

Methods

The CPES collected data on the prevalence of mental and substance use disorders, associated impairments, and treatment patterns from representative samples of majority and racial/ethnic minority adults in the US (32). CPES data was collected by the Survey Research Center of the Institute for Social Research (ICPSR) at the University of Michigan. The public use data set (33) was accessed through the ICPSR website and used in accordance to terms and conditions of a standard Restricted Data Use Agreement.

Participants and Data Collection

Participants were recruited using two sampling methods: (1) core sampling based on multi-stage stratified area probability designs, resulting in a nationally representative household sample; and (2) high-density supplemental sampling to oversample Census block groups for target ancestry groups (e.g., Afro-Caribbean, Chinese, Filipino, Vietnamese and Puerto Rican). The NCS-R was administered in two parts. Part I included all respondents (n=9,282). To reduce respondent burden, Part II, which included assessments of risk factors, consequences, correlates, and additional disorders, was administered to 5,692 respondents, oversampling those with clinically significant disorders (28).

The full CPES sample included data from 20,013 adults ages 18 years or older who resided in any of the 50 states and Washington, DC. The final response rates for the surveys were: 70.9% (NCS-R), 72.3% (NSAL), and 73.2% (NLAAS). A total of 284 respondents in this study identified as an "Other" race and were not included in our analyses. The NCS-R sample consisted of 6,696 Whites, 1,230 Blacks, 883 Latinos and 189 Asians. The NSAL sample consisted of 3,570 African Americans, 1,621 Blacks of Caribbean ancestry, and 891 Whites (35). The NLAAS Latino sample consisted of 868 Mexicans, 495 Puerto Ricans, 577 Cubans and 614 'other' Latinos (36). The NLAAS Asian sample consisted of 600 Chinese, 508 Filipinos, 520 Vietnamese, and 467 'other' Asians (37). Table 1 lists weighted demographic characteristics for CPES respondents by race/ethnicity.

INSERT TABLE 1 ABOUT HERE

Interviews were conducted face-to-face or by telephone using a computer-assisted instrument between February 2001 and December 2003 (35, 37, 38). When requested, NLAAS interviews were conducted in the respondent's native language (Spanish, Chinese, Tagalog or Vietnamese) (37, 38). Written informed consent was obtained from all participants in their preferred languages, and study procedures and protocols were approved by the Internal Review Boards of Cambridge Health Alliance, the University of Washington, the University of Michigan, and Harvard Medical School (35, 37-39).

Instruments and Measures

The core CPES questionnaire used across studies was adapted from the World Health Organization's (WHO) expanded version of the Composite International Diagnostic Interview (CIDI) developed for the World Mental Health (WMH) Survey initiative (40). The WMH-CIDI is a fully-structured, lay-administered diagnostic interview that generates DSM-IV diagnoses. In addition to the core diagnostics, each study also assessed key socio-demographic characteristics and impairments associated with these disorders.

The present analyses focus on lifetime substance use (alcohol and drug abuse or dependence), mood (major depressive episode or dysthymic disorder), and anxiety disorders (agoraphobia without panic, panic disorder, generalized anxiety disorder, social phobia, or posttraumatic stress disorder). We define history of COD as any lifetime alcohol or drug abuse or dependence AND any lifetime mental disorder (mood or anxiety

disorder). This definition has been used in other studies using the CPES data (31). Substance use and posttraumatic stress disorders were not assessed among Whites in the NSAL study. In total, we could not determine COD status for 891 Whites, 188 Blacks, and 5 Latinos, all participants in the NSAL study.

Age of onset (AOO) for disorders in the WMH-CIDI is determined based on separate probes for the age at which symptoms for each disorder began. AOO variables for substance use and mental disorders were created by using the earliest age of onset for each type of disorder. We define different patterns of co-occurring disorders based on when the disorders began. Temporally primary substance use disorder is defined as any substance use disorder onset predating any mental disorder onset by more than a year; temporally secondary substance use disorders is defined as any mental disorder onset predating any substance use disorder onset by more than a year; temporally co-occurring disorders is defined as the onset of substance abuse and mental disorders within one year of each other.

To examine differences in psychosocial impairment among individuals with COD of different racial/ethnic groups, we created variables to measure poor physical health status, current unemployment, and difficulty paying bills as well as history of attempted suicide and psychiatric hospitalization. Poor health was defined as a response of “poor” on a 4-point scale ranging from excellent to poor. We dichotomized the CPES work status variable to denote being currently unemployed (versus employed or not in the workforce). Responses of bill paying being “extremely difficult”, “very difficult”, or “somewhat difficult” were used to create a dichotomous variable reflecting difficulty paying bills.

Psychiatric severity was assessed based on history of suicide attempts and psychiatric hospitalization. Respondents were coded as having a history of attempted suicide if they had ever attempted suicide; respondents who had thought about suicide but never attempted or never seriously thought about suicide were considered not to have a history of attempted suicide. Respondents with a particular disorder were asked whether they had ever been hospitalized for that disorder. Individuals who answered affirmatively to that question or who reported being admitted for an overnight stay in a hospital or other facility to receive help for problems with emotions, nerves, mental health, use of alcohol or drugs were considered to have a history of psychiatric hospitalization.

Analyses

We first estimated the overall prevalence of co-occurring disorders and the prevalence of various combinations of different co-occurring depressive and anxiety disorders among respondents with alcohol, drug, and any substance use (alcohol or drug) disorders in each racial/ethnic group. We then estimated the prevalence of different patterns of onset of substance use and mental disorders among respondents in each racial/ethnic group. Finally, we estimated the prevalence of different psychosocial correlates among individuals with COD of different racial/ethnic groups. Differences among racial/ethnic groups were tested using logistic and linear regression (White used as the reference category). All regression models adjusted for gender, age, marital status, income, education, and region as these characteristics vary by race/ethnicity and have been included in models in similar studies (21, 22). To reduce Type 1 error rates, tests of differences between racial/ethnic subgroups were conducted only if the overall effect of race was significant (adjusted Wald test with $p<0.05$). Because the CPES studies employed complex sampling methods, we used weighting corrections to adjust for probabilities of selection under the different components of the sampling design (34). Because our analyses included NCS-R study Part II variables, we used the CPES long weight. All analyses were conducted in Stata version 11 (41). Detailed tables are available from the corresponding author.

Results

The *overall* prevalence of any lifetime substance use and any lifetime mental disorder was 7.3%; approximately 8.2% of Whites, 5.4% of Blacks, 5.8% of Latinos, 2.1% of Asians met criteria for a lifetime substance use and lifetime mental disorder. The likelihood of lifetime COD varied significantly by race/ethnicity. Whites were more likely than Blacks (OR=2.2, $p<0.001$), Latinos (OR=2.4, $p<0.001$), and Asians (OR=5.2, $p<0.001$) to have lifetime COD. Blacks and Latinos were each more likely than Asians to have lifetime COD (OR=2.6, $p=0.004$; OR=3.0, $p<0.001$, respectively).

Table 2 indicates the prevalence of various mental disorders among those with alcohol, drug, and any substance use disorders. Among those with lifetime alcohol disorders, race/ethnicity was associated with differences in the likelihood of having any life time depressive disorder, a major depressive episode, and any anxiety disorder. Whites with a history of alcohol disorders were more likely than Blacks to have had any co-occurring depressive disorder (OR=1.8, $p<0.001$), a major depressive episode (OR=1.8, $p<0.001$), and any anxiety disorder (OR=1.5, $p=0.007$).

INSERT TABLE 2 ABOUT HERE

Among those with any lifetime drug disorder, race/ethnicity was associated with differences in having had any life time depressive disorder, a major depressive episode, dysthymic disorder, agoraphobia, and social phobia. Whites with lifetime drug disorders were more likely than Blacks and Latinos to have had any depressive disorder (OR=1.8, p=0.004; OR=1.7, p=0.041, respectively) and a major depressive episode (OR=1.8, p=0.004; OR=1.7, p=0.042, respectively). Whites and Latinos were less likely than Asians to have lifetime dysthymic disorder (OR=0.4, p=0.027; OR=0.2, p=0.004, respectively). Whites were less likely than Asians to have had agoraphobia (OR=0.1, p=0.004) but were more likely than Blacks to have had social phobia (OR=1.8, p=0.009).

Among those with any substance use disorder, race/ethnicity was associated with differences in having had any life time depressive disorder, a major depressive episode, any anxiety disorder, social phobia, and any mental disorder. Whites with any substance use disorders were more likely to have had these disorders than Blacks (OR=1.9, p<0.001; OR=1.9, p<0.001; OR=1.6 p=0.003; OR=1.8, p=0.002; OR=1.6, p=0.002). Whites were also more likely than Latinos to have had any lifetime anxiety disorder (OR=1.5, p=0.022).

INSERT TABLE 3 ABOUT HERE

Table 3 presents findings with respect to age of onset of substance abuse and mental disorders and temporal ordering of disorders among individuals with COD. Irrespective of race/ethnicity, the majority of those with COD reported that symptoms of mental disorders occurred before symptoms of substance use disorders. Temporal ordering of disorders did not vary by race/ethnicity; however, average age-of-onset for substance use disorders did. Average age of onset for substance use disorders was younger for Whites than for Blacks (B=-1.8, p=.001).

INSERT TABLE 4 ABOUT HERE

Table 4 presents the prevalence of various psychosocial impairments by race/ethnicity. Only rates of unemployment and history of psychiatric hospitalization were found to vary significantly by racial/ethnic group. Whites with COD were less likely than Blacks (OR=0.2, p<0.001), Latinos (OR=0.3, p=0.002), and Asians (OR=0.1, p=0.014) to be unemployed. Whites were more likely than Blacks to report ever staying of night in a

hospital for psychiatric problems (OR=2.0, p=0.018). Blacks were less likely than Latinos to report ever staying of night in a hospital for psychiatric problems (OR=0.4, p=0.033).

Discussion

Our results indicate COD were generally more common among Whites. An important exception to this finding occurred among individuals with drug disorders. Asians with a history of drug disorders were more likely than Whites and Latinos to have had dysthymic disorder; they were also more likely than Whites to have had agoraphobia. Our results differ from those of Huang et al. (22) in that we found differences in the likelihood of co-occurring anxiety disorders by race/ethnicity where they did not, and we found that the association between substance use and mood disorders among Whites was stronger than among Blacks.

There are several differences between the NESARC and the CPES studies that complicate comparisons. First, our rates reflect the lifetime prevalence of COD while comparable studies from the NESARC study have examined the prevalence of "current" or past-12 month disorders. Our decision to use lifetime criteria as opposed to current was partly practical (to increase power) but mostly because we were also investigating average AOO of mental and substance use disorders and related psychosocial impairments, and similar studies examining onset and temporal sequencing of COD used lifetime prevalence criteria (27, 31).

The NESARC and CPES studies also used different instruments to assess psychiatric diagnoses. The NESARC study used the Alcoholism Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version (AUDADIS-IV) (42), which was developed to better differentiate between independent and substance-induced disorders. Although the WMH-CIDI asks respondents if they thought their mood or anxiety disorder was due to drinking or drug use, this approach has been criticized as differing from the intent and the specific definitions provided in the DSM-IV (43). It is possible that the potential lack of differentiation between independent and substance-induced disorders could lead to inflated rates of non-substance use disorders in particular and inflated rates of COD more generally. However, an additional criticism of the WMH-CIDI is that respondents skip the alcohol and drug dependence questions if responses to questions on abuse are all negative, which could lead to an undercounting of individuals who could potentially meet criteria for dependence and not abuse (44) and therefore an undercounting of individuals with COD.

Finally, in their analysis of the NESARC data, Huang et al. (22) controlled for sex, age, income, marital status, education, region, and urbanicity. Our analyses controlled for all of these variables except urbanicity

because the CPES data contained no comparable proxy measure. Including urbanicity may have highlighted greater disparities among minorities groups, as research suggests that rural minorities lag behind rural Whites and urban minorities on many crucial economic and social measures (45). However, our findings that Whites with substance use disorders were, in general, more likely than their minority counterparts to have various co-occurring mental disorders is similar to what Vega et al. (31) found in their analysis of the NLAAS data and to what Compton et al. (46) found in their study of differences between Whites and Blacks with substance dependence and other psychiatric disorders in drug treatment.

Our findings regarding Asians are notable because racial/ethnic minorities are more likely to experience greater disability from mental disorders due to receipt of less care and poorer quality of care (47-50). Asians may face unique barriers due to beliefs about the causes of psychiatric disorders and attitudes toward helping professionals (51-54). In their study of receipt of services among Asian, Native Hawaiian/Other Pacific Islander (NHOPI) and White mothers, Ta et al. (20) found that Asians and NHOPI were significantly less likely than Whites to have ever received mental health and substance abuse treatment. The reasons underlying differential risk for COD among racial/ethnic groups raises important questions regarding the influence of culture on psychopathology and how these differences may affect treatment seeking and use of psychiatric services.

Irrespective of race/ethnicity, the majority of individuals with COD reported that symptoms of mental disorders occurred before symptoms of substance use disorders. This finding is consistent with other studies showing that mental disorders typically begin at earlier ages (55-57) and predict subsequent onset of substance use disorders (58-61). Although simulation studies have found that treatment of mental disorders would not be cost-effective in preventing substance use disorders (62), our findings lend further evidence to suggest that prevention of substance use disorders should be considered an important secondary outcome of treatment for early onset mental disorders. We also found that average AOO for substance use disorders was younger for Whites than for Blacks; further work is needed to identify factors that may explain these differences.

Individuals with COD tend to be worse off than those with substance use or mental disorders alone. We found that Blacks, Latinos, and Asians with COD were more likely to be unemployed than Whites. Unemployment rates are typically higher among minorities (63, 64), and having a COD may make them even

more vulnerable. We also found that Whites and Latinos with COD were more likely than Blacks to report a history of psychiatric hospitalization. Although we intended history of psychiatric hospitalization to be an indicator of psychiatric severity, it may reflect differential help seeking or access to services. Further work needs to be done to sort out the two, particularly given research that suggests that perceived stigma may prevent Blacks from accessing mental health services (65, 66) and that Blacks with COD are more likely to receive substance abuse rather than mental health treatment (67, 68).

In addition to the aforementioned limitations, several others should be noted as well. The CPES studies are cross-sectional and psychiatric diagnoses are based on self-reported symptoms. The lack of longitudinal data as well as self-presentation bias and recall error limit the interpretation of our findings, particularly with respect to temporal ordering of substance use and mental disorders. Further, our AOO variable was determined based probes for the age at which symptoms for each disorder began, which may not reflect the age at which the disorder first manifest. It is also important to note that although we did examine temporal ordering, our definition of co-occurring disorders was not restricted to the temporally co-occurring disorders. Finally, although the CPES studies oversampled key racial/ethnic minority groups, the subsample of Asians with COD was relatively small and may have limited detection of differences between Asians and other racial/ethnic groups.

Despite these limitations, this study is the first we could find to examine differences in temporal ordering and biopsychosocial impairments among individuals with COD of varying racial/ethnic groups in the general population. Our results indicate that rates of COD vary by race/ethnicity and highlight that ”minorities” are not a homogeneous group and that rates of COD vary depending on the type of substance use disorder (alcohol v. drug) and type of mental disorder (mood v. anxiety) considered. Future studies are need to better understand the nature of these differences and how they may affect help seeking and service use among individuals with COD in general and among minorities in particular. Such research is critical to developing culturally-sensitive prevention and treatment programs for racial/ethnic minorities with COD.

References

1. Grant BF, Stinson FS, Dawson DA, Chou P, Dufour MC, Compton W, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. Arch Gen Psychiatry. 2004;61(8):807-16.
2. Grant BF, Dawson DA. Introduction to the National Epidemiologic Survey on Alcohol and Related Conditions. Alcohol Res Health. 2006;29(2):74-8.
3. Drake RE, Mueser KT, Clark RE, Wallach ME. The course, treatment, and outcome of substance disorder in persons with severe mental illness. Am J Orthopsychiatry. 1996;66(1):42-51.
4. Kessler RC. Impact of substance abuse on the diagnosis, course, and treatment of mood disorders: The epidemiology of dual diagnosis. Biol Psychiatry. 2004;56(10):730-7.
5. Lehman AF, Dixon LB. Double jeopardy: Chronic mental illness and substance use disorders. Langhorne, PA: Harwood Academic Publishers; 1995.
6. O'Brien CP, Charney DS, Lewis L, Cornish JW, Post RM, Woody GE, et al. Priority actions to improve the care of persons with co-occurring substance abuse and other mental disorders: A call to action. Biol Psychiatry. 2004;56(10):703-13.
7. Dickey B, Normand S-LT, Weiss RD, Drake RE, Azeni H. Medical morbidity, mental illness, and substance use disorders. Psychiatr Serv. 2002;53(7):861-7.
8. Osher FC, Goldberg RW, McNary SW, Swartz MS, Essock SM, Butterfield MI, et al. Substance abuse and the transmission of Hepatitis C among persons with severe mental illness. Psychiatr Serv. 2003;54(6):842-7.
9. Watkins KE, Burnam A, Kung F-Y, Paddock S. A national survey of care for persons with co-occurring mental and substance use disorders. Psychiatr Serv. 2001;52(8):1062-8.
10. Watkins KE, Hunter SB, Wenzel SL, Tu W, Paddock SM, Griffin A, et al. Prevalence and characteristics of Clients with co-occurring disorders in outpatient substance abuse treatment. The American Journal of Drug and Alcohol Abuse. 2004 30(4):749-64.
11. McNiel DE, Binder RL. Psychiatric emergency service use and homelessness, mental disorder, and violence. Psychiatr Serv. 2005;56(6):699-704.
12. Aharonovich E, Liu X, Nunes E, Hasin DS. Suicide attempts in substance abusers: Effects of major depression in relation to substance use disorders. The American Journal of Psychiatry. 2002;159(9):1600-2.
13. Minkoff K, Cline CA. Changing the world: The design and implementation of comprehensive continuous integrated systems of care for individuals with co-occurring disorders. Psychiatric Clinics of North America Special Issue: Addictive Disorders. 2004;27(4):727-43.
14. Mueser KT, Noordsy DL, Drake RE, Fox L, Barlow DH. Integrated treatment for dual disorders: A guide to effective practice. New York, NY: Guilford Press; 2003.
15. McFarland BH, Gabriel RM, Tanielian TL. Service availability for persons with co-occurring conditions. Psychiatr Serv. 2004;55(9):978.
16. Humes KR, Jones NA, Ramirez RR. Overview of race and Hispanic origin: 2010. 2010 Census Brief. U.S. Census Bureau, 2011 U.S. Census Bureau. Report C2010BR-02.
17. McGuire TG, Alegria M, Cook BL, Wells KB, Zaslavsky AM. Implementing the Institute of Medicine definition of disparities: An application to mental health care. Health Serv Res. 2006;41(5):1979-2005.
18. Wells K, Klap R, Koike A, Sherbourne C. Ethnic disparities in unmet need for alcoholism, drug abuse, and mental health care. Am J Psychiatry. 2001;158(12):2027-32.
19. Ta VM, Hodgkin D, Gee GC. Generational status and family cohesion effects on the receipt of mental health services among Asian Americans: Findings from the National Latino and Asian American Study. Am J Public Health. 2010;100(1):115-21.
20. Ta VM, Juon H-s, Gielen AC, Steinwachs D, Duggan A. Disparities in use of mental health and substance abuse services by Asian and Native Hawaiian/other Pacific Islander women. The Journal of Behavioral Health Services & Research. 2008;35(1):20-36.
21. Smith SM, Stinson Fs, Dawson DA, Goldstein R, Huang B, Grant BF. Race/ethnic differences in the prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions.

Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences. 2006;36(7):987-98.
22. Huang B, Grant BF, Dawson DA, Stinson FS, Chou SP, Saha TD, et al. Race-ethnicity and the prevalence and co-occurrence of Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, alcohol and drug use disorders and Axis I and II disorders: United States, 2001 to 2002. Compr Psychiatry. 2006;47(4):252-7.
23. Kessler RC. The National Comorbidity Survey of the United States. International Review of Psychiatry. 1994;6(4):365-76.
24. Buckner JD, Timpano KR, Zvolensky MJ, Sachs-Ericsson N, Schmidt NB. Implications of comorbid alcohol dependence among individuals with social anxiety disorder. Depress Anxiety. 2008;25(12):1028-37.
25. Agosti V, Nunes E, Levin F. Rates of psychiatric comorbidity among U.S. residents with lifetime cannabis dependence. Am J Drug Alcohol Abuse. 2002;28(4):643-52.
26. Chen C-Y, Wagner FA, Anthony JC. Marijuana use and the risk of major depressive episode: Epidemiological evidence from the United States National Comorbidity Survey. Soc Psychiatry Psychiatr Epidemiol. 2002;37(5):199-206.
27. Falk DE, Yi H-y, Hilton ME. Age of onset and temporal sequencing of lifetime DSM-IV alcohol use disorders relative to comorbid mood and anxiety disorders. Drug Alcohol Depend. 2008;94(1-3):234-45.
28. Kessler RC, Berglund P, Chiu WT, Demler O, Heeringa S, Hiripi E, et al. The US National Comorbidity Survey Replication (NCS-R): Design and field procedures. Int J Methods Psychiatr Res. 2004;13(2):69-92.
29. Jackson JS, Neighbors HW, Nesse RM, Trierweiler SJ, Torres M. Methodological innovations in the National Survey of American Life. Int J Methods Psychiatr Res. 2004;13(4):289-98.
30. Alegria M, Takeuchi D, Canino G, Duan N, Shrout P, Meng X-L, et al. Considering context, place and culture: The National Latino and Asian American Study. Int J Methods Psychiatr Res. 2004;13(4):208-20.
31. Vega WA, Canino G, Cao Z, Alegria M. Prevalence and correlates of dual diagnoses in U.S. Latinos. Drug Alcohol Depend. 2009;100(1-2):32-8.
32. Pennell B-E, Bowers A, Carr D, Chardoul S, Cheung G-Q, Dinkelmann K, et al. The development and implementation of the National Comorbidity Survey Replication, the National Survey of American Life, and the National Latino and Asian American Survey. Int J Methods Psychiatr Res. 2004;13(4):241-69.
33. Alegria M, Jackson JS, Kessler RC, Takeuchi D. Collaborative Psychiatric Epidemiology Surveys (CPES), 2001-2003 In: Institute for Social Research; Survey Research Center, editor. ICPSR20240-v5 ed. Ann Arbor, MI: Inter-university Consortium for Political and Social Research; 2007.
34. Heeringa SG, Wagner J, Torres M, Duan N, Adams T, Berglund P. Sample designs and sampling methods for the Collaborative Psychiatric Epidemiology Studies (CPES). Int J Methods Psychiatr Res. 2004;13(4):221-40.
35. Williams DR, Haile R, Gonzalez HM, Neighbors H, Baser R, Jackson JS. The mental health of Black Caribbean immigrants: Results from the national survey of American life. Am J Public Health. 2007;97(1):52-9.
36. Alegria M, Mulvaney-Day N, Woo M, Torres M, Gao S, Oddo V. Correlates of past-year mental health service use among Latinos: Results from the National Latino and Asian American Study. Am J Public Health. 2007;97(1):76-83.
37. Takeuchi DT, Alegria M, Jackson JS, Williams DR. Immigration and mental health: Diverse findings in Asian, Black, and Latino populations. Am J Public Health. 2007;97(1):11-2.
38. Alegria M, Mulvaney-Day N, Torres M, Polo A, Cao Z, Canino G. Prevalence of psychiatric disorders across Latino subgroups in the United States. Am J Public Health. 2007;97(1):68-75.
39. Kessler RC, Merikangas KR. The National Comorbidity Survey Replication (NCS-R): Background and aims. Int J Methods Psychiatr Res. 2004;13(2):60-8.
40. Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). Int J Methods Psychiatr Res. 2004;13(2):93-121.
41. StataCorp. Stata statistical software: Release 11.0. College Station, TX: Stata Corporation LP; 2009.
42. Grant BF, Dawson DA, Hasin D. The Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism, Alcoholism NIAAA; 2001.

43. Grant BF, Stinson FS, Dawson DA, Chou SP, Dufour MC, Compton W, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. Alcohol Research & Health. 2006;29(2):107-20.
44. Cottler LB. Drug use disorders in the national comorbidity survey: Have we come a long way? Arch Gen Psychiatry. 2007;64(3):380-1.
45. Swanson LL. Racial/Ethnic Minorities in Rural Areas: Progress and Stagnation, 1980-90: Rural Economy Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 731; 1996.
46. Compton WM, Cottler LB, Abdallah AB, Phelps DL, Spitznagel EL, Horton JC. Substance dependence and other psychiatric disorders among drug dependent subjects: Race and gender correlates. The American Journal on Addictions. 2000;9(2):113-25.
47. U.S. Department of Health and Human Services. 2010 National Healthcare Disparities Report. Agency for Healthcare Research and Quality, 2010 March 2011. Report No.: AHRQ Publication No. 11- 0005.
48. Alegria M, Chatterji P, Wells K, Cao Z, Chen C-n, Takeuchi D, et al. Disparity in depression treatment among racial and ethnic minority populations in the United States. Psychiatr Serv. 2008;59(11):1264-72.
49. Good MD, James C, Becker AE. The culture of medicine and racial, ethnic, and class disparities in healthcare. In: Smedley BD, Stith AY, Nelson AR, editors. Institute of medicine unequal treatment: Confronting racial and ethnic disparities in healthcare Washington, DC: The National Academies Press; 2003. p. 594–625.
50. U.S. Department of Health and Human Services. Mental Health: Culture, Race, and Ethnicity - A Supplement to Mental Health: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, 2001.
51. Chen SX, Mak WWS. Seeking professional help: Etiology beliefs about mental illness across cultures. Journal of Counseling Psychology. 2008;55(4):442-50.
52. Kim BSK. Adherence to Asian and European American cultural values and attitudes toward seeking professional psychological help among Asian American college students. Journal of Counseling Psychology. 2007;54(4):474-80.
53. Kim BSK, Atkinson DR, Umemoto D. Asian cultural values and the counseling process: Current knowledge and directions for future research. The Counseling Psychologist. 2001;29(4):570-603.
54. Wong YJ, Tran KK, Kim S-H, Van Horn Kerne V, Calfa NA. Asian Americans' lay beliefs about depression and professional help seeking. J Clin Psychol. 2010;66(3):317-32.
55. Merikangas KR, Mehta RL, Molnar BE, Walters EE, Swendsen JD, Auilar-Gaziola S, et al. Comorbidity of substance use disorders with mood and anxiety disorders: Results of the international consortium in psychiatric epidemiology. Addict Behav. 1998;23(6):893-908.
56. Costello EJ, Erkanli A, Federman E, Angold A. Development of psychiatric comorbidity with substance abuse in adolescents: Effects of timing and sex. J Clin Child Psychol. 1999;28(3):298-311.
57. Compton WM, Cottler LB, Phelps DL, Abdallah AB, Spitznagel EL. Psychiatric disorders among drug dependent subjects: Are they primary or secondary? The American Journal on Addictions. 2000;9(2):126-34.
58. King SM, Iacono WG, McGue M. Childhood externalizing and internalizing psychopathology in the prediction of early substance use. Addiction. 2004;99(12):1548-59.
59. Pardini D, White HR, Stouthamer-Loeber M. Early adolescent psychopathology as a predictor of alcohol use disorders by young adulthood. Drug Alcohol Depend. 2007;88:S38-S49.
60. Swendsen J, Conway KP, Degenhardt L, Glantz M, Jin R, Merikangas KR, et al. Mental disorders as risk factors for substance use, abuse and dependence: Results from the 10-year follow-up of the National Comorbidity Survey. Addiction. 2010;105(6):1117-28.
61. Wilens TE, Biederman J, Adamson JJ, Henin A, Sgambati S, Gignac M, et al. Further evidence of an association between adolescent bipolar disorder with smoking and substance use disorders: A controlled study. Drug Alcohol Depend. 2008;95(3):188-98.
62. Glantz MD, Anthony JC, Berglund PA, Degenhardt L, Dierker L, Kalaydjian A, et al. Mental disorders as risk factors for later substance dependence: estimates of optimal prevention and treatment benefits. Psychol Med. 2009;39(8):1365-77.

63. Reidenbach L, Weller C. The State of Minorities in 2010: Minorities are Suffering Disproportionately in the Recession. Center for American Progress; 2010. p. January 15, 2010.
64. Office of Employment and Unemployment Statistics. Labor Force Characteristics by Race and Ethnicity, 2009. U.S. Department of Labor, U.S. Bureau of Labor Statistics, 2009 Report 1026.
65. Alvidrez J, Snowden LR, Kaiser DM. The experience of stigma among Black mental health consumers. J Health Care Poor Underserved. 2008;19(3):874-93.
66. Ayalon L, Alvidrez J. The experience of Black consumers in the mental health system--Identifying barriers to and facilitators of mental health treatment using the consumers' perspective. Issues Ment Health Nurs. 2007;28(12):1323-40.
67. Havassy BE, Alvidrez J, Owen KK. Comparisons of patients with comorbid psychiatric and substance use disorders: implications for treatment and service delivery. Am J Psychiatry. 2004;161(1):139-45.
68. Alvidrez J, Havassy BE. Racial Distribution of Dual-Diagnosis Clients in Public Sector Mental Health and Drug Treatment Settings. J Health Care Poor Underserved. 2005;16(1):53-62.