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Cumulative burden of comorbid mental disorders, substance use disorders, chronic medical conditions, and poverty on health among adults in the United States

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Abstract

The health of individuals in the United States is increasingly being defined by complexity and multimorbidity. We examined the patterns of co-occurrence of mental illness, substance abuse/dependence, and chronic medical conditions and the cumulative burden of these conditions and living in poverty on self-rated health. We conducted a secondary data analysis using publically-available data from the National Survey on Drug Use and Health (NSDUH), which is an annual nationally-representative survey. Pooled data from the 2010-2012 NSDUH surveys included 115,921 adults 18 years of age or older. The majority of adults (52.2%) had at least one type of condition (mental illness, substance abuse/dependence, or chronic medical conditions), with substantial overlap across the conditions. 1.2%, or 2.2 million people, reported all three conditions. Generally, as the number of conditions increased, the odds of reporting worse health also increased. The likelihood of reporting fair/poor health was greatest for people who reported AMI, chronic medical conditions, and poverty (AOR=9.41; 95% CI: 7.53-11.76), followed by all three conditions and poverty (AOR=9.32; 95% CI: 6.67-13.02). For each combination of conditions, the addition of poverty increased the likelihood of reporting fair/poor health. Traditional conceptualizations of multimorbidity should be expanded to take into account the complexities of co-occurrence between mental illnesses, chronic medical conditions, and socioeconomic factors.

Keywords

chronic disease; comorbidity; mental disorders; socioeconomic status; substance use

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Introduction

The health of individuals in the United States is increasingly being defined by complexity and multimorbidity, the co-occurrence of two or more chronic medical conditions (Nardi et al., 2007). The high prevalence of comorbid conditions has been well documented among people with mental disorders (Barnett et al., 2012; Lin, Zhang, Leung, & Clark, 2011); however there is little research on multimorbidity in this population. Furthermore, people with mental illness experience greater socioeconomic disadvantage (Barnett et al., 2012) and individuals with mental disorders or medical conditions report worse self-rated health compared to healthy individuals (Fok et al., 2014; Perruccio, Katz, & Losina, 2012).

Given the medical and socioeconomic complexities faced by people with mental illness and the paucity of research on multimorbidity with mental disorders, we examined patterns of multimorbidity in the United States. We answered the following research questions: What proportion of adults experience each combination of mental illness, substance abuse or dependence, and chronic medical conditions? What are the associations of these combinations, as well as poverty, with self-rated health?

Methods

We used publically-available data from three waves (2010-2012) of the National Survey on Drug Use and Health (NSDUH), which included 115,921 adults ages 18 and older (United States Department of Health and Human Services, 2010-2012). The NSDUH is an annual survey conducted by the Substance Abuse and Mental Health Services Administration (SAMHSA) that provides nationally representative estimates of drug use and mental illness for the civilian, noninstitutionalized United States population. In-person interviews are conducted at the participant's residence, utilizing a computer-assisted self-administered process. The weighted response rates for each year ranged from 86.1-88.8% for household screening and 73.0-74.7% for interviews (SAMHSA, 2011, 2012, 2013a, 2013b).

Measures

Any mental illness (AMI) in the past year is based on participants' responses to the Kessler-6 scale, measuring psychological distress (Kessler et al., 2002), and the World Health Organization Disability Assessment Schedule, assessing functional impairment (Novak, Colpe, Barker, & Gfroerer, 2010). SAMHSA developed prediction models to determine the presence of AMI, rather than specific diagnoses. These models are valid in predicting presence of AMI among subsamples of participants who completed a Structured Clinical Interview for DSM-IV Axis I Disorders (Aldworth et al., 2010; Liao et al., 2012).

The NSDUH includes structured questions based on the criteria in the DSM-IV (American Psychiatry Association, 2002) to assess abuse or dependence on illicit drugs and alcohol in the past 12 months. Illicit drugs assessed included marijuana, hallucinogens, inhalants, tranquilizers, cocaine, heroin, pain relievers, stimulants, and sedatives. We used a combined variable of abuse or dependence on illicit drugs and/or alcohol.

Respondents indicated whether a physician had ever told them (yes or no) they had the following ten chronic medical conditions: asthma, cirrhosis, diabetes, heart disease, hepatitis, high blood pressure, HIV/AIDS, lung cancer, pancreatitis, and stroke. Respondents were grouped in two categories (zero conditions or one or more chronic conditions).

The NSDUH uses family income relative to the national poverty thresholds published by the U.S. Census Bureau to determine poverty status (US Department of Health and Human Services, 2012). Respondents were classified as living in poverty (family income less than 100% of the poverty threshold) or not living in poverty.

Self-rated health was assessed by the question, “Would you say your health in general is excellent, very good, good, fair, or poor?” Responses were grouped into excellent/very good/good health and fair/poor health.

Demographic and socioeconomic status correlates included age (18-25, 26-34, 35-49, 50-64, 65 or older), gender, racial or ethnic group (Non-Hispanic white, Non-Hispanic black, Hispanic, other), marital status (married, previously married, never married), county metro status (nonmetro, small metro, large metro), education level (less than high school, high school graduate, college and above), employment status (not working, working), health insurance status (uninsured, insured), and government assistance (receiving, not receiving).

Statistical Analyses

We conducted descriptive statistics and chi-square tests to describe demographic characteristics by condition. We ran logistic regression models for each pair of conditions and poverty to assess the likelihood of the conditions co-occurring. We then ran logistic models assessing the associations between all combinations of the conditions and poverty with self-rated health. Logistic regression models were run unadjusted and then adjusted for age, gender, race/ethnicity, marital status, education, employment, health insurance, government assistance, and county metro status. Data analyses were conducted in IBM SPSS Statistics 21, using the complex samples module to account for the NSDUH's complex sampling design and weights (for more detail, see: SAMHSA, 2013a). To reduce the chance of type I error due to running multiple statistical tests, we assessed statistical significance at $p < .01$.

Results

Overall, 18.4% of adults had a past-year mental illness, 8.6% reported past-year substance abuse/dependence, 37.8% had one or more chronic medical conditions in their lifetime, and 14.7% were living in poverty. Compared to individuals without any condition, adults with one condition (AMI, substance abuse/dependence, or chronic conditions) reported higher percentages of living in poverty, receiving government assistance, having less than a high school education, being unemployed, and having no health insurance (see Table 1).

Looking at co-occurrence of these conditions, 6.4% of individuals reported AMI and chronic conditions, 2.2% reported AMI and substance abuse/dependence, 1.5% reported substance abuse/dependence and chronic medical conditions, and 1.2%, equivalent to 2.2 million

people, reported all three conditions. The logistic regression models assessing associations between each pair of conditions, as well as poverty, are shown in Table 2. People with AMI were over three times more likely to report substance abuse/dependence (AOR=3.30; 95% CI: 3.10-3.50), almost 1.5 times more likely to have a chronic medical condition (AOR=1.46; 95% CI: 1.38-1.56), and 1.2 times more likely to live in poverty (95% CI: 1.12-1.31) compared to people without AMI.

We then examined the odds of reporting fair/poor health for every combination of conditions, with and without poverty (see Table 3). Generally, as the number of conditions increased, the odds of reporting fair/poor health also increased (see Figure 1). The likelihood of reporting fair/poor health was greatest for people who reported AMI, chronic medical conditions, and poverty (AOR=9.41; 95% CI: 7.53-11.76), followed by all three conditions and poverty (AOR=9.32; 95% CI: 6.67-13.02). For each combination of conditions, the addition of poverty increased the likelihood of reporting fair/poor health.

Discussion

Traditionally, multimorbidity has been conceptualized as the co-occurrence of two or more chronic conditions, generally medical conditions, at the same time (Nardi et al., 2007; Valderas, Sibbald, & Salisbury, 2009). This view often fails to capture mental illnesses and substance use disorders, as well as the impact of socioeconomic factors on health and quality of life. We found that 1.2% of individuals report co-occurring AMI, substance abuse/dependence, and chronic medical conditions, which is equivalent to about 2.2 million people. Generally, increasing numbers of conditions were associated with poorer self-health, with poverty further elevating the association with poor health.

Recently, work has been done to examine measurement of multimorbidities (Diederichs, Berger, & Bartels, 2011) and generate guidelines and recommendations for improving the health of people with multiple medical conditions (Uhlrig et al., 2014). While these guidelines often include depression due to its high prevalence, our findings indicate that any mental illness and substance abuse/dependence are also important considerations. Improving the health of people with multimorbidities will involve increased access to and coordination between a variety of services. Collaborative care models are effective in treating mental illnesses in primary care (Gilbody, Bower, Fletcher, Richards, & Sutton, 2006) and providing primary care in specialty mental health settings (Druss & Von Esenwein, 2006). These models are less commonly applied to substance use disorders, which can result in fragmentation in care for people with these conditions (Gurewich, Prottas, & Sirkin, 2014).

Our findings also suggest the need to broaden our view of illness complexity beyond the health care system to address disadvantage and other social determinants of health (Shim et al., 2014). Strategies to address social determinants include wellness and recovery-oriented initiatives (Cook et al., 2009), supported employment (Kinoshita et al., 2013), and supported housing (Patterson, Currie, Rezanoff, & Somers, 2015).

Limitations

The results should be considered in light of several limitations. First, this is a cross-sectional study, which prevents causal claims regarding the association between multimorbidity and self-rated health. Second, although estimates of AMI were based on validated prediction models, the measure of AMI involved self-reported responses to scales rather than structured diagnostic interviews. The NSDUH measures the presence AMI, but not specific diagnoses or the number of co-occurring mental disorders. Third, the NSDUH includes a select number of medical conditions, thus we were unable to assess other relevant medical conditions or conditions for which participants were not treated. Finally, the conditions were measured on different timescales, thus we were unable to verify that all of them occurred together.

Conclusions

Mental illness, substance abuse/dependence, chronic medical conditions, and poverty commonly overlap and this multimorbidity contributes to poor health. Conceptualizations of multimorbidity must be expanded to include the complexities of co-occurrence of mental illnesses, chronic medical conditions, and socioeconomic factors.

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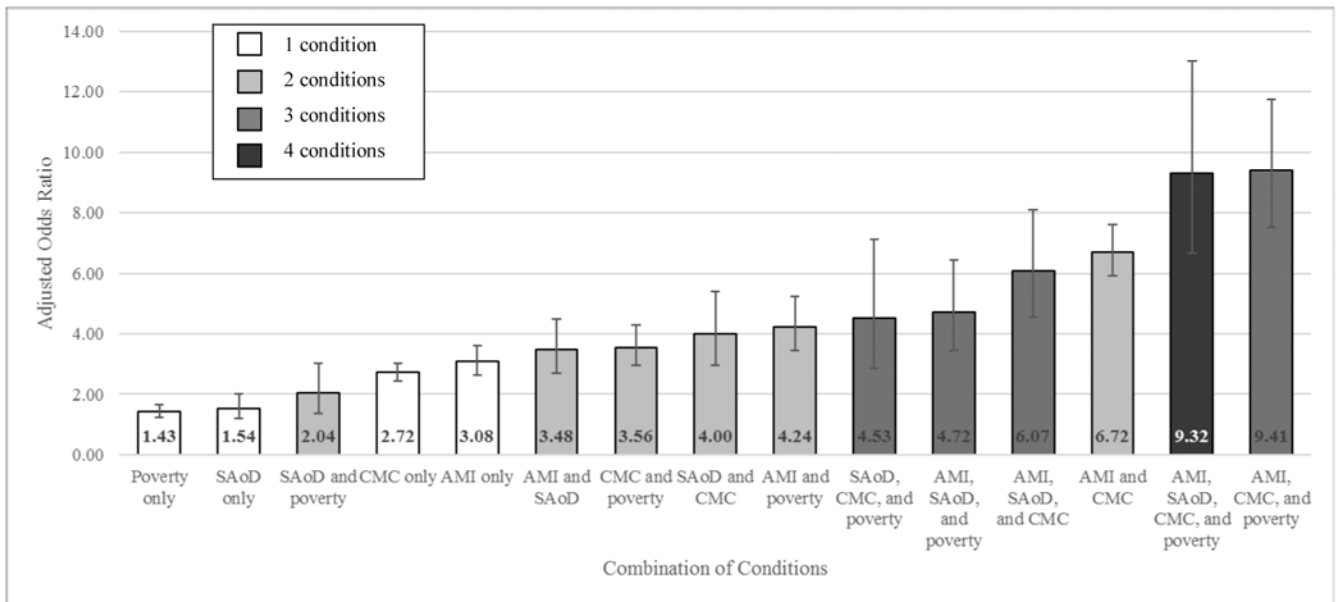


Figure 1. Adjusted odds ratios of reporting poor or fair health among all combinations of adults with mental illness, substance use disorder, chronic medical conditions, and/or living in poverty^a
 AMI = any mental illness; CMC = chronic medical conditions; SAoD = substance abuse and/or dependence.

^aOdds of reporting fair/ poor self-rated health compared to good/very good/excellent health. Reference category is no mental illness, substance use disorder, chronic medical condition, or poverty. All groups are mutually exclusive. Adjusted for age, gender, race/ethnicity, marital status, county metro status, education, employment, government assistance, and health insurance.

Table 1
Characteristics of adults in the 2010-2012 NSDUH, by past-year mental illness, past-year substance abuse and/or dependence, and lifetime chronic medical conditions^a

Characteristic	None of the conditions (n=46017)	Any mental illness (n=23094)	Substance abuse and/or dependence (n=15743)	One or more chronic medical conditions (n=13490)
	n (weighted %)	n (weighted %)	n (weighted %)	n (weighted %)
Age Group				
18-25	21622 (14.6)	11076 (15.2)**	10840 (33.0)**	11110 (7.8)**
26-34	7747 (18.7)	3917 (18.9)	2187 (24.1)	3657 (9.2)
35-49	10701 (31.4)	5040 (29.6)	1977 (24.9)	6965 (21.3)
50-64	4222 (24.5)	2156 (26.4)	610 (14.0)	5430 (32.3)
65 or older	1725 (10.8)	905 (11.7)	129 (4.1)	4328 (29.4)
Gender				
Female	23512 (50.6)	14694 (61.0)**	6203 (34.8)**	17014 (52.1)
Male	22505 (49.4)	8400 (39.0)	9540 (65.2)	14476 (47.9)
Race or Ethnic Group				
Non-Hispanic white	30208 (68.3)	15399 (70.8)**	10224 (68.4)**	20488 (69.8)**
Non-Hispanic black	4597 (8.9)	2527 (10.9)	1727 (11.2)	4658 (13.4)
Hispanic	7282 (15.0)	3028 (11.8)	2390 (15.5)	3840 (10.8)
Other	3930 (7.8)	2140 (6.5)	1402 (4.9)	2504 (6.0)
Marital Status				
Married	19204 (58.9)	6804 (42.9)**	2488 (30.4)**	12863 (55.6)**
Previously married	4144 (15.3)	3722 (26.1)	1372 (16.8)	5568 (26.1)
Never married	22669 (25.8)	12568 (31.0)	11883 (52.8)	13059 (18.3)
County metro status				
Nonmetro	9101 (14.2)	4908 (16.5)**	3112 (13.8)**	701 (17.8)**
Small metro	15977 (29.9)	8609 (32.5)	5740 (31.5)	11248 (30.8)
Large metro	20939 (55.9)	9577 (51.0)	6891 (54.7)	13228 (51.4)
Poverty				
Living in poverty	-	5686 (20.3)**	3831 (20.3)**	6103 (13.0)**
Not living in poverty	-	17020 (79.7)	11439 (79.7)	24946 (87.0)
Received Government Assistance				
No	39577 (89.1)	15841 (71.4)**	11589 (75.1)**	23339 (80.5)*
Yes	6440 (10.9)	7253 (28.6)	4154 (24.9)	8151 (19.5)
Education				
Less than high school	5613 (10.3)	3808 (16.1)**	2821 (16.9)**	4979 (14.9)**
High school	14230 (27.7)	7306 (29.9)	5116 (29.8)	10475 (32.0)
College and above	26174 (62.0)	11980 (54.0)	7806 (53.3)	16036 (53.0)
Employment Status				
Working full or part time	35128 (75.9)	13935 (56.8)**	10551 (67.7)**	19094 (55.2)**

Characteristic	None of the conditions (n=46017)	Any mental illness (n=23094)	Substance abuse and/or dependence (n=15743)	One or more chronic medical conditions (n=13490)
	n (weighted %)	n (weighted %)	n (weighted %)	n (weighted %)
Unemployed or not in labor force	10889 (24.1)	9159 (43.3)	5192 (32.3)	12396 (44.8)
Health Insurance				
Uninsured	8712 (15.0)	5043 (19.1)**	4037 (25.4)**	5140 (11.7)**
Insured	37305 (85.0)	18051 (80.9)	11706 (74.6)	26350 (88.3)
Any mental illness				
No	-	-	9912 (60.9)**	23933 (79.8)**
Yes	-	-	5831 (39.1)	7557 (20.2)
Substance abuse and/or dependence				
No	-	17263 (81.6)**	-	27691 (92.9)**
Yes	-	5831 (18.4)	-	3799 (7.1)
Chronic medical conditions				
0	-	14860 (57.9)**	11592 (69.3)**	-
1 or more	-	7557 (42.1)	3799 (30.7)	-
Self-rated health				
Fair/Poor	1806 (4.7)	4285 (25.5)**	1720 (14.9)	5382 (20.6)**
Excellent/Very good/Good	44205 (95.3)	18807 (74.5)	14020 (85.1)	26100 (79.4)

^aMental illness, substance abuse and/or dependence, chronic medical conditions, and poverty groups are not mutually exclusive. Chi square tests for each group compared having the condition to not having the condition.

* p<.01,

** p<.001

Table 2
Odds ratios for co-occurrence of mental illness, substance abuse and/or dependence, chronic medical conditions, and poverty

		Adults with this condition:		
		AMI	SAoD	CMC
Who also have one of these conditions:		OR (95% CI)	OR (95% CI)	OR (95% CI)
SAoD	Unadjusted	3.27 (3.08-3.48) **	-	-
	Adjusted ^a	3.37 (3.17-3.58) **	-	-
CMC	Unadjusted	1.24 (1.78-1.31) **	0.71 (0.66-0.75) **	-
	Adjusted ^a	1.46 (1.38-1.56) **	1.12 (1.04-1.20) *	-
Poverty	Unadjusted	1.72 (1.60-1.84) **	1.60 (1.49-1.73) **	0.86 (0.81-0.92) **
	Adjusted ^a	1.20 (1.12-1.31) **	1.08 (0.99-1.17)	0.99 (0.92-1.07)

AMI = any mental illness; CI = confidence intervals; CMC = chronic medical conditions; OR = odds ratio; SAoD = substance abuse and/or dependence.

Reference categories were not having the condition.

^aAdjusted for age, gender, race/ethnicity, marital status, county metro status, education, employment, government assistance, and health insurance

* p<.01,

** p<.001

Table 3
Odds ratios for poor or fair self-reported health among adults with use mental illness, substance abuse and/or dependence, chronic medical conditions, and/or living in poverty

	N (Weighted %)	Unadjusted	Adjusted ^a
		OR (95% CI)	AOR (95% CI)
No conditions (reference) ^b	46017 (41.3)	-	-
1 condition			
AMI only	8176 (6.8)	2.96 (2.56-3.42) **	3.08 (2.63-3.60) **
SAoD only	5574 (3.1)	1.23 (0.98-1.55)	1.54 (1.19-2.00) *
CMC only	17890 (25.8)	3.68 (3.35-4.05) **	2.72 (2.44-3.02) **
Poverty only	11770 (6.4)	2.81 (2.57-3.21) **	1.43 (1.23-1.66) **
2 conditions			
AMI and SAoD	2893 (1.7)	2.74 (2.14-3.50) **	3.48 (2.69-4.50) **
AMI and CMC	4309 (5.1)	8.71 (7.81-9.72) **	6.72 (5.92-7.63) **
AMI and poverty	2466 (1.5)	8.22 (6.89-9.81) **	4.24 (3.45-5.23) **
SAoD and CMC	1556 (1.2)	4.38 (3.26-5.89) **	4.00 (2.97-5.39) **
SAoD and poverty	1716 (0.7)	3.05 (2.08-4.46) **	2.04 (1.37-3.03) *
CMC and poverty	3654 (3.0)	10.07 (8.61-11.78) **	3.56 (2.95-4.30) **
3 conditions			
AMI, SAoD, and CMC	1191 (0.9)	6.49 (5.18-8.13) **	6.07 (4.54-8.12) **
AMI, SAoD, and poverty	1033 (0.5)	8.14 (6.27-10.57) **	4.72 (3.44-6.46) **
AMI, CMC, and poverty	1489 (1.3)	24.54 (20.42-29.51) **	9.41 (7.53-11.76) **
SAoD, CMC, and poverty	488 (0.2)	8.35 (5.73-12.18) **	4.53 (2.87-7.13) **
4 conditions			
AMI, SAoD, CMC, and poverty	472 (0.3)	17.04 (12.27-23.67) *	9.32 (6.67-13.02) **

AMI = any mental illness; AOR = adjusted odds ratio; CI = confidence intervals; CMC = chronic medical conditions; OR = odds ratio SAoD = substance abuse and/or dependence.

Odds of reporting poor/fair self-rated health compared to good/very good/excellent health.

^aAdjusted for age, gender, race/ethnicity, marital status, county metro status, education, employment, government assistance, and health insurance

^bAll groups are mutually exclusive

* p<.01,

** p<.001