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Concordance between DSM-5 and DSM-IV nicotine, alcohol, and cannabis use disorder diagnoses among pediatric patients

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Abstract

Background—The recently published Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) includes several major revisions to substance use diagnoses. Studies have evaluated the impact of these changes among adult samples but research with adolescent samples is lacking.

Methods—525 adolescents (93% African American) awaiting primary care appointments in Baltimore, Maryland were recruited for a study evaluating a substance use screening instrument. Participants were assessed for DSM-5 nicotine, alcohol, and cannabis use disorder, DSM-IV alcohol and cannabis abuse, and DSM-IV dependence for all three substances during the past year using the modified Composite International Diagnostic Interview-2, Substance Abuse Module. Contingency tables examining DSM-5 vs. DSM-IV joint frequency distributions were examined for each substance.

Results—Diagnoses were more prevalent using DSM-5 criteria compared with DSM-IV for nicotine (4.0% vs. 2.7%), alcohol (4.6% vs. 3.8%), and cannabis (10.7% vs. 8.2%). Cohen's κ , Somers' d , and Cramer's V ranged from 0.70-0.99 for all three substances. Of the adolescents categorized as “diagnostic orphans” under DSM-IV, 7/16 (43.8%), 9/29 (31.0%), and 13/36 (36.1%) met criteria for DSM-5 disorder for nicotine, alcohol, and cannabis, respectively. Additionally, 5/17 (29.4%) and 1/21 (4.8%) adolescents who met criteria for DSM-IV abuse did not meet criteria for a DSM-5 diagnosis for alcohol and cannabis, respectively.

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Contributors

All authors assisted in the conceptualization and design of the study. Drs. Kelly and Schwartz managed the literature searches and summaries of previous related work. Dr. Kelly undertook the statistical analysis, under the direction of Dr. O’Grady. Drs. Kelly and Schwartz wrote the first draft of the manuscript, which was revised and edited by all authors. All authors contributed to and have approved the final manuscript.

Conflict of Interest

The authors report no conflicts of interest.

Conclusions—Categorizing adolescents using DSM-5 criteria may result in diagnostic net widening—particularly for cannabis use disorders—by capturing adolescents who were considered diagnostic orphans using DSM-IV criteria. Future research examining the validity of DSM-5 substance use disorders with larger and more diverse adolescent samples is needed.

Keywords

adolescent; DSM-5; DSM-IV; diagnostic concordance; substance use disorder

1. INTRODUCTION

In the recently-published Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychiatric Association, 2013), substance use disorder (SUD) diagnoses were revised based on findings of the American Psychiatric Association's Substance-Related Disorders Work Group (Hasin et al., 2013). Changes were guided by findings from item response theory studies, which identified several recurring issues with DSM-IV, including limited diagnostic utility of the legal problems criterion (Hartman et al., 2008; Hasin et al., 2012), support for craving as an SUD criterion (Keyes et al., 2011), evidence of cannabis withdrawal syndrome (Chung et al., 2008), and problems with having two separate diagnoses (abuse and dependence) with different levels of severity (Gelhorn et al., 2008; Langenbucher et al., 2004; Martin et al., 2006). A related issue pertained to “diagnostic orphans,” or individuals who do not meet criteria for abuse or dependence but have 1-2 dependence symptoms (Hasin and Paykin, 1999; Pollock and Martin, 1999), placing them at risk of a future SUD (Degenhardt et al., 2008; Gelhorn et al., 2008).

Final revisions to DSM-5 included merging abuse and dependence into a single diagnosis called substance use disorder, eliminating the legal-involvement criterion, and adding a craving criterion and cannabis withdrawal (excluded in DSM-IV cannabis dependence). Additionally, criteria for nicotine use disorder (NUD) are consistent with criteria for other SUDs in DSM-5. A DSM-5 SUD diagnosis requires endorsement of at least 2 of the 11 criteria, and includes mild (2-3 items), moderate (4-5 items), and severe (6 items) SUD (American Psychiatric Association, 2013).

Studies examining concordance between DSM-5 and DSM-IV diagnoses among adults have been mixed. Chung and colleagues (2012) found DSM-5 NUD to be 44.3% more prevalent than DSM-IV nicotine dependence with young adults. Several studies found greater prevalence of DSM-5 alcohol use disorder (AUD) compared with DSM-IV alcohol abuse and dependence, reporting differences of 11.3% (Agrawal et al., 2011), 25.3% (Hagman and Cohn, 2011), 61.7% (Mewton et al., 2011), and 0.8% (Peer et al., 2013). Discrepancies are likely due to differences in populations studied or ratio of abuse-to-dependence among participants, and/or operationalization of DSM criteria (Agrawal et al., 2011; Peer et al., 2013). Dawson and colleagues (2013) found 30.2% greater prevalence of DSM-5 mild AUD than DSM-IV alcohol abuse, but 12.8% less prevalence of DSM-5 moderate-to-severe AUD than DSM-IV alcohol dependence. Peer and colleagues (2013) found a 4.1% increase in diagnoses when using DSM-5 criteria for cannabis use disorder (CUD) compared with

DSM-IV cannabis abuse and dependence. However, Mewton and colleagues (2013) found DSM-5 CUD to be 14.8% less prevalent than DSM-IV cannabis abuse and dependence.

The appropriateness of using DSM criteria with adolescents has been questioned due to differences in substance use patterns, DSM criteria endorsement, and interpretation of DSM items (Chung and Martin, 2002, 2005). Only one study has compared DSM-IV and DSM-5 SUD diagnoses in adolescents (Chung et al., 2012), which found DSM-5 NUD to be twice as prevalent as DSM-IV nicotine dependence. Thus, we examined the concordance between DSM-5 and DSM-IV diagnoses for nicotine, alcohol, and cannabis in adolescent pediatric patients. We hypothesized that using DSM-5 criteria would result in greater SUD prevalence for all three substances due to DSM-5's lower threshold requirement and expanded number of symptoms for NUD and CUD.

2. METHODS

2.1. Participants and setting

Study participants were 525 adolescents awaiting primary care appointments at three sites of a Federally Qualified Health Center that provides services to medically underserved and uninsured residents in Baltimore, Maryland. Participants enrolled June, 2012 through February, 2013 for a study evaluating a substance use screening instrument. Of 584 eligible adolescents approached, 54 refused participation, and data from 5 participants were lost due to data transmission error.

Inclusion criteria were: 1) 12-17 years of age; and 2) willingness to provide informed assent. The study was approved by Friends Research Institute's Institutional Review Board (IRB). No identifying information was collected and the IRB approved waivers of written assent and parental consent.

2.2. Procedure

A Research Assistant (RA) approached eligible adolescents (and parents, if present) attending medical visits and asked if they would like to hear about the study. The RA described the study in a private room using an IRB-approved information sheet. Upon obtaining adolescents' informed assent, parents returned to the waiting area and the RA administered study measures to participants. All participants received a \$20 gift card for a sandwich shop.

2.3. Measures

A modified Composite International Diagnostic Interview (Second Edition) Substance Abuse Module (CIDI-2 SAM; Cottler, 2000) consisting only of the items pertaining to the diagnostic classifications was administered by the RA. CIDI-2 SAM alcohol, nicotine, and illicit substance items map to DSM-IV diagnostic criteria for abuse (1 item of 4; alcohol and illicit substances only) and dependence (3 items of 7 [3 of 6 for cannabis]) during the past year. The modified CIDI-2 SAM included the remaining items needed to diagnose NUD (which were not used for a nicotine abuse diagnosis in DSM-IV), and items pertaining

to craving for each substance and cannabis withdrawal, thereby allowing for DSM-5 SUD diagnoses (2 items of 11).

2.4. Statistical analysis

Only past-year nicotine, alcohol, and cannabis use were examined because of infrequent use for all other substances. For DSM-5, participants were categorized as: not meeting criteria for disorder—0 symptoms; sub-threshold for disorder—1 symptom; meeting criteria for mild disorder (2-3 symptoms); or meeting criteria for moderate-to-severe disorder (4 symptoms; American Psychiatric Association, 2013). For DSM-IV, participants were categorized as: not meeting criteria for abuse or dependence—0 symptoms; diagnostic orphans —1-2 dependence symptoms and no criteria for abuse; meeting criteria for abuse only (alcohol and cannabis); or meeting criteria for dependence (regardless of whether they met criteria for abuse).

Contingency tables (3 X 4 for nicotine, 4 X 4 for alcohol and cannabis) examining the joint frequency distributions of DSM-5 vs. DSM-IV were calculated and likelihood-ratio exact tests of independence were determined for each substance, together with Somers' *d* symmetric measure of association for ordinal variables and Cramer's V measure of association for nominal variables. Cohen's kappa (κ) measure of agreement was obtained for alcohol and cannabis only because κ is restricted to square tables where rows and columns represent the same scaling.

3. RESULTS

3.1. Participant demographics

The 525 participants were 55% female and 93% African American. Half were 15-17 years old; 60% were in high school. The study sample was representative of adolescent patients treated at the three health centers.

3.2. Nicotine

Of the 525 participants, 21 (4.0%) met DSM-5 criteria for NUD (Table 1): 10 (47.6%) of these adolescents met criteria for mild disorder and 11 (52.4%) met criteria for moderate-to-severe disorder. In contrast, 14 participants (2.7%) met criteria for DSM-IV dependence (see Table 2 for values for measures of association).

Of the 16 participants categorized as diagnostic orphans for nicotine dependence under DSM-IV, 7 (43.8%) met criteria for mild NUD under DSM-5; 2 of these 7 adolescents obtained their DSM-5 diagnosis due to the DSM-5 craving item.

3.3. Alcohol

For alcohol, 24 (4.6%) of 525 participants met criteria for DSM-5 AUD: 20 (83.3%) of these adolescents met criteria for mild and 4 (16.7%) met criteria for moderate-to-severe disorder. Regarding DSM-IV, 20 (3.8%) participants met criteria for a diagnosis, including 17 (3.2%) for abuse and 3 (0.6%) for dependence.

Of the 29 participants categorized as diagnostic orphans for DSM-IV alcohol dependence, 9 (31.0%) met criteria for DSM-5 mild AUD; no one switched categories due to the added craving item. In contrast, 5 (29.4%) of the 17 participants who met criteria for DSM-IV alcohol abuse failed to meet criteria for AUD under DSM-5, including 2 adolescents who lost their diagnosis due to the elimination of the legal item in DSM-5.

3.4. Cannabis

Regarding cannabis, 56 (10.7%) participants met criteria for DSM-5 CUD: 27 (48.2%) of these adolescents met criteria for mild and 29 (51.8%) met criteria for moderate-to-severe CUD. In contrast, 43 (8.2%) participants met criteria for a DSM-IV diagnosis, including 21 (4.0%) for abuse and 22 (4.2%) for dependence.

Of the 36 adolescents categorized as diagnostic orphans for DSM-IV cannabis dependence, 13 (36.1%) met criteria for DSM-5 CUD. Five of these participants met criteria for mild CUD due to endorsement of either the new craving item ($n=4$) or the new cannabis withdrawal item ($n=1$); 3 participants endorsed both craving and withdrawal resulting in a diagnosis of moderate CUD. One participant had no DSM-IV symptoms but endorsed both craving and withdrawal and met criteria for DSM-5 mild CUD. Only 1 participant (4.8%) of the 21 who met criteria for DSM-IV abuse failed to meet criteria for DSM-5 CUD, which was due to elimination of the legal item in DSM-5.

4. DISCUSSION

This is the first study of which we are aware comparing DSM-IV and DSM-5 diagnostic categories for nicotine, alcohol, and cannabis use disorders in pediatric patients. Findings show moderate-to-strong agreement between DSM-IV and DSM-5 diagnoses for all three substances among 525 mostly African-American participants. Much of the discordance between DSM-5 and DSM-IV categorizations may be attributable to the considerable minority of participants who were considered diagnostic orphans using DSM-IV criteria but had a diagnosis using DSM-5 criteria. In the case of nicotine, which did not have an abuse diagnosis in DSM-IV, nearly half of adolescents categorized as diagnostic orphans in DSM-IV met criteria for DSM-5 NUD. Our findings are consistent with the only other published study that examined concordance between DSM-IV and DSM-5 diagnoses among adolescents, which found DSM-5 NUD to be twice as prevalent as DSM-IV nicotine dependence among mostly Caucasian participants in substance abuse treatment (Chung et al., 2012).

The elimination of the legal item in DSM-5 resulted in 2 of 5 (40%) switches from having a diagnosis in DSM-IV to not having a diagnosis in DSM-5 for alcohol, and the only such switch for cannabis. The new craving item in DSM-5 accounted for nearly a third of the new diagnoses for nicotine. Chung and colleagues (2012) also found an increase in DSM-5 NUD diagnoses in their adolescent sample that was largely attributed to the new craving item. Craving did not account for any of the new DSM-5 alcohol diagnoses in our study. For cannabis, endorsement of 1-2 DSM-IV dependence items plus the new craving item accounted for 4 of the 14 new DSM-5 CUD diagnoses, and endorsement of 1-2 dependence items plus cannabis withdrawal accounted for 1 new CUD diagnosis. Endorsement of both

craving and withdrawal accounted for 4 new diagnoses in DSM-5. Therefore, the addition of craving and/or withdrawal accounted for nearly two-thirds (9 of 14) of new DSM-5 CUD diagnoses in this study.

Thus, categorizing adolescents using DSM-5 SUD criteria may result in widening of the diagnostic net. Because studies have shown that individuals classified as DSM-IV diagnostic orphans for alcohol (Harford et al., 2010; Schuckit et al., 2008) or marijuana (Degenhardt et al., 2008) may be at risk for developing abuse or dependence diagnoses compared with individuals who do not endorse any criteria, net widening may be beneficial. Increasing the number of adolescents with SUDs may afford more opportunities for these adolescents to receive brief interventions from their primary care providers. Likewise, more adolescents may be referred to substance abuse treatment.

Conversely, diagnostic net widening may lead to an increase in the number of adolescents characterized with a disorder that may never progress to more serious involvement with substances, possibly leading to stigmatization (Winters et al., 2011). It could also increase the heterogeneity of the type of adolescents who are labeled with SUD, confounding future clinical research with this population (Chung et al., 2012).

Rates of DSM-IV alcohol diagnoses in the study sample (3.8%) were similar to national rates for 12-17 year-olds in 2012 (3.4%). However, DSM-IV cannabis diagnoses in this study (8.2%) were more than twice the national rate (3.2%) for this age group (SAMHSA, 2013).

A number of limitations may have affected generalizability, including a mostly African-American sample and only a modest number of participants meeting SUD criteria. More research is needed on the validity of DSM-5 nicotine, alcohol, and cannabis use disorders with larger and more diverse samples.

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TABLE 1

Crosstabulations for DSM-5 vs. DSM-IV for nicotine, alcohol, and cannabis use (N=525)

DSM-5	DSM-IV				Total
	Neither abuse nor dependence (0 symptoms)	DSM-IV diagnostic orphans (1-2 symptoms of 7 for dependence and no abuse) ^a	Abuse (1 symptom of 4)	Dependence (3 symptoms of 7) ^a	
Nicotine		<i>n</i> (row %)			
Doesn't meet criteria for disorder (0 symptoms)	493 (100.0)	0 (0.0)	----	0 (0.0)	493
DSM-5 sub threshold for disorder (1 symptom)	2 (18.2)	9 (81.8)	----	0 (0.0)	11
Mild disorder (2-3 symptoms)	0 (0.0)	7 (70.0)	----	3 (30.0)	10
Moderate/Severe disorder (4 symptoms)	0 (0.0)	0 (0.0)	----	11 (100.0)	11 ^b
Total	495	16	----	14	525
Alcohol		<i>n</i> (row %)			
Doesn't meet criteria for disorder (0 symptoms)	476 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	476
DSM-5 sub threshold for disorder (1 symptom)	0 (0.0)	20 (80.0)	5 (20.0)	0 (0.0)	25
Mild disorder (2-3 symptoms)	0 (0.0)	9 (45.0)	10 (50.0)	1 (5.0)	20
Moderate/Severe disorder (4 symptoms)	0 (0.0)	0 (0.0)	2 (50.0)	2 (50.0)	4 ^c
Total	476	29	17	3	525
Cannabis		<i>n</i> (row %)			
Doesn't meet criteria for disorder (0 symptoms)	445 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	445
DSM-5 sub threshold for disorder (1 symptom)	0 (0.0)	23 (95.8)	1 (4.2)	0 (0.0)	24
Mild disorder (2-3 symptoms)	1 (3.7)	10 (37.0)	14 (51.9)	2 (7.4)	27
Moderate/Severe disorder (4 symptoms)	0 (0.0)	3 (10.3)	6 (20.7)	20 (69.0)	29 ^d
Total	446	36	21	22	525

Note: DSM-IV does not have an abuse diagnosis for nicotine. No participants reported the DSM-IV legal item only for alcohol or cannabis or the DSM-5 craving item only for nicotine, alcohol, or cannabis.

^a 3 symptoms of 6 for cannabis dependence since withdrawal was not included in DSM-IV cannabis dependence

^b 3 moderate, 8 severe

^c 3 moderate, 1 severe

^d 14 moderate, 15 severe

Chi-square (χ^2) test of independence, Cohen's Kappa (κ), symmetric Somers' d , and Cramer's V measures of association for DSM-5 vs. DSM-IV crosstabulations for nicotine, alcohol, and cannabis use ($N=525$)

TABLE 2

	χ^2	κ	Symmetric Somers' d	Cramer's V
Nicotine	248.8	----	0.96	0.90
Alcohol	344.1	0.81	0.99	0.70
Cannabis	925.1	0.84	0.98	0.77

Notes: Degrees of freedom (df) for likelihood ratio χ^2 test is 6 for nicotine and 9 for alcohol and cannabis; all p values < 0.001. Cohen's κ is a measure of nominal scale agreement between two categorizations of responses or ratings; it is restricted to square tables where row and column values represent the same scaling. Thus, there is no κ value for nicotine. Symmetric Somers' d is an ordinal measure of association between categorizations and indicates the proportional reduction in error from predicting the ranking of respondents in one categorization from the ranking in the other categorization. Cramer's V is a measure of association for nominal variables for use with tables greater than 2×2 in size.