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Substance Dependence Disorders and Patterns of Psychiatric Comorbidity among At-Risk Teens: Implications for Social Policy and Intervention

Ingrid Obsuth, Gillian K. Watson, & Marlene M. Moretti

Drug and alcohol use is a widespread and serious problem among pre-teens and adolescents in virtually all developed countries, and substance use disorders are among the most prevalent mental health problems in high-risk adolescents and young adults.¹ The fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)² specifies diagnostic criteria for two levels of substance use disorders—substance abuse and substance dependence. *Substance abuse* is defined by a period of at least 12 months of continued use of a specified substance in conjunction with negative consequences such as failure to fulfill life obligations (e.g., repeated absence or poor performance at work or at school, repeated suspensions or expulsions from school, neglect of children or household), legal problems (e.g., arrests for substance-related disorderly conduct), recurrent substance use in situations in which it is hazardous (e.g., driving a car while impaired), and/or other significant social problems (e.g., physical fights, arguments with romantic partners or parents related to intoxication). *Substance dependence*, the more serious of the two diagnoses, is marked by the development of tolerance for a particular substance (i.e., addiction or needing increased amounts to experience intoxication or desired effects) and/or withdrawal symptoms when not using the substance. Additional symptoms include spending a great deal of time on activities necessary to obtain the substance and/or recover from its effects, experiencing a persistent desire for the substance, and experiencing

unsuccessful attempts to cut down and/or continuing to use despite the knowledge of the harmful effects. Unlike other diagnoses in the DSM-IV-TR, substance abuse and substance dependence do not require an age cut-off, which means that youth of any age can be diagnosed with these disorders.

Over the past few decades, researchers in the U.S. and other countries have noted a steady increase in substance use by young people in the general population.³ An even greater increase has been noted in high-risk youth⁴ and youth involved with the juvenile justice system.⁵ U.S. based estimates range from approximately 44-87% for the prevalence of substance use and dependence in juvenile detainees with slightly higher rates for males.⁶ In Canada, according to the Ontario Student Drug Use Survey 2 from 2007,⁷ use in the general population is high: 65% of youth in grades 7-12 reported lifetime use of alcohol, 30% cannabis, 4% cocaine and less than 4% other drugs, including heroin, ketamine (an anesthetic, which in high doses elicits dissociative and hallucinatory effects), and crystal methamphetamine. These numbers are likely underestimates as they do not include high-risk youth who do not attend school. High prevalence rates of substance use disorders have also been reported in youth who have been incarcerated for several months. For example, of 790 recently interviewed female and male adolescents who were incarcerated for at least nine months at the time of the interview, 80% met criteria for some type of current substance use disorder.⁸

Footnotes

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2. AM. PSYCHIATRIC ASS'N, DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS (4th ed. 2000).
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8. Niranjana S. Karnik, Marie Soller, Allison Redlich, Melissa Silverman, Helena C. Kraemer, Rudy Haapanen & Hans Steiner, *Prevalence of and Gender Differences in Psychiatric Disorders Among Juvenile Delinquents Incarcerated for Nine Months*, 60 PSYCHIATRIC SERVICES 838 (2009).

Researchers in the fields of developmental and health psychology have investigated the links between childhood familial and neighborhood experiences, and later substance use problems. They identified numerous early risk factors related to adolescent substance use, abuse, and dependence, including exposure to childhood sexual abuse,⁹ childhood physical abuse,¹⁰ residential and caregiver instability during childhood,¹¹ and neglectful and distant parenting.¹² Reasons for substance use initiation are complex and multifaceted; however, most studies suggest that the negative impact of adverse childhood experiences can reduce the ability to cope with stressful events and substance use may be utilized as a maladaptive strategy for coping¹³ and regulating affect.¹⁴

The negative consequences of early drug and alcohol use can be broad and long lasting. For example, individuals with early onset and long-standing substance use problems are less likely to complete high school,¹⁵ hold a job,¹⁶ or maintain meaningful relationships.¹⁷ Further, prolonged substance use is directly linked to a variety of physical and mental health problems, which may result in disability¹⁸ and other debilitating effects in everyday functioning, such as homelessness.¹⁹ Not surprisingly, substance use disorders often co-occur with other mental health disorders, and further increase risk for later psychopathology and general maladjustment.

Considerable evidence points to the direct link between substance use and violence.²⁰ There are at least three ways in which substance use contributes to aggression: 1) substance use can directly facilitate violent crimes through its pharmacological effects directly causing aggression, or through the effects on other factors such as threat perception, impulsivity, and involvement in aversive environments, which in turn may lead to aggression; 2) substance use or dependence may lead to crimes to support drug habits; and 3) substance use results in

association with criminal networks and activities such as drug dealing which in turn increase risk for criminal behavior independent of substance use. Furthermore, evidence suggests that youth who are diagnosed with a substance use disorder before the age of 16 are four times more likely to be incarcerated in connection with a substance-related offense when they are adults.²¹ Thus, providing prevention and early and effective intervention for substance use problems among high-risk youth has the potential to result in enormous cost savings, through reductions in the utilization of the adult mental health system, adult justice system, criminal justice system and costs associated with the victims of crime.

A thorough understanding of the complex mental health profiles of justice-involved youth with substance dependence problems is fundamental to developing effective interventions and to tailoring interventions to fit individual youths' profiles. For example, understanding the age of onset of drug exposure, rates of abuse and dependence, type of substances used, gender differences in the effects of exposure, and comorbidity with other mental health disorders can facilitate effective rehabilitation. The current review summarizes the mental health profiles of justice involved youth based on the findings from the Gender and Aggression Project (GAP)—Vancouver Site. To assess mental health disorders as defined by the DSM-IV (Diagnostic Statistical Manual published by the American Psychiatric Association in 1994) we administered the widely used Diagnostic Interview for Children and Adolescents (DICA-R)²² to 141 justice-involved youth (65 females, 76

Considerable evidence points to the direct link between substance use and violence.

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21. Eric P. Slade, Elizabeth A. Stuart, David S. Salkever, Mustafa Karakus, Kerry M. Green & Nicholas Ialongo, *Impacts of Age of Onset of Substance Use Disorders on Risk of Adult Incarceration Among Disadvantaged Urban Youth: A Propensity Score Matching Approach*, 95 DRUG & ALCOHOL DEPENDENCE 1 (2008).
22. Wendy Reich, *Diagnostic Interview for Children and Adolescents (DICA)*, 39 J. AM. ACAD. CHILD. & ADOLESCENT PSYCHIATRY 59 (2000).

[I]n our study girls and boys reported similar rates of Alcohol, Marijuana, and Street Drug Dependence...

males) between the ages of 12 and 18 years. The DICA consists of a series of questions that map onto the DSM-IV diagnostic criteria for each mental health disorder and generates both current (i.e., whether the person met criteria for the disorder within the past 12 months) and lifetime (i.e., whether the person met criteria for the disorder

at any time in their life) diagnoses. The diagnoses considered in this review are: Substance Abuse (SA) and Substance Dependence (SD) with respect to Alcohol, Marijuana and Street Drugs (heroin, cocaine, speed, downers, crack, and psychedelic drugs); Conduct Disorder (CD); Attention Deficit Hyperactivity Disorder (ADHD); Major Depressive Episode (MDE); and Posttraumatic Stress Disorder (PTSD). All youth whom we interviewed were either referred to a provincial center mandated to serve youth with serious aggressive and anti-social behavior or detained in youth custody centers.

RATES OF SUBSTANCE ABUSE

Consistent with previous reports,²³ the rates of substance abuse were high in this high-risk population: 77% of youth met criteria for at least one current SA disorder (alcohol, marijuana, and/or street drugs), and 83% of youth met criteria for an SA disorder at one point in their lives. The most prevalent type of SA disorder was alcohol abuse: more than two-thirds of youth met criteria for a current (65%) or lifetime (72%) diagnosis of alcohol abuse disorder. The prevalence of marijuana abuse was also quite high: 55% of youth met criteria for current marijuana abuse, and 69% met criteria for lifetime marijuana abuse. The rate of street drug abuse was not much lower: approximately half of the youth in the study met criteria for street drug abuse currently or at one point in their life (48% and 51%, respectively).

RATES OF SUBSTANCE DEPENDENCE DISORDER

Typically, substance abuse, the less severe of the two substance-related disorders, is substantially more prevalent than substance dependence among youth in the general population.²⁴ In this sample, however, rates of SA disorder were only 6-12% higher than were rates of SD disorder, which are reported below. The high degree of overlap between youth who met criteria for SA and SD in the current sample is likely due to the high-risk nature of this population.

Consistent with others' reports,²⁵ in our study girls and boys reported similar rates of Alcohol, Marijuana, and Street Drug Dependence both *currently* (i.e., in the period 12-months before and up to the time of assessment) and in their *lifetime* (i.e., ever in their life). Of all youth, 70% met criteria for at least one SD disorder at the time of the assessment, and 74% of youth met criteria for at least one dependence disorder over their lifespan. This is an alarmingly high prevalence rate as it indicates that

approximately three quarters of all youth are experiencing significant impairments in their daily lives because of an addiction to at least one type of substance. In addition, the comparable rates of current and lifetime dependence suggest that most of these youth had become dependent within the 12 months before testing, that is, during adolescence.

RATES OF SPECIFIC TYPES OF SUBSTANCE DEPENDENCE DISORDERS AND AGE OF FIRST EXPOSURE

With respect to specific substances, 57% of youth met criteria for a current Alcohol Dependence (AD) and 61% of youth met criteria for a lifetime diagnosis of AD. Females endorsed the first diagnostic (or significantly impairing) symptom of AD at an average age of 13.3 and males at 13.8 years of age. However, both females and males reported to first take a drink much earlier, at an average age of only 10.6 years. This is an extraordinarily young age for first exposure, but it appears that there may be an approximately three-year-long window of opportunity between the ages of first use and alcohol dependence for an early intervention targeting children who begin drinking at this early age.

Further, 48% of youth met criteria for current Marijuana Dependence (MD) and 57% met criteria for lifetime MD. Females endorsed the first diagnostic (or significantly impairing) symptom of MD at an average age of 12.6 and males at an average age of 13.0. However, both females and males reported to have started using marijuana at a slightly younger age (at 11.2 and 11.5 years, respectively). These results suggest that on average, children begin to use marijuana approximately one year after their first use of alcohol, but their use of marijuana escalates to dependence much more quickly; in approximately one year as compared to three years for AD.

Finally, 40% of youth met criteria for current Street Drug Dependence (SDD), and 45% met criteria for a lifetime diagnosis of SDD. Females endorsed the first diagnostic symptom of SDD at 13.2 and males at 14.1 years of age. In this case, females reported to have started using street drugs at a slightly younger age (12.9) than did males (13.6). Not surprisingly, compared to alcohol and marijuana use, youth began to use street drugs at an older age; however, they progressed to symptoms of dependence faster. Specifically, both females and males endorsed symptoms of SDD less than one year following first use. This indicates that similar to MD, the window of opportunity to prevent addiction in youth once they begin using street drugs is quite limited.

Of the 64 youth who met criteria for SDD at some time in their life, more females than males reported heroin use (52% vs. 32%, respectively) and downers (e.g., barbiturates, sleeping pills, tranquilizers, etc.; 70% vs. 48%, respectively). However, the most popular drugs, which both females and males used, were cocaine (94% of both males and females), speed (e.g. amphetamines, Dexedrine, etc.; 91% and 81%, respectively), crack (88% and 77%, respectively) and psychedelic drugs (e.g., LSD, mescaline, peyote, DMT, etc.; 74% and 73%, respectively). In terms of number of drugs tried, 27% of males and

23. McCrystal, *supra* note 4.

24. AM. PSYCHIATRIC ASS'N, *supra* note 2.

25. Abrams, Teplin, McClelland & Dulcan, *supra* note 6.

16% of females reported having tried each of these six categories of drugs, and 79% of females and 61% of males reported trying at least four of these different types of drugs over their lifespan. Thus, while the rates of street drug dependence in females and males are comparable, females tend to report experimenting with a wider variety of street drugs than males. This suggests that females may have less specific drug preferences, but instead are willing to use multiple drugs and thus are at higher risk for harmful health outcomes such as overdose, blood-borne diseases, and the short- and long-term impact of drug combinations on cognitive functioning.²⁶

POLY-SUBSTANCE DEPENDENCE DISORDERS

With respect to dependence on multiple substances (poly-dependence), currently 23% of youth met criteria for all three SD disorders (AD, MD, and SDD) and 52% of youth met criteria for at least two of the three dependences. Specifically, 38% of youth met criteria for both current AD and current MD, 32% met criteria for both current AD and current SDD, and 29% met criteria for both current MD and current SDD. The fact that more than half of all youth met criteria for at least two dependences is extremely concerning given the increased difficulties in treating individuals with multiple SD compared to one.

With respect to poly-dependence over the lifespan, 33% of youth met criteria for all three SD disorders and 57% of youth met criteria for at least two of the three dependences. Specifically, 45% of youth met criteria for both a lifetime diagnosis of AD and MD, 37% met criteria for both AD and SDD, and 40% met criteria for both MD and SDD.

In summary, it appears that early drug exposure and multiple SD disorders are relatively common among justice-involved youth, both females and males. Early substance use, abuse, and dependence are unquestionably related to increased rates of juvenile offending. As mentioned previously, this could be because of crimes committed under the influence of substances, altercations surrounding drug dealing, or crimes committed to get substances on which they are dependent. A variety of factors are associated with early substance use, including parental substance use or various forms of child maltreatment.²⁷ Many youth with early substance use problems have multiple stressors in their lives that lead them to use substances as a way of coping.²⁸

COMORBIDITY OF SUBSTANCE DEPENDENCE DISORDERS WITH OTHER MENTAL DISORDERS

Not surprisingly, substance use disorders often occur in conjunction with other mental health conditions. In the next section of this paper we summarize the comorbid mental health disorders experienced by justice-involved youth with diagnosable SD: Major Depressive Episodes (MDE), Conduct

Disorder (CD), Attention Deficit Hyperactivity Disorder (ADHD), and Posttraumatic Stress Disorder (PTSD). Two sets of prevalence rates for comorbidity are presented. First, we present comorbidity with *current* diagnosable SD based on the 72% of females and 67% of males in our sample who met criteria for a current SD at the time they were assessed. Next we present the prevalence rates for comorbidity with *lifetime* diagnosable SD based on the sample of 77% of females and 71% of males in our sample who meet criteria for at least one SD (alcohol dependence, marijuana dependence, and/or street drug dependence) at any point in their life.

[Adolescent] females... are at higher risk for harmful health outcomes... and the short- and long-term impact... on cognitive functioning.

With respect to comorbidity of mental health disorders among youth with *current* SD, we examined the co-occurrence of CD, ADHD, and MDE. A significant proportion of youth with a current SD had at least one additional disorder (88%) and 48% had at least two additional disorders. No gender differences were noted in the proportion of females and males who were diagnosed with up to two additional disorders; however, significantly more females (23%) than males (8%) met criteria for all four diagnoses: that is, SD in conjunction with CD, ADHD, and MDE. Examination of the comorbidity of SD with each of the other individual disorders further elucidates this gender difference. Specifically, no gender differences were observed in the rates of comorbidity between SD and CD (81% of youth) and comorbidity between SD and ADHD (47% of youth). However, twice as many females were diagnosed with both SD and MDE (32%) than were males (16%). This finding has significant implications for treatment of these justice-involved adolescent girls because youth with comorbid internalizing and externalizing disorders have worse outcomes and often require more comprehensive treatments than youth with only externalizing disorders.²⁹

An investigation of the lifetime mental health problems of youth with SD elucidated a range of complex needs and vulnerabilities these youth have experienced throughout their lives thus far. Of the youth who met criteria of a SD at some point in their lifetime, nearly all (96%) also met criteria for *at least one* other mental health disorder, and three quarters (75%) also met criteria for *at least two* other lifetime mental health disorders. No gender difference emerged in these rates. However, consistent with results for comorbidity of current disorders, significantly more females (55%) than males (22%) had been diagnosed with *three or more* disorders in addition to SD over their lifespan.

26. Stephen E. Lankenau & Michael C. Clatts, *Patterns of Polydrug Use Among Ketamine Injectors in New York City*, 40 *SUBSTANCE USE & MISUSE (SPECIAL ISSUE)* 1381 (2005).

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28. Chiong, Bry & Johnson, *supra* note 13.

29. R. Jeffrey Goldsmith, *Overview of Psychiatric Comorbidity: Practical and Theoretical Considerations*, 22 *PSYCHIATRIC CLINICS N. AM.* 331 (1999).

Our findings also highlight the young age at which youth first use substances.

To better understand why females with SD are diagnosed with a greater number of co-occurring disorders than males over their lifespan, we examined the comorbidity of each of the individual disorders. This examination revealed that com-

parable rates of SD-diagnosed females (84%) and males (91%) also met criteria for conduct disorder. Similarly, there were no gender differences between females (70%) and males (76%) who met criteria for a lifetime diagnosis of SD and also ADHD. However, significantly more females (40%) than males (13%) met criteria for SD and PTSD. Similarly, significantly more females (48%) than males (26%) met criteria for SD and MDE. This is particularly important as depression is associated with suicidal thoughts and behaviors and thus can present a life-threatening condition. Further, PTSD is linked to difficulties controlling impulsive behavior when distressed,³⁰ which has a potential to contribute to the perpetuation of aggressive and delinquent behavior. While substance use in these youth may be an attempt to escape overwhelming and distressing thoughts and feelings, it likely only exacerbates these difficulties. A more thorough understanding of the interaction between these youths' different mental health problems and the links between them will result in better informed and targeted treatment and rehabilitation programs.

IMPLICATIONS FOR POLICY AND INTERVENTION

Information generated from our research in conjunction with findings from other studies point to important gender differences in SD and comorbid mental health disorders among justice-involved females and males. Extremely high comorbidity rates of a variety of mental health disorders with current or lifetime SD was evident in both females and males. However, compared to males, the mental health profiles of females are further complicated by increased rates of internalizing disorders, specifically MDEs and PTSD. The combination of externalizing and internalizing problems in justice-involved females represents a particularly complex picture of treatment needs. Internalizing disorders, such as depression- and trauma-related conditions, often go undetected in this population because of the justice systems' focus on antisocial and delinquent behavior.³¹ Our failure to detect problems such as depression and trauma can prolong the course of severe mental health problems, including the potential for self-harm, and compromise

the degree to which youth are responsive to rehabilitation. This is particularly likely in high-risk populations as research suggests that those youth who exhibit emotional problems are at the greatest risk for other serious problems, including continuing substance use³² and persistent offending behaviors.³³ Therefore, it is imperative that screening protocols that fully assess a broad range of mental health disorders be implemented for all high-risk youth but in particular for justice-involved young females. Assessment results should be used to tailor intervention within correctional setting and recommendations for community monitoring.

Our findings also highlight the young age at which youth first use substances (approximately age 10 for alcohol, age 11 for marijuana and age 12-13 for street drugs in both males and females). SD soon follows, between one year (for marijuana and street drugs) to three years (for alcohol) later. The gap between the age at first use and onset of severe difficulties related to substance abuse highlights the need for prevention, early identification, and effective intervention with these youth. Intervening with youth at the time of first use may slow or stop the progression to SD as well as other comorbid mental health problems and accompanying difficulties, including antisocial and delinquent behavior. Additionally, given the high rates of polysubstance use and abuse in high-risk youth and young adults, early identification and treatment at first use of any substance may prevent youth from escalating to use multiple substances which makes treatment much more difficult.

CONCLUSION

Our results are consistent with reports from the U.S., and suggest that SD is extremely common among high-risk and incarcerated youth. Substance problems begin at an early age in these children, during the pre-adolescent and early adolescent periods, and escalate to dependencies within the one-to-three-year period. This is particularly concerning as adolescence is a sensitive developmental period marked by rapid neurological development,³⁴ and substance use during this period can significantly impair cognitive development³⁵ and consequently impair social and emotional functioning. Therefore the provision of targeted early substance use programs should be considered a priority. Such measures are essential in reducing the likelihood of dependence and consequent effects to the brain and related cognitive functioning. Furthermore, treatment during this critical period could prevent youth from disengaging from the education system and

30. Marina A. Bornoalova, Paige Ouimette, Aaron V. Crawford & Roy Levy, *Testing Gender Effects on the Mechanisms Explaining the Association Between Post-Traumatic Stress Symptoms and Substance Use Frequency*, 34 ADDICTIVE BEHAV. 685 (2009).

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32. Elizabeth J. D'Amico, Phyllis L. Ellickson, Rebecca L. Collins, Steven Martino & David J. Klein, *Processes Linking Adolescent Problems to Substance Use Problems in Late Young Adulthood*, 66 J. STUD. ON ALCOHOL 766 (2005).

33. Terrie E. Moffitt & Avshalom Caspi, *Childhood Predictors Differentiate Life-Course Persistent and Adolescent-Limited Antisocial Pathways Among Males and Females*, 13 DEV. & PSYCHOPATHOLOGY 355 (2001).

34. Sarah-Jayne Blakemore & Suparna Choudhury, *Development of the Adolescent Brain: Implications for Executive Function and Social Cognition*, 47 J. CHILD PSYCHOL. & PSYCHIATRY 296 (2006).

35. R. Andrew Chambers, Jane R. Taylor & Marc N. Potenza, *Developmental Neurocircuitry of Motivation in Adolescence: A Critical Period of Addiction Vulnerability*, 160 AM. J. PSYCHIATRY 1041 (2003).

drifting toward antisocial activity. The high rates of comorbid mental health disorders in youth with SD disorders highlight their complex needs. Comprehensive diagnostic assessment tools are required to fully determine the individual mental health needs of each youth and to tailor interventions accordingly. Timely identification and treatment of youth with substance use disorders is essential not only for ensuring their mental and physical health but also in preventing and reducing recidivism.

Take-Home Messages

- The rates of substance abuse and substance dependence are extremely high in this high-risk population of females and males.
- The age at which youth first start to use substances is alarmingly early and revealed no gender differences (on average 10.6 years for alcohol use, 11.3 years for marijuana use, and 13.25 for street drugs use).
- The time gap between first use and dependence is short and calls for timely and effective interventions to prevent escalation of substance use and associated problems.
- Comorbidity between different types of substance abuse and substance dependency is high in females and males. Timely interventions at the time of first use of first substance may prevent exposure and addiction to additional substances.
- Comorbidity between substance dependence with other mental health disorders is high. Females are at particular risk for comorbid disorders of depression and trauma (PTSD).
- Full diagnostic screening is required to assess the complex individual mental health needs of justice-involved girls and to tailor interventions accordingly.



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