C003725 ABSTRACT: Recent epidemiological research documenting the pervasive co-occurrence of addictive and mental disorders has been concerned primarily with adults. This paper proposes the need for similar studies of adolescents, considers the special problems inherent in the assessment of co-occurrence in this age group, reviews evidence suggesting that the prevalence of co-occurring disorders in adolescents parallels that documented for adults, and delineates future research strategies (authors).

Title Co-Occurring Addictive and Mental Disorders Among Adolescents: Prevalence Research and Future Directions.

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Type Journal Article

Source American Journal of Orthopsychiatry 66(1): 52-60, 1996.

Year 1996 **Length** 9 pages

Medium **Control No: 003725**

American Journal of Orthopsychiatry, 66(1), January 1996

CO-OCCURRING ADDICTIVE AND MENTAL DISORDERS AMONG ADOLESCENTS: Prevalence Research and Future Directions

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Recent epidemiological research documenting the pervasive co-occurrence of addictive and mental disorders has been concerned primarily with adults. This paper proposes the need for similar studies of adolescents, considers the special problems inherent in the assessment of co-occurrence in this age group, reviews evidence suggesting that the prevalence of co-occurring disorders in adolescents parallels that documented for adults, and delineates future research strategies.

An important shift has occurred in our understanding of addictive and mental disorders. During the last decade, taxonomic changes and large-scale epidemiological field studies have focused attention on the co-occurrence of these two types of disorders. More generally, comorbidity has been characterized as the "premier challenge facing mental health professionals in the 1990s" *(Kendall & Clarkin, 1992, p. 833)*. Rooted in the implementation of *DSM-III*, which permitted multiple diagnoses derived from polythetic criteria, the idea that addictive and mental disorders frequently co-occur has gained wide acceptance. Indeed, co-occurring addictive and mental disorders (COAMD) have come to be seen more as the rule than the exception.

Among adults in the United States, empirical support for pervasive COAMD comes from a series of recently completed, large-scale epidemiological studies. In the most recent, the National Comorbidity Study, Kessler and colleagues *(1994)* found that more than half (56%) of all persons aged 15–54 years with a mental or addictive disorder had at least one other co-occurring disorder. In the earlier Epidemiological Catchment Area multi-site studies *(Helzer & Pryzbeck, 1988; Regier et al., 1990)*, similar increased risk was found for either a co-occurring addictive or mental disorder if the other type of disorder was present (odds ratios [OR]=2.7 and 2.8, respectively).

The increased attention that researchers have focused on COAMD prevalence has been applied almost exclusively to adults. Among adolescents, large-scale epidemiological studies of COAMD have not yet been undertaken. Such information would be useful in understanding adolescent psychopathology and, to the degree that adult comorbidity reflects a process with origins in childhood and adolescence, could provide developmental data for adult models of co-occurrence as well. Knowledge of these developmental pathways might also be useful in implementing preventive and treatment interventions. Notwithstanding the existing gap in adolescent epidemiological re-

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search, some evidence for adolescents already has accumulated that is consistent with the adult findings of pervasive addictive and mental disorder comorbidity. This paper reviews existing research on prevalence of adolescents with COAMD and suggests directions for future research.

Assessment Complexity

Before studies on the prevalence of adolescent COAMD are reviewed, a number of prevailing issues in adolescent assessment need to be considered. First, few assessment instruments and guidelines are available for measuring addictive disorders specifically for this age group. Consequently, co-occurrence during adolescence exacerbates the long-standing problem of heavy reliance on adult criteria in assessment of adolescent addictive disorders. Traditionally, adult assessment models identify addictive disorders by measuring three different dimensions of drug involvement: pathological use, drug-related problems, and tolerance/withdrawal symptoms. Among adolescents, a shorter history of substance use, as well as differences in life-stage and associated problems (e.g., unemployed, unmarried) make some criteria less appropriate. For example, recent onset of drug use in adolescents may cause relative attenuation of tolerance, craving, and withdrawal symptoms which, in turn, may result in assessments that underestimate drug disorders *(Kaminer & Frances, 1991)*.

Assessing drug-related problems among adolescents with a mental disorder is also complex. Bukstein, Brent, and Kaminar *(1989)* have argued that attempts to assess negative effects of addictive disorders on individuals already impaired by a mental disorder may lack validity because of the difficulty in distinguishing the independent contributions of each type of disorder to the existing functional impairment. This may be especially true for adolescents with schizophrenia, as both drug use and schizophrenia have similar adolescent onsets and often produce a mixed and overlapping set of symptoms at assessment *(Ananth et al., 1989; Drake, Osher, & Wallach, 1991; Mueser, Bellack, & Blanchard, 1992)*.

Problems inherent in selecting the most appropriate source of assessment information may also serve to erode reliable and valid assessment of adolescents with COAMD. Within the clinical child arena, parents or adult caregivers often are considered the preferred assessment source, as the child may not be willing or able to provide the necessary information. As with adults *(Drake, Alterman, & Rosenberg, 1993)*, multisource assessment is recommended; however among adolescents, the situation becomes more ambiguous. Adolescent addictive behavior is usually illegal and often hidden from adults. The differences between adolescent and parental reports can lead to dramatic differences in assessed diagnoses *(Boyle & Offord, 1991)*.

Adolescent assessment is further complicated since few normative data exist to set adolescent age-appropriate extreme levels of tolerance and withdrawal, as well as differences between abuse and dependence *(Halikas, 1990; Vuchinich, Tucker, & Harlee, 1988)*. Additionally, it is difficult to ascertain what constitutes addictive disorders in a population where experimental substance use is the norm *(Halikas, 1990; Shedler & Block, 1990)*. Thus, the construct of adolescent substance abuse and dependence has yet to be clearly defined. Current instrumentation for adolescents also complicates assessment; most such instruments have unknown psychometric properties and may have little clinical value *(Drake et al., 1993; Halikas, 1990; Winters, 1990)*. In sum, the vagaries of current assessment practices contribute to a high but unknown level of variability in adolescent COAMD prevalence estimates; reliable estimates are a goal for future work rather than the current state of the art.

Clinical Heterogeneity

The use of a single term (whether it be dual disorders, dual diagnoses, or COAMD)

to refer to co-existing addictive and mental disorders also confounds the issue, since the label does not identify a homogeneous clinical population *(Attia, 1988; Drake, Osher, & Wallach, 1991; Weiss, Mirin, & Frances, 1992)*. Rather, there are varied clinical patterns of etiology, symptom, and course. This heterogeneity has been posited among both addictive and mental disorders. For example, clinical heterogeneity may occur within a single drug of choice (e.g., Type I and Type II alcoholism) *(Cloninger, 1987)* or among the different addictive disorders (e.g., various drugs of choice; cocaine, marijuana, or stimulants). Similarly, clinical heterogeneity may be reflected in the specific mental problems involved (e.g., anxiety disorder vs. conduct disorder) which may have different etiologies and courses. At least three different theoretical models have been suggested to explain substance use among those with mental disorders. These include: *a)* self-medication to relieve aversive emotional states such as anxiety and depression; *b)* sensation-seeking, risk-taking, and impulsive behavior usually associated with the disruptive disorders; and *c)* vulnerability to stress, including use of psychoactive substances that increase behavioral and emotional disorientation and may thus exacerbate mental health symptoms (e.g., schizophrenia) *(Mueser, Bellack, & Blanchard, 1992)*. Therefore, a comprehensive model of COAMD must include different types of drug involvement co-occurring with different types of psychological disorders.

PREVALENCE RESEARCH

Results from existing prevalence studies can be organized around two basic questions. First, among adolescents, how prevalent is COAMD? Second, what particular combinations of addictive and mental disorders co-occur? Accurately answering these questions requires data based on a general population sample of American adolescents, which, as noted earlier, has not been done. Nevertheless, some data from general population samples (with a broad age range) are available, as are data from a variety of clinical samples. TABLE 1 provides a summary description of the various samples studied.

General Population Studies

As noted earlier, the recent National Comorbidity Study *(Kessler et al., 1994)* included adolescents ages 15–18 as part of the 8,098 respondents in the national probability sample in the United States. Although this study represents a milestone in epidemiological research on COAMD, its information about adolescents with COAMD is more suggestive than definitive. Major limitations in this regard were the use of overly-broad age groupings (i.e., 15–24, 25–34, 35–44, and 45–54 years) to examine age-related COAMD prevalence and the absence of reporting nonsubstance psychiatric disorders specific to adolescents (e.g., conduct disorder, attention deficit disorder). Therefore, few data for adolescents with COAMD were available. Nevertheless, significant clustering of dual disorders among

Table 1

SUMMARY OF PREVALENCE STUDIES ON CO-OCCURRING ADDICTIVE AND MENTAL DISORDERS AMONG ADOLESCENTS

STUDY	YEAR	*N*	AGES
General Population Samples			
Boyle & Offord	1991	1202	12–16
Cohen et al.	1993	776	10–20
Kessler et al.	1994	1765	15–24
Psychiatric Inpatient Samples			
Groves, Batey, & Wright	1986	204	11–17
Roehrich & Gold	1986	41	10–18
Caton et al.	1989	100	12–35
Greenbaum et al.[a]	1991	547	12–18
Eisen et al.	1992	48	14–19
Addictive Behavior Inpatient Samples			
Stowell & Estroff	1992	226	12–18
DeMilio	1989	57	14–18
Milin et al.	1991	111	11–17
Kaminer	1991	72	ADOL[b]
Bukstein et al.	1992	156	13–18

Note. ADOL=Adolescent.
[a]Approximately half the sample was nonresidential special education students.
[b]Sample identified as adolescent, but no specific ages were given.

adolescents was suggested, in that the youngest age group, 15–24 years, when compared to the three other groups, had the highest prevalence within the last 12 months of *a)* any disorder (2.1 OR); *b)* any substance use disorder (3.7 OR); and *c)* three or more disorders (2.1 OR).

Currently, the most detailed information on COAMD prevalence among children and adolescents in the United States comes from an epidemiological study of a representative community sample of 776 youth, ages 10–20 living in upstate New York. Using a hybrid longitudinal/cross-sectional design, Cohen and colleagues *(1993)* found that half of those youth having at least one *DSM-III-R* substance use disorder (i.e., alcohol, marijuana, other drug) had a co-occurring disruptive disorder (i.e., conduct, attention-deficit, oppositional). No emotional disorder (i.e., separation anxiety, major depression, overanxiousness) was associated significantly with any substance use disorder nor did comorbidity patterns differ between males and females.

As the researchers *(1993)* noted, because of potential differences in age patterns and assessment instruments used in other adolescent epidemiological samples, replication of these findings are needed. Future research should also assess the full range of addictive and mental disorders, rather than the more limited set assessed by Cohen et al. *(1993)*. Notwithstanding these limitations, the finding of significant co-occurring addictive disorders with major categories of child and adolescent mental disorders suggests that, as with adults, COAMD constitute a major issue for adolescents.

Similar findings emerged from Boyle and Offord's *(1991)* study of a general population sample of 1,202 Canadian youth, aged 12–16 years. Among the three categories of mental disorders assessed via a checklist format (conduct, emotional—anxiety or depression—and attention-deficit disorder), a strong association was found between prevalence of these disorders and substance use. Consistent with Cohen et al.'s *(1993)* findings, conduct disorder was related significantly to alcohol (3.5 OR); marijuana (4.0 OR); and hard drug use (6.5 OR). Unlike Cohen et al., however, Boyle and Offord found a marked interaction for predicting regular use of alcohol by gender. For males, the odds ratio for alcohol use among those with conduct disorder, versus those with no conduct disorder, was 3.3 OR; for females, the equivalent OR was 20.3, indicating significantly greater risk of females with conduct disorder having high levels of substance use. Emotional disorders also were related significantly to substance use, but specifically only to other drug (e.g., stimulants, sedatives, psychedelics, heroin), 2.2 OR; and alcohol use, 1.9 OR. In this study, attention-deficit disorder was unrelated to substance use. Finally, an interesting outcome of this study underscores the importance of assessment issues in determining COAMD. All the significant findings currently cited were based on adolescent reports; when parent reports were examined, there were no significant co-occurrences. This discrepancy may be explained by the understandable tendency of adolescents to keep addictive behavior hidden from their parents.

Limitations of the Boyle and Offord findings include weak external generalizability with regard to American adolescents, assessment of only substance use rather than the full range of symptoms needed to arrive at a DSM substance use disorder diagnosis, and "approximate" mental disorder diagnoses based on a checklist format. Additionally, the limited number and categories of mental disorders assessed would likely miss some COAMD cases, resulting in an underestimate of the overall prevalence of COAMD among adolescents.

Clinical Studies

Although clinical samples cannot establish truly unbiased prevalence estimates (due to referral bias, co-payment policies, etc.), they may provide estimates that reflect co-occurrence patterns similar to those in

the general population. Moreover, estimating COAMD prevalence for adolescents actually receiving services can provide information useful for planning and evaluation.

Existing clinical studies of COAMD prevalence among adolescents have sampled at least two different types of clinical populations. On the one hand have been studies of adolescent psychiatric inpatients in which all subjects had a mental disorder and the prevalence of addictive disorders or use of psychoactive substances was reported. In contrast, other studies have assessed prevalence of mental disorders among adolescent inpatients in an addictive behavior treatment program. Results from both types of clinical studies provide useful comparisons for establishing convergence of research findings.

Psychiatric Inpatient Studies

During the last decade, five studies have reported prevalence of either substance-use or addictive disorders among adolescents who were receiving inpatient psychiatric care. Groves, Batey, & Wright *(1986)*, found that 45% of the adolescents admitted to psychiatric hospitalization had used at least one illicit drug prior to admission. These data were obtained from retrospective chart reviews of patients' self-report and likely underestimate actual use. Using a similar retrospective chart review method, Roehrich and Gold *(1986)* found that, when systematically assessed for *DSM-III* addictive disorders as part of the admitting procedure, 71% of their patient sample had a co-occurring addictive diagnosis. Roehrich and Gold also found evidence for clinical heterogeneity in their sample. Among the various mental disorders, 59% of those with an addictive disorder had conduct disorder, while none of the patients without addictive disorder had conduct disorder. This finding was particularly robust despite the small sample size (N=41) and the accompanying low power of this design to detect differences among the sample.

Prevalence from these early retrospective studies remains consistent with that from more recent studies which employed more valid concurrent designs. Caton, Gralnick, Bender, and Simon *(1989)*, in a sample of 100 adolescents and young adults, aged 12–35 years (median age=18.0) who were consecutively admitted for long-term psychiatric hospital care, found that, at admittance, 51% were diagnosed with a concurrent *DSM-III* addictive disorder. When specific psychiatric diagnoses, gender, and minority status (white/black) were examined as factors that predicted COAMD, no significant differences were found.

Eisen, Youngman, Grob, and Dill *(1992)* have reported similar findings from a study of 48 patients, aged 14–19 years, consecutively admitted into a psychiatric hospital. At intake, approximately 50% had an alcohol or drug problem. A review of chart records at discharge revealed that 42% had a *DSM-III* addiction diagnosis as assessed by the clinician in charge of care.

The final study to be reviewed in this section had a relatively large sample (N=547) that permitted subanalyses of COAMD heterogeneity (N=119). Using *DSM-III* criteria, Greenbaum, Prange, Friedman, and Silver *(1991)* concurrently assessed mental and addictive disorders (i.e., only alcohol or marijuana) among youth aged 12–18 years receiving services from either residential mental health facilities or community-based special education school programs. Although approximately half of the sample were not receiving inpatient care (i.e., those in school programs), this study is included here since all children were identified as having serious emotional or behavioral problems rather than a substance problem prior to the study.

Results indicated an overall prevalence of a co-occurring addictive disorder of 21.8%. Perhaps not surprisingly, prevalence increased with age, with the highest prevalence found among those aged 16 (34.0%). Specific mental disorders significantly associated with having an addictive

disorder included conduct disorder and depression. There was some evidence of a significant interaction between these two disorders, with the highest prevalence of addictive disorder co-occurrence (39%) found among those with both conduct and depression disorders. Moreover, when the effects for these mental disorders were statistically controlled, anxiety and attention-deficit disorders, which in initial univariate analyses had been significant, were no longer associated with addictive disorders. Similarly, gender effects were nonsignificant when adjusted for other variables in the multivariate model. It should be noted that there were no adolescents in this sample with schizophrenic disorders, so that this diagnosis could not be assessed for co-occurrence with addictive disorders.

The wide variability in prevalence among the reported studies deserves comment. Differences in prevalence are to be expected based on differences in mean age, methods of case ascertainment, admission and referral biases, among other uncontrolled factors in these studies, and illustrate some of the difficulties and limitations of using clinical rather than general population samples for deriving valid prevalence estimates. Nevertheless, all of the rates are substantial and support an overall pattern of relatively high magnitudes of co-occurrence.

Addictive Behavior Inpatient Studies

Within this set of studies, all subjects were adolescents who were receiving inpatient substance-abuse treatment. A review of adolescent alcohol and drug abuse *(Brown, Mott, & Meyers, 1990; Brown, Mott, & Stewart, 1992)* estimated that as many as 75% of drug-abusing adolescents had a coexisting mental disorder. Estimates of clinical heterogeneity among the co-occurring mental disorders also were reported, with conduct disorder co-occurring most often (50%), followed by affective disorders (e.g., depression, anxiety, 20%), and attention-deficit disorder (20%).

Results from the only empirical study of COAMD prevalence in an addictive behavior inpatient sample support both high prevalence and clinical heterogeneity estimates, but suggest different rates of co-occurrence among the specific disorders. Stowell and Estroff *(1992)*, in a study of 226 adolescents entering inpatient care for an addictive disorder, found 82% of the sample met *DSM-III-R* criteria for a co-occurring mental disorder. The most frequent co-occurring mental disorders were depression and other mood disorders (61%), conduct disorder (54%), and anxiety disorders (43%).

Several studies in substance-abuse treatment settings were conducted with samples where the presence of a co-occurring disorder was inherent in the study's design (i.e., either samples from treatment units where patients had COAMD as a criterion for admission or from correction units where juvenile offenders were almost all diagnosed with high rates of conduct disorder).

In a study of juvenile offenders referred by the court for psychiatric assessment *(Halikas, 1990; Milin, Halikas, Meller, & Morse, 1991)*, an important design feature was inclusion of a control group of nonabusing juvenile offenders, which made it possible to compare rates of specific mental-disorder comorbidity while controlling for mental disorders more likely to be associated with becoming incarcerated than with having an addictive disorder (e.g., conduct disorder). Among the sample of 111 adolescents, aged 11–17 years (M=15.5), conduct disorder occurred at a rate of 91% among subjects with an addictive disorder. However, as the rate of conduct disorder among controls was almost identical (90%), the presence of conduct disorder in this sample is probably more indicative of their status as criminal offenders than substance abusers. Notwithstanding the ubiquity of conduct disorder in this sample, when conduct disorder was removed from the analysis of mental-disorder diagnoses, there was a trend (p<.10)

for substance abusers to have a higher prevalence (39%) of co-occurrence of other mental disorders than the nonabusing controls (14%). Further, 60% of those with an addictive disorder had triple diagnoses of an addictive disorder, conduct disorder, and another mental disorder, compared to the control-group rate of 13.9%. Additional differences between adolescents with and without an addictive disorder included greater prevalence of aggressive conduct disorder among those with addictive disorder (68% vs. 33%) and of attention deficit disorder (23% vs. 0%). With regard to clinical heterogeneity as a function of drug of choice, no reliable differences were noted among mental disorders for the four most frequently abused drugs (marijuana, cocaine, stimulants, and sedatives). Finally, it should be noted that anxiety disorders were not part of the assessment procedures and no information on them was available for the sample.

DeMilio *(1989)*, in a sample of 57 adolescents (aged 14–18 years, M=16.2) admitted as inpatients for addictive disorder and other concurrent mental disorders, found that conduct and depression disorders were the two most prevalent diagnoses. No significant differences in prevalence were found between the drug of choice (i.e., alcohol, THC, cocaine) and the different mental health problems. Similarly, Kaminer *(1991)* found that, among 72 adolescents with COAMD admitted for addictive disorder treatment, the highest prevalence was for conduct disorder (59%), followed by a depressive or mood disorder (33%).

Finally, in a study of 156 adolescents, aged 13–18 years, (M=15.1) receiving treatment for a *DSM-III-R* co-occurring disorder, Bukstein, Glancy, & Kaminer *(1992)* found high prevalence of conduct disorder (70.5%) and affective disorders (51.3%), particularly major depression (30.7%). A gender difference also was found, with females having a significantly higher prevalence of co-occurring major depression.

This study also explored differences between primary and secondary diagnoses. Among adults with COAMD, one model of clinical heterogeneity has distinguished primary and secondary diagnoses based on chronology of symptom onset *(Schuckit, 1985, 1986)*. However, among adolescents, distinctions based on symptom onset have not proved useful. Bukstein, Glancy, and Kaminer *(1992)* found no significant differences in either short-term remission of depression symptoms or family history between primary and secondary major depressives with a co-occurring addictive disorder.

FUTURE DIRECTIONS

Research on adolescents with COAMD has just begun. Existing studies suffer from numerous problems, which produce wide variability in reported prevalence, particularly when viewed as a coherent group that purportedly represents a body of knowledge. Nonrandom sampling, nonindependence of syndromal criteria producing COAMD as definitional artifact (e.g., addictive behavior symptoms that are used in meeting syndromal criteria of depression or conduct disorder), syndromal criteria shifting with changes in *DSM*, and nonstandard and inappropriate (i.e., adult) assessment criteria are just a few of the issues needing to be addressed. These represent serious methodological and conceptual problems.

Nevertheless, a number of consistent patterns can be discerned through the methodological haze. First, substantial COAMD prevalence among adolescents has been reported by all studies, with approximately half of all adolescents receiving mental health services reported as having a dual disorder. This finding parallels results from the adult COAMD literature and supports the concept of COAMD as important in understanding etiological relationships and designing effective treatment. Second, among adolescents with COAMD, conduct disorder and depression are the two most frequently reported co-

occurring mental disorders. However, results from Cohen et al.'s *(1993)* epidemiological study, the closest existing study to a detailed general population survey of American adolescents, did not replicate the findings from the clinical studies for depression. Most clinicians consider depression to be a major element of dual disorders, and future work should address this issue. With regard to anxiety disorders, only one study *(Stowell & Estroff, 1992)* found an association with co-occurrence of addictive disorders.

Future research also should extend current understanding by focussing on three types of investigations. First, studies are needed that help develop psychometrically valid and reliable assessment instruments for measuring adolescents' addictive behavior. Such work would lay the foundation for a reliable yardstick with which to measure adolescent COAMD prevalence. Second, there is a need for establishing prevalence of adolescent COAMD using general population samples. Only with true randomly selected community samples can unbiased and valid prevalence estimates be obtained. Additionally, these studies should have large enough samples so that age-specific and gender-specific, rather than grouped "adolescent," prevalence can be estimated. Finally, studies that explore differences between adolescents with COAMD and single-disorder subjects are needed. These studies can inform us about differences in antecedent (e.g., etiology, demographics, family history, onset pattern/primary vs. secondary), concurrent (e.g., symptom severity), and future (e.g., recovery, relapse rates) course and outcomes. Such studies will help establish whether co-occurring addictive and mental disorders represent a distinct class of clinical disorders or merely reflect more severe complications of a preexisting mental disorder. Answers to these questions can begin to meet the challenge that adolescents with COAMD present to mental health professionals.

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