Co-occurrence of substance use disorders with other psychiatric disorders: Implications for treatment services

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ABSTRACT
Introduction: This paper critically evaluates the literature on the co-occurrence of substance-use disorders (SUDs) with other psychiatric conditions. Our review considers the variety of different associations between the two, and suggests the implications of the literature for the design of treatment services that address both types of disorders. Methods: A narrative review of research and theory was conducted, covering epidemiology of co-occurring psychiatric disorders worldwide, mechanisms underlying co-occurrence, and treatment models. Results: Epidemiological research has documented a high prevalence of co-occurring disorders in both clinical samples and the general population, although the literature is based primarily on studies in high-income countries and some of the overlap might be due to the co-occurrence of milder forms of both types of disorders. Consistent with what has been reported in other reviews, we conclude that clients with co-occurring disorders tend to have a more severe course of illness, more severe health and social consequences, more difficulties in treatment, and worse treatment outcomes than clients with a single disorder; we address the implications of these findings for the design of treatment services. Conclusions: Much of the evidence shows that separately, treatments for both SUD and other psychiatric disorders are effective in reducing substance use and in improving behavioral, familial, and psychosocial outcomes. The evidence further suggests that these outcomes might be improved when treatment modalities are offered in combination within an integrated treatment plan that simultaneously addresses substance abuse and psychiatric problems. It is concluded that there is potentially more to be gained from taking a public health perspective and working on efforts to implement existing evidence-based practices at the systems level, than from the current tendency to look for ever more powerful individual-level interventions at the clinical level. KEYWORDS – dual diagnosis, concurrent disorders, substance-use disorders, co-occurring disorders, treatment systems

Introduction
The modern history of psychiatric epidemiology is dominated by attempts to classify psychiatric disorders into discrete diagnostic categories, as documented in the major diagnostic systems (World Health Organization or WHO, 1992; American Psychiatric Association or APA, 2013). Ideally, concepts and the terms describing them should permit operational definitions to facilitate communication among clinicians and to permit better research on causal mechanisms and treatment. As diagnostic categories have proliferated, so too have the terms used to describe the
connections between substance-use disorders (SUDs) and other psychiatric disorders (or “mental illnesses,” “mental health disorders,” etc.) When multiple diagnoses are present, the term “co-morbidity” has been used to indicate that the client meets criteria for more than one psychiatric disorder. Kaplan, Crawford, Cantell, Kooistra and Dewey (2006) noted that the definition of co-morbidity merely specifies an association in time, not necessarily a causal relationship. In a similar way, the terms “dual diagnosis,” “concurrent disorders,” and “co-occurring disorders” imply a purely temporal relationship, which could reflect either a common underlying cause or completely unrelated etiologies. Another term, “co-existing substance use and mental health problems,” was proposed in a New Zealand report (Todd, 2010) because the word “co-existing” was thought to imply interaction more than “co-occurring.” Szerman et al. (2013) introduced the term “dual pathology,” referring not only to the co-existence of two disorders, but also to the presence of at least one SUD and at least one other psychiatric disorder. The confusing use of terminology in the English language is in part a function of the conceptual confusion surrounding psychiatric disorders in general, and might create difficulties when these concepts are translated into other languages. For this paper, we will use the term “co-occurring disorders” to imply a purely temporal relationship between an SUD and another psychiatric disorder.

The aim of this article is to take a critical look at the co-occurrence of SUDs with other psychiatric conditions, consider the variety of different mechanisms underlying them, and suggest the implications of the literature for the design of appropriate treatment services. This will be approached by a consideration of the populations involved (e.g., adolescents, adults), the epidemiology of substance abuse in these populations, and systems issues related to the provision of treatment services for individuals with both SUDs and other psychiatric disorders. We begin with a discussion of theoretical, terminological, and conceptual issues that characterize this area of psychiatric epidemiology.

There are at least three conceptual issues that have arisen in the evaluation of research on persons with multiple diagnoses. The first is the appropriateness of using this concept in a way that is analogous to clinical medicine, where “co-morbidity” is defined by the presence of at least two independent diseases whose etiologies are often well known. In contrast, most psychiatric disorders are behavioral or psychological syndromes that are defined by their deviation from normality, and for the most part their underlying causes are unknown (APA, 2013). Some (e.g., Kaplan et al., 2006) have argued that the co-morbidity found among developmental disorders might be due to how symptoms are aggregated within the various classification systems. A related issue involves the lack of clear boundaries between discrete diagnostic categories, the existence of overlapping symptoms, and the distribution of syndrome severity across a continuum rather than according to a bi-modal distribution that would imply a separate disorder that is either present or absent (Szerman et al., 2013). For this reason, Kaplan and colleagues (2006) suggested that the term co-morbidity is misleading and that it would be preferable...
to speak of a continuum of disability that emphasizes the inter-relatedness of different disorders. In short, the evolution of psychiatric nosology in the area of SUDs has proceeded in parallel with the need to consider multiple psychiatric diagnoses co-observed in the same individual.

**Epidemiology of co-occurrence**

Epidemiological studies have found that the co-occurrence of SUDs and other psychiatric disorders is relatively common in the general populations of countries where it has been investigated (e.g., Europe, Australia and New Zealand, North America). Individuals with SUDs tend to have higher rates of mental illness than the reverse, and the percentage rates rise among individuals with illicit drug use disorders. Among individuals already in some kind of treatment, the entanglement of these multiple diagnoses (often 3 or more, Kessler et al., 2005) and the resulting sequelae becomes difficult to ignore. The National Co-morbidity Study (NCS), which collected data using a revised version of the Composite International Diagnostic Interview (CIDI; Robins et al., 1988) from over 8,000 individuals aged 15–54 in the U.S. between 1990 and 1992, found that 51.4% of those surveyed with a lifetime SUD also reported a lifetime mental health disorder, and 50.9% of those with a lifetime history of a mental health disorder also had a lifetime history of at least one SUD (Kessler et al., 1996). More recently, the Substance Abuse and Mental Health Services Administration (SAMHSA, 2013) released estimates from the 2012 National Survey on Drug Use and Health (NSDUH) indicating that among U.S. adults with a past-year SUD, 40.7% (8.4 million) had a co-occurring mental health disorder; these same adults accounted for 19.2% of individuals over 18 who had any past-year mental health disorder and also met criteria for an SUD. Adults with a past-year SUD were also more likely than those without an SUD to have serious suicidal thoughts (12.6% vs. 3.0%), plan suicide (3.9% vs. 0.9%), or make a suicide attempt (2.3% vs. 0.4%; SAMHSA, 2013).

Within Europe, there is a lack of both truly “pan-European” prevalence studies and studies that specifically link substance use and other psychiatric disorders (vs. describing the disorders separately). Alonso et al. (2004) used data from the European Study of the Epidemiology of Mental Disorders (ESEMeD), a cross-sectional study in a representative sample of 21,425 adults in Belgium, France, Germany, Italy, the Netherlands, and Spain, to examine co-occurrence of 12-month mood, anxiety, and alcohol-use disorders. The authors observed that alcohol dependence was commonly and more frequently correlated with most mood and anxiety disorders than alcohol abuse, although major depression was associated with both abuse and dependence. In both North American and European countries, the general population prevalence of co-occurring mood or anxiety disorders and SUDs in a 12-month period has been estimated at 1–2% (Grant et al., 2004b; Rush, Urbanoski, Bassani, Castel, & Wild, 2010); this is likely an underestimate of the problem of co-occurring disorders when other mental health disorders are taken into account. Community-based population surveys in Australia, New Zealand, and Canada (cf. Rush et al., 2010 for a review; Scott, McGee, Oakley Browne, Wells, & New Zealand Mental...
Health Survey Research Team, 2006; Teesson, Slade, & Mills, 2009) have produced results that are similar to those of the U.S. and Europe.

It is not clear how the prevalence estimates above generalize to the rest of the world. The World Mental Health Survey (Kessler et al., 2007), completed in 14 countries, provided prevalence rates for SUDs (excluding Western European countries) and mental health disorders separately, but not specifically in combination. Smaller treatment studies have been conducted in some African countries (c.f. Ndetei et al., 2008; Weich & Pienaar, 2009) indicating high rates of co-occurrence among local psychiatric hospital inpatients, but they do not allow for conclusions about the general population. A review of recent studies focusing on co-occurring SUDs and psychiatric disorders in Asia (Thirthalli, Kumar, & Arunachal, 2012) reported generally low rates of co-occurrence and low prevalence rates of substance use in China, Japan, and Taiwan. For example, Phillips et al. (2009) found that only about 0.14% of 63,004 Chinese adults screened for Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) Axis I disorders (First, Spitzer, Gibbon, & Williams, 2002) had co-occurring alcohol-use disorders and mood or anxiety disorders; prevalence rates of other SUDs were even smaller and psychiatric co-occurrence rates were not computed.

Generally speaking, there are few classes of mental health disorders that have not been associated with an SUD of some kind, at some point. Findings from the U.S.-based National Epidemiologic Survey on Alcohol and Related Conditions (Grant et al., 2004a, 2004b), Epidemiologic Catchment Area study (Regier et al., 1990), and NCS (Kessler et al., 1997), as well as the World Mental Health surveys (e.g., Tominaga et al., 2009) and catchment studies and reviews (e.g., Jane-Llopis & Matysina, 2006; Langås, Malt, & Opjordsmoen, 2012), have shown that the most common psychiatric diagnoses among individuals with a co-occurring SUD include mood, anxiety, and personality disorders.

Some prevalence statistics have also focused on gender and age, particularly in high-income countries. The NSDUH (SAMHSA, 2013) estimated that in the U.S., the percentage of past-year co-occurring SUD and other psychiatric disorders was higher among adult males than females (4.1% vs. 3.1%). In Europe’s ESEMeD study, men more frequently reported co-morbidity between mood and alcohol disorders (Alonso et al., 2004). Regarding age, 2012 U.S. NSDUH data (SAMHSA, 2013) demonstrated that the percentage of adults with any past-year mental illness who also met criteria for an SUD decreased with age (e.g., 34.5% for those aged 18–25 vs. 8.6% for those 50+). In general, the 18–25 year-old age bracket had the highest percentage of adults with co-occurring mental illness and SUD (6.8%). Similar findings have been reported elsewhere (e.g., Alonso et al., 2004; Chan, Dennis, & Funk, 2008). It is not yet clear whether these statistics would be comparable in other countries, but these counterintuitive findings of declining SUD rates have been questioned by data indicating that adolescents tend to confuse hangover with withdrawal symptoms (Caetano & Babor, 2006; Babor & Caetano, 2008).

Adolescent statistics are, generally
speaking, less inclusive of mental health disorders and less descriptive of SUDs (Greenbaum, Foster-Johnson, & Petrila, 1996). Differences in adolescent use of substances (e.g., binge and drug use, “experimentation”) call for differences in diagnostic criteria, and possibly, different survey methods. Adolescents, for example, might be less subject to tolerance or withdrawal symptoms despite harmful use (cf. Hawkins, 2009). Chan et al. (2008) gathered results from 77 major U.S. SUD treatment studies; statistics on 4,939 adolescents presenting to SUD treatment showed that approximately 1/3 reported receiving past-year mental health treatment, and about 2/3 reported at least one mental health problem. The authors noted that across the overall sample of adolescents and adults, the rates of internalizing problems increased with age, and vice versa for externalizing problems, though over 40% of adolescents and young adults combined endorsed symptoms of both. In general, non-U.S. adolescent-specific data are quite limited, although some studies exist. Chong, Chan and Cheng (1999), for example, conducted a study of co-occurrence of SUD and other psychiatric disorders among 774 adolescents in Taiwan. They found that 11% of the children had SUDs (most common substance being nicotine), and that 62% of the teens with SUDs had other co-occurring psychiatric disorders (especially mood disorders, conduct disorder, and ADHD).

In summary, research in both the general population and clinical samples of several countries indicates that the co-occurrence of SUDs and other psychiatric disorders is prevalent among both adults and adolescents, and males and females, with affective disorders or (3+) combinations of disorders being the most prevalent. With regard to the course of illness, early onset of co-occurring disorders appears to be an indicator of poor prognosis for both types of disorders. Potential consequences of untreated or poorly treated co-occurring disorders include overall poorer functioning and physical health, decreased social functioning, more severe symptoms of either or both types of disorder, increased risk of being homeless or incarcerated, disability, and a generally worsened quality of life (Buckley, 2006; Cleary, Hunt, Matheson, Siegfried, & Walter, 2008). These general findings need to be evaluated in the context of the limitations of current psychiatric epidemiology methods, however. These include the reliance on a multitude of different diagnostic interviews, the lack of systematic prospective studies to determine the sequencing of symptoms and syndromes, the dearth of research in less resourced countries, the use of different timeframes (e.g., lifetime, past-year), and the classification of disorders according to different diagnostic systems. These problems reduce the comparability of findings across studies and countries, and make it difficult to make statements about the causal mechanisms underlying any of the observed associations. Furthermore, the predominance of research from the U.S. and other English-speaking countries limits the generalizability of the findings to other languages and cultures.

Research and theory on the mechanisms underlying co-occurrence

Despite methodological limitations, clinical and epidemiological researchers have
made progress investigating the causal mechanisms underlying the observed associations between SUDs and other psychiatric disorders. These include developments in genetic epidemiology (e.g., twin studies), investigations of the neurobiology of SUDs (Szerman et al., 2013), qualitative research on behavioral mechanism clarification (Whitley & Crawford, 2005), and prospective follow-up studies of treated alcohol-dependent clients (e.g., Tómasson & Vaglum, 1996), substance-dependent clients (e.g., Landheim, Bakken, & Vaglum, 2006), and clients with co-occurring disorders (e.g., Xie, McHugo, Fox, & Drake, 2005). And yet the nature and directionality of the mental illness and SUD association remains a major challenge to researchers. As a widely distributed behavior in the general population, substance use has been known to precede psychopathology in some cases, and follow the onset of psychopathology in other cases. Sometimes, the two appear simultaneously, and at other times, it is difficult to determine which came first. At least five explanations have been advanced to explain co-morbidity in the literature:

1. **Psychopathology increases the risk of substance use, abuse, dependence, or withdrawal.** Most clients report that the symptoms of a mental illness preceded their SUD. Chan et al. (2008) reported that among their U.S. data pool of 4,939 adolescents and 1,958 adults admitted to SUD treatment, one third of the adolescents and half of adults endorsed depressive symptoms in the year prior to entering substance abuse treatment. Interestingly, data produced from the U.S.-based National Comorbidity Survey Replication (NCS-R; Kessler et al., 2005) showed that the median age of onset for anxiety and impulse-control disorders (age 11) preceded the median age of onset for all SUDs (age 20) by nearly 10 years. Although these studies do not support causal conclusions, similar data have been used to support the “self-medication hypothesis” (Khantzian, 1985, 2013; Quitkin, Rifkin, Kaplan, & Klein, 1972), as well as the “tension reduction” (Conger, 1956), “stress-response dampening” (for alcoholism; Sher & Levenson, 1982), and “alleviation of dysphoria” models (cf. Mueser, Drake, & Wallach, 1998). The self-medication theory proposes that individuals tend to select drugs that alleviate their specific psychiatric symptoms (Khantzian, 2013; Suh, Ruffins, Robins, Albanese, & Khantzian, 2008). This theory is not strongly supported, however, because clients with co-occurring disorders seldom report that specific substances alleviate specific symptoms of a particular mental disorder. Osher and Drake (1996) noted that historically, “narrow ideologies construed psychiatric symptoms as simply the sequelae of alcohol and drug abuse, or substance abuse as simply a self-medication strategy for underlying mental disorders (p.8),” and that this led to further separation of mental health and SUD treatment. Instead, research suggests that proneness is more general, as evidenced by high rates of SUD for multiple substances, nicotine, alcohol, cannabis, and cocaine, which have different effects (Regier et al., 1990; Stinson et al., 2005). An alternative explanation for the causal hypothesis is that substance abuse is an aspect of more general neurobiological deficits and that it is this “deviance proneness” that contributes to the high rate of substance misuse and abuse.
among individuals with psychopathology (cf. Sher, Grekin, & Williams, 2005; Serman et al., 2013).

2. **Substance abuse, dependence, or withdrawal increases the risk of psychopathology.** This model holds that SUD accounts for mental illness in clients with co-occurring disorders. SUDs have been shown to propel, exacerbate, or “unmask” minor symptoms of mental illness in vulnerable individuals to the point where they become diagnosable conditions (cf. Brady, Verduin, & Tolliver, 2007 for a review; Markou, Kosten, & Koob, 1998; Niemi-Pynttäri et al., 2013; Schepis & Hakes, 2011). For alcohol in particular, studies have suggested that heavy use or dependence can be a causal factor for depressive symptoms, accounting for up to 10% of male depression in some European countries (reviewed in Jane-Llopis & Matytsina, 2006). Acute alcohol and stimulant intoxication can produce mood and behavioral changes as well as symptoms of mania or hypomania and anxiety. Likewise, substance withdrawal (tobacco included) is often manifested through symptoms of dysphoria, mild paranoia, depression, anxiety, or even full-blown psychosis in the case of severe alcohol withdrawal (Fatseas, Denis, Lavie, & Auriacombe, 2010; Koob & Volkow, 2009; Saravay & Pardes, 1967). Cannabis-induced psychosis has been subject to a considerable amount of study (Hall & Babor, 2000; Hall & Degenhardt, 2000; Moore et al., 2007), and it is reported to be particularly prevalent in African countries with the use of “daggaa” (Ramlagan, Peltzer, & Matseke, 2010). Interestingly, a U.S.-population-based study found that among the nearly 22,000 individuals with lifetime psychedelic drug use, there was no association with increased mental health problems (Krebs & Johansen, 2013). There are numerous categories in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR and DSM-V; APA, 2000, 2013) that describe substance-induced mental health disorders (e.g., Substance-Induced Persisting Amnestic Disorder, Substance-Induced Persisting Dementia, Substance-Induced Sexual Dysfunction). For the most part, substance-induced psychotic mental disorders are time-limited and resolve with abstinence (excepting alcohol-induced pathological dementia; Rounsaville, 2007). If symptoms persist beyond a lengthy abstinence, there is likely an underlying mental health disorder. In practice, however, it is often difficult to differentiate what is substance-induced and what is organic; many individuals are not able to achieve the lengthy abstinence from substances that is required for proper diagnosis. Furthermore, while substance-induced disorders are common, this model still only describes a subgroup of clients with co-occurring disorders.

3. **Overlapping genetic vulnerabilities.** It is possible that underlying genetic factors play a role in certain co-occurring disorders, as evidenced by some familial and twin studies. In a review of the genetics of substance abuse and dependence, Dick and Agrawal (2008) noted that family, twin, and adoption studies demonstrated heritability estimates of 50-60% for alcohol dependence among both women and men, and 45-79% for the abuse or dependence of illicit drugs. The authors discussed a common genetic liability for dependence on alcohol and other drugs that also extends to antisocial behavior (or a
general inclination towards externalizing psychopathology). In a large twin study of white U.S. males and females, Kendler, Prescott, Myers and Neale (2003) concluded that the lifetime co-morbidity pattern of common psychiatric and substance-use disorders is largely a result of the effects of genetic risk factors, with shared environmental risk factors potentially contributing to co-morbidity in at least a subgroup of externalizing disorders. However, other studies have offered evidence against a shared-etiologic genetic model, particularly in the case of alcohol and depression (Swendsen & Merikangas, 2000), alcohol and schizophrenia (Rimmer & Jacobsen, 1977), and alcohol and bipolar disorder (Maier, Lichtermann, Minges, Delmo, & Heun, 1995). Still others have suggested that the observed associations might be explained, at least in part, by other common factors such as parental psychopathology or overlapping environmental triggers such as stress, trauma, and early exposure to drugs (McCutcheon et al., 2013).

4. Bidirectional causal association between the two conditions. The bidirectional model suggests that a positive feedback loop or feed-forward cycle that intertwines the mental illness with the abuse of or dependence on substances takes center stage once the conditions are initiated, with one serving to worsen or sustain the other in reciprocal fashion (Smith & Randall, 2012). This model is supported for co-occurring alcohol dependence and anxiety disorders (Kushner, Abrams, & Borchardt, 2000), however, its application to other drug-use disorders remains largely untested. In one large prospective Dutch population study, Griffith-Lendering et al. (2013) reported that a “psychosis vulnerability” factor was found to predict cannabis use among adolescents as well as the reverse, suggesting a potential bidirectional causal association. The bidirectional model is well in line with a developmental view of co-occurrence, wherein a developing brain that is exposed to either drugs or mental illness (e.g., in the form of a depressive episode) changes in such a way that it is left vulnerable to the other, and vice versa.

5. Etiological independence. Finally, there is always the possibility that psychiatric symptoms and substance abuse or dependence are etiologically independent, although this has not been evaluated systematically.

In summary, the literature on co-occurring disorders is both extensive and complicated. There are, however, several conclusions that we can take from existing studies and reviews. First, mental illness is a predictor of the course of SUD problems, including heightened symptoms, more frequent relapse, and hospitalizations. Secondly, SUDs can be both a cause and a consequence of other psychiatric disorders. Additionally, evidence suggests an ongoing interaction between them; having one may affect the vulnerability to developing the second or change its clinical course. Finally, it remains unclear whether all individuals whose SUD preceded a mental health disorder would have developed one without substance abuse. Whereas many cases of co-occurrence can be assumed to be either a cause or a consequence of substance use, studies with opiate- and alcohol-dependent adults in SUD treatment (e.g., Gossop, Marsden, & Stewart, 2006; Brown et al., 2011) have
shown that some depressive, anxious, and psychotic symptomatology can remit with abstinence. The clients with more severe psychiatric symptoms at baseline tend to report more psychiatric symptoms at follow-up, however, and these studies have not necessarily focused on clients with true co-occurring diagnoses but rather symptomatology. Notably, Rigg's (2003) review of treatments for adolescents with co-occurring disorders reported that among these youth, untreated non-SUD psychiatric disorders such as ADHD and depression tend to persist even after SUDs are treated “successfully” and produce abstinence. Consistent with what has been reported in other reviews of this literature (see also Kalina, 2013), we conclude that clients with co-occurring disorders tend to have a more severe course of illness, more severe health and social consequences, more difficulties and complications in treatment, and worse treatment outcomes than clients with a single disorder. To the extent that this conclusion is well supported, the remainder of this paper addresses the implications of these findings for the design of treatment services.

Treatment of co-occurring disorders

In addition to the development of a research literature on co-occurrence of SUDs and other psychiatric disorders, a variety of treatment approaches have been applied in settings staffed by addiction specialists, mental health clinicians, social workers, and others. Most treatment research has been conducted in high-income countries, focusing on the use of pharmacotherapies (Nunes & Levin, 2004; Kelly et al., 2012; Murthy & Chand, 2012), behavioral and psychosocial interventions (Kelly et al., 2012), contingency management (Prendergast et al., 2006), and therapeutic communities (Kalina, 2013; Sacks et al., 2008). This article will not attempt to review the extensive literature on the effectiveness of different treatment modalities for co-occurring disorders. Instead, we focus on three treatment models that have emerged from the literature as promising methods to manage clients with various combinations of co-occurring disorders:

1. **Sequential/Serial Treatment.** In this model of treatment, the client or patient is first treated for one disorder (SUD or mental health), followed by treatment of the other. Some have suggested that it is more important to first address the SUD because further compliance with psychotherapy and pharmacotherapy is unlikely without bringing the substance use under control (Kalina & Vácha, 2013). Kelly et al. (2012) noted concerns that some treatments for certain mental health disorders (e.g., CBT homework and exposure therapy for anxiety) might trigger anxiety, and therefore substance use, if attempted before substance use was under control, however no empirical support is provided for these claims. Without first addressing the mental health issues and working with a client to come up with alternate coping strategies in times of difficulty (e.g., for feelings of anxiety or depression), attempts to fix a serious substance problem might prove difficult. For these reasons, the efficacy of sequential treatment is questionable.

2. **Simultaneous/Parallel.** This model allows for treatment of both disorders at the same time, but separately by service
providers working in isolation from each other. In some cases, treatment for both disorders is provided at the same time in separate but closely linked systems. In a review of models for treatment of co-occurring disorders by Torrens et al. (2012), the authors warned that due to frequent difficulties in communication, cooperation, and logistics coordination between substance abuse and mental health treatment organizations, parallel treatment is a risky approach to take—responsible often falls on the client to follow through a treatment plan involving both systems.

3. Integrated. Integrated treatment aims to target comorbid psychopathology and substance misuse simultaneously within one agency or treatment program, with service providers either coordinating care or providing treatment as a team. It often involves a flexible combination of treatments for a client depending on severity of symptoms and substances of abuse (Horsfall et al., 2009). The term “comprehensive integrated treatment” (termed CIT by Sacks, 2000) implies a program that comprises a broad array of services, not only to address substance use and mental health problems directly, but also to capture services that might indirectly impact outcomes (e.g., via addressing issues related to health care, housing, employment, social services, and skill development). Integrating services requires that professionals from multiple fields learn to work together and in general, interprofessional dynamics play an important role in the process (Sylvain & Lamothe, 2012).

Most integrated treatment programs include intensive case management, individual and/or group therapy, and family counseling (Sacks, 2000). Kelly et al. (2012) concluded from a review of treatment studies that the most effective treatment is one that is multifaceted, with a combination of prescriptions for different behavioral, pharmaceutical, and psychotherapy methods. Severe conditions appear to do better when matched to higher intensity treatments. Prior to treatment, a close look must be taken at which substances are being abused and the severity of the abuse, as well as the severity of any mental illness. A review by Drake, Mercer-McFadden, Mueser, McHugo and Bond (1998) identified three categories of integrative treatment programs that were "less promising": Adding co-occurring disorder groups to traditional mental health services, using short-term intensive integrated treatment approaches in controlled settings, and demonstration programs providing integrated services to high-risk groups such as homeless persons, migrant workers, or inner-city residents. Program features that were associated with effectiveness included assertive outreach, case management, and a longitudinal, staged, motivational approach to SUD treatment. Drake and colleagues concluded that comprehensive and integrated treatment, particularly for durations of 18 months or longer, led to significantly less substance abuse and hospital use as well as substantial remission rates (some studies) and other improvements.

In general, integrated treatment seems to be the preferred model in that there is little evidence that parallel or sequential treatment affect outcomes compared with a focus solely on substance abuse. As per
Smith and Randall (2012), neglecting to treat the second disorder could place individuals at high risk of relapse to the disorder that was treated (e.g., Bruce et al., 2005; Driessen et al., 2001). There is some evidence that integrated programs improve treatment retention and are more cost effective (Kalina & Vácha, 2013), and some evidence of better post-treatment outcomes (Drake, O’Neal, & Wallach, 2008). The literature is rather sparse, however, except for studies focusing on treatment of co-occurring disorders that are particular to individuals with severe mental illness (as reviewed in Cleary et al., 2008; Drake, Mueser, Brunette, & McHugo, 2004; Dumaine, 2003). Generally, the complex package of interventions comprising integrated treatments, tested across different populations and within different treatment models, has elicited diffuse effectiveness data (Drake & Bond, 2010). This has made the translation to training difficult, and many institutions have maintained the “status quo”. It has been suggested (Kelly et al., 2012) that creative and individually tailored combinations of behavioral, psychotherapeutic, and pharmacological interventions will elicit the best outcomes for individuals with severe co-occurring disorders, with an increased emphasis on non-pharmacological treatments (i.e., longer duration, possibly more intensive structure) for combinations such as schizophrenia and cannabis dependence, due to pharmacological limitations. Drake et al. (2004) similarly suggested that the process of treatment and recovery from co-occurring disorders must take a holistic lens and include broad change that usually occurs in increments over months or years (vs. weeks). Clients must work within treatment to both create and pursue personally meaningful life goals that will provide them with alternative reward mechanisms and a sense of worth and value. These goals might concern the development of new habits or coping skills, improved social relationships, employment aims, family connections, diet and nutrition, or physical fitness and exercise.

**Implications for the development of treatment systems**

Since the 1960s, there has been a steady growth of specialized medical, psychiatric, and social services for individuals with SUDs in the industrialized countries (Babor, Stenius, & Romelsjö, 2008; Klingemann & Hunt, 1998). Nevertheless, many countries report no dedicated funding for SUD services within their health-care systems (WHO, 2010), and the development of specialized services is highly correlated with the level of economic development. High-income countries are much more likely to have separate administration of SUD, mental health, and medical services. In addition, system organizations are rarely neutral; professional dominance and treatment traditions often define the way treatment is conducted.

Although each country developed a different mix of services and administrative structures, there are some commonalities across national systems in the higher income countries in the types of service settings (residential, detoxification, and outpatient) and therapeutic approaches (Klingemann & Hunt, 1998). As treatment services became more numerous and specialized, new concepts were developed to describe how they related to different types of population needs, including...
co-occurring disorders. These concepts included the continuum-of-care, chronic-care, and broadening the base of treatment models.

The continuum-of-care concept, as described by Rush (2010), refers to the way service users are expected to pass through the mix of treatment options available to them. In an ideal system, the services should be arranged sequentially, beginning with diagnostic assessment, then assignment to particular settings depending on the acuity, severity, and complexity of the diagnoses and the availability and cost of appropriate services. An example of the continuum-of-care model is the stepped-care approach, wherein clients are assigned initially to the least intensive level of care and then “stepped up” to a more intensive level if outcomes are not optimal.

The chronic-care model addresses the needs of individuals with more serious cases of substance dependence (e.g., co-occurring disorders) by coordinating specialized services over time. This model operates under the assumption that once substance dependence has developed, there is a need for continuing care and management, as is done with chronic conditions like diabetes and hypertension. The chronic-care model was adapted to substance abuse by both Minkoff (2000) and Rush (2010). Rush defined a series of “tiers” that constitute the most important elements of a continuum of services for the management of chronic substance users. In addition to health promotion, early intervention, and crisis management, the framework includes specialized care for people in need of more intensive services, such as residential programs, outpatient counseling, and pharmacotherapy. The highest tier comprises highly specialized care functions for individuals with complex problems, such as inpatient withdrawal management, forensic services, and long-term psychiatric care. The tiered model is designed for use as a planning tool for the development of an integrated system of service functions for substance abuse, mental health disorders, and gambling problems.

The general call for service providers to “broaden the base of treatment” for substance use, by organizations such as the Institute of Medicine (1990; for alcohol) and the WHO (all substances), has led to the recent phenomenon of incorporating early intervention into the treatment continuum (Babor et al., 2008). “Broadening the base” refers to identifying and treating a wider range and diversity of clients with substance-use problems, with regard to age, treatment motivation, and level of problem. Humphreys and Klaw (2001) attempted to broaden the base of treatment, for example, by offering Internet-based interventions to nondependent, non-treatment-seeking problem drinkers. On a larger scale, however, broadening the base of treatment and early intervention includes screening of both adolescents and adults, brief intervention for patients considered to be at risk, and referral to treatment for patients in need of diagnostic evaluation and therapy. The expansion of screening and early intervention programs opens the possibility of combining early intervention for the most prevalent co-occurring psychiatric disorders, such as alcohol-use disorders and depression, as well as the early detection of incipient psychiatric disorders that may not reach a diagnostic threshold.
In contrast to the systems envisioned via these idealized models, services in most parts of the world are fragmentary and lack coordination. Babor et al. (2008, 2010) described the components and dynamics of an optimal treatment system from a public health perspective, which could serve as a guide for future system developments directed at different types of clients with co-occurring disorders. A key component of this model consists of system qualities, such as accessibility, economy, and efficiency, all of which contribute to the smooth functioning of the service system. According to assumptions of this model, these qualities should improve the overall effectiveness of services for service users. To the extent that the existing literature suggests that continuity of care, a period of abstinence from substance use, and coordination of mental health services are beneficial to persons with co-occurring disorders, the application of systems concepts should result in better outcomes. In addition, it is likely that coordinating and matching services to client needs could be improved by better diagnostic evaluation, taking into account the major differences of SUDs combined with internalizing, externalizing, or psychotic disorders.

The use of a systems approach is consistent with the work of Minkoff (2000), whose principles for the treatment of co-occurring disorders focus on treatment engagement and case management. This model recommends matching of services to a global subtype based on the severity of each disorder, taking into account diagnosis, treatment phase, and levels of client motivation and disability. A similar set of principles proposed by Miller and Carroll (2006) recommends universal screening for the full range of substance-related problems, not just the most severe, followed by brief motivational counseling as a first-line intervention, and more expensive and intensive services for those who do not respond to this brief intervention (ideally a menu of options for clients depending on individualized needs).

The general orientation of these models is to shift the burden of decision-making from the individual to the system or health-management agency responsible for defined populations. Unfortunately, separation of mental health and addiction services has been strongly reinforced over the past 30 years by both public and private sector initiatives in the U.S., Canada, and other countries that have invested in treatment services for substance users (Osher & Drake, 1996). Minkoff (2000) has suggested that large-scale systems change is needed in which programs at all levels of care develop competency for approaching co-occurring disorders. Such change will require program-level modifications, alterations in clinical-practice guidelines, the use of integrated screening tools that cover SUDs and other psychiatric conditions, and clinician changes via competency requirements, certification programs, and on-the-job education and training initiatives. Systems-level infrastructure changes depend on intergovernmental collaboration and the ability of both the mental health and addiction treatment sectors to communicate, coordinate, and take mutual responsibility for outcomes (Horsfall et al., 2009). This is no easy task, but regardless of the nature and extent of existing services, planning and quality improvement are likely to benefit from service mapping, needs assessment,
and needs-based planning. Service mapping involves the description of system structures and qualities as they are currently configured within a country, municipality, or an administrative area. For example, WHO designed a procedure for assessing, monitoring, and evaluating national treatment systems for SUDs in relation to population needs (Babor & Poznyak, 2010). The WHO-Substance Abuse Instrument for Mapping Services (SAIMS) identifies service-delivery gaps and areas for system improvement. Although there are no international standards for assessing unmet need, the SAIMS permits incremental planning that directs resources at the most important and manageable treatment needs in a population. The simplest procedure is to use population surveys to estimate the number of people in need of treatment. For example, rates of dependence and harmful use can translate into the potential demand for specialized services (residential and outpatient) as well as early intervention services in other health-care settings.

The need for substance-abuse services among the general population can also be estimated through the use of health and social indicators, such as substance-related mortality, morbidity, social problem statistics, and expert opinion on treatment needs. For service systems that are already well resourced, it may be more fruitful to conduct “needs-based planning.” This approach (Rush et al., 2014) requires the development of a service-system “model” and uses population prevalence data to estimate the types of treatment services to be received by population sub-groups, potentially including persons with various combinations of co-occurring disorders.

Conclusions

The evidence suggests that among clients being treated for co-occurring mental health and substance-use-related difficulties, outcomes are improved when these “separate” treatment modalities are offered in combination within an integrated treatment plan that addresses both substance abuse and other psychiatric problems simultaneously. By applying systems concepts, it becomes possible to make explicit the connections between what is already happening within a set of treatment services and what evidence-based practices we would like to use to address co-occurrence (see Weingardt & Gifford, 2007).

Implementation of changes at the systems level will likely come in different forms as we seek to engage those not in treatment who need help and motivate those in treatment to stay there. A large number of evidence-informed procedures and interventions are now ready for dissemination in systems of care in both low- and high-income countries. These innovations can directly address the system integration challenges discussed above, such as access, equity, and coordination. With regard to implementation of changes on the program level, factors such as staff resistance to change, a lack of resources, training obstacles, and poor commitment from organizational leaders have frequently led to fragmentary and inadequate services for persons with co-occurring disorders. Durlak and DuPre (2008) showed via an extensive review of implementation studies that the level of implementation of prevention and promotion programs significantly impacts the outcomes obtained; greater implementation leads to better outcomes. While identification of evidence-
Based practices is accelerating, attempts to improve the use of best practices with treatment manuals and one-time workshops alone do not help practitioners to gain proficiency (Miller, Sorensen, Selzer, & Brigham, 2006). Rather coaching, individual performance feedback, and specific implementation incentives (e.g., training money, pay raises, promotions) are needed to encourage systems to adopt new approaches. Beyond the implementation of evidence-based practices at the level of service providers and treatment programs, the public health approach also requires changes in treatment policies that operate at the level of treatment systems.

Finally, it is important to note that most persons with mental health problems do not have substance abuse problems. The optimal configuration of treatment service systems needed to manage persons with co-occurring disorders will vary according to a country’s current level of services, as well as the nature of their alcohol and drug problems. The total integration of the mental health and substance abuse treatment systems may not always be the right solution. Nevertheless, in most countries a capability to identify co-occurring problems in all health and welfare services seems warranted, and integrated clinical services for persons with co-occurring problems should be provided.

Declaration of interest None.

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