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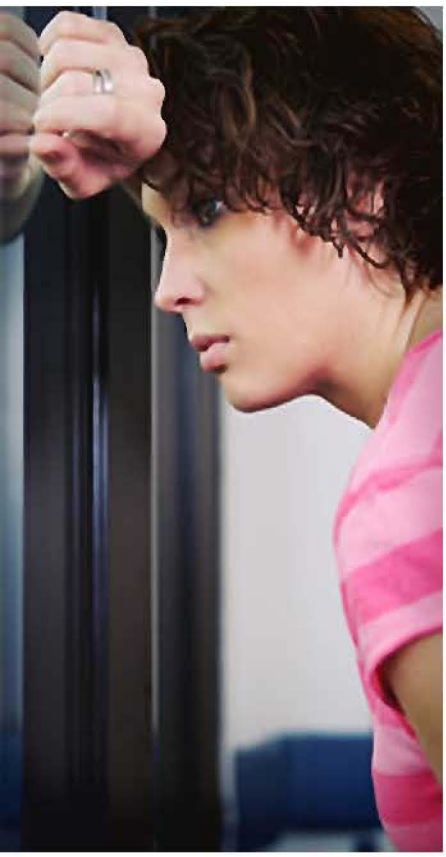

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Patients struggling with addiction arrive at a doctor's office or facility seeking help and trusting that physicians of any specialty will be cognizant of their symptoms and determine the best course of treatment for all their medical issues. Psychiatrists, emergency physicians and primary care physicians all may benefit from a heightened awareness of addiction medicine and how coordinating care can be in the patient's best interest.

Alcohol use on college campuses has been in the spotlight recently. An examination of students' drinking habits on game days and a commentary on the Amethyst Initiative are included in this issue. Special thanks go to Scott Teitelbaum, MD, FAAP, ASAM for his assistance as issue coordinator.

The Journal of Global Drug Policy and Practice, a joint effort of the Institute on Global Drug Policy and the International Scientific and Medical Forum on Drug Abuse is an international, open access, peer-reviewed, online journal with the goal of bridging the information gap on drug policy issues between the medical/scientific community, policy makers and the concerned lay public.

Edited by Eric A. Voth, MD, FACP and David A. Gross, MD, DFAPA, our intended readership includes clinicians, clinical researchers, policymakers, prevention specialists and the interested public

IN THIS ISSUE

THE JOURNAL OF
GLOBAL DRUG POLICY AND PRACTICE

Addiction in Clinical Practice: Psychiatry

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Abstract

The substance-related disorders are underdiagnosed and frequently misdiagnosed in the clinical practice of psychiatry; however, the magnitude of their influence cannot be overstated. Substance use can complicate the diagnostic process as well as the recommended course of treatment for patients. It is common among patients with mental health problems, and symptoms of substance use disorders are often mistaken for other psychiatric conditions. Given the importance of accurate diagnosis to the success of treatment, many factors should be considered when evaluating patients for substance use and related disorders. The present review highlights key issues in the assessment and treatment of psychiatric patients with comorbid substance use.

Keywords: addiction; psychiatry; clinical practice; review

Introduction

Patient substance use is an important factor to consider in the clinical practice of psychiatry. Substance abuse and dependence are serious conditions in their own right; in addition, substance-induced mental disorders or comorbidity of a primary psychiatric disorder with an addiction disorder can complicate an otherwise seemingly straightforward diagnosis. When substance use disorders co-occur with other Axis I disorders, the clinician must determine whether the etiology of psychiatric symptoms stems primarily from substance use, endogenous neurochemistry, or other psychological or developmental factors. Clarifying the extent to which substance use contributes to the presenting problem will facilitate effective treatment planning and maximize the likelihood of successful treatment outcome. This paper reviews important considerations in the treatment of patients with substance use and primary psychiatric disorders in order to help clinicians optimize their care.

Epidemiology

Substance use disorders and other psychiatric disorders are relatively common. Almost 40% of Americans admit to using one or more illicit substances in their lifetime (1). Indeed, the lifetime prevalence of any substance use disorder in the general American population has been estimated at 26.6% (2), though the risk is estimated to be even higher among select groups (3). With regard to psychiatric disorders, according to the National Institute of Mental Health (NIMH), primary psychiatric illnesses make up 26.2% of medical illnesses in a given year (4), and mental disorders are the leading cause of disability among individuals between the ages of 15-44 in the U.S. and Canada (5).

Psychiatric disorders also frequently coexist with substance use disorders. In fact, in 2007, the Substance Abuse and Mental Health Services Administration (SAMHSA) approximated that 4.6 million individuals in the United States are affected by co-occurring mental and substance abuse disorders (6). Clinical studies and epidemiologic surveys consistently indicate that substance use disorders and mood and anxiety disorders have strong associations when considered on a lifetime basis (7). Other research has demonstrated that 70-80% of patients being treated in addiction clinics have a comorbid psychiatric disorder (such as depression, anxiety, or schizophrenia), and approximately 50-80% of patients being treated in a mental health clinic have a comorbid substance use disorder (8).

Unfortunately, there are relatively few research studies which have specifically studied the prevalence of the nine substance-induced mental disorders defined by the *Diagnostic and Statistical Manual of Mental Disorders* (9). Nevertheless, it is important to recognize how substance use can mimic a myriad of psychiatric symptoms. For example, three such disorders are referred to as "organic brain syndrome" (i.e., substance-induced delirium, substance-induced persisting amnestic disorder, and substance-induced persisting dementia). Four others include the substance-induced disorders of mood, psychosis, anxiety, and sleep. The remaining two are substance-induced sexual dysfunction and hallucinogen persisting perceptual disorder. In general, the literature regarding substance-induced mental disorders is limited to descriptions of the underlying symptoms or concurrent disorder and has served primarily to raise professional awareness of these conditions (10). However, some attempts have been made to estimate their prevalence (11-13).

Diagnostic Issues

Historically, patients with comorbid psychiatric and substance use disorders have been under-diagnosed or misdiagnosed. The challenge of differentiating concurrent substance use disorders from psychiatric disorders necessitates strict adherence to the diagnostic criteria in order to accurately distinguish between

substance intoxication, withdrawal symptoms, and the symptoms of psychiatric disorders. Indeed, the diagnostic criteria for psychiatric disorders mandate that substance use must always be ruled out before assigning a diagnosis (9). In addition, attention to the temporal sequencing of symptom onset is critical to determining the appropriate diagnosis. These steps are necessary to properly classify the illness and to optimize treatment efforts. For example, to isolate an independent mood or anxiety disorder from a substance use disorder, the DSM-IV (9) requires either 1) evidence that the mood or anxiety syndrome was occurring *before* substance use, or 2) evidence that the mood or anxiety syndrome persisted for 4 weeks or more *after* the cessation of intoxication or withdrawal. Alternatively, isolation of a substance-induced disorder requires that the mood or anxiety symptoms coincide with periods of substance use or remit shortly thereafter.

Unfortunately, clinicians frequently overlook or underestimate the impact of substance use due to patient denial, lack of experience managing patients with substance-related problems, inadequate screening methods, or faulty value judgments regarding the "typical" alcohol or other drug user. As a result, clinicians may find it beneficial to order urine drug screening with new patients and to adequately survey all potential psychotropic chemicals which are not included in the urine toxicology. Confirmation of history through collateral sources such as family, friends, or other health care professionals may be valuable.

Finally, the distinction between behaviors caused by substance use versus mental illness can be difficult to make, particularly when there exists a great deal of overlap between the two. For example, depression and mood instability are relatively common among patients with substance use disorders (14); whereas, a strong association between schizophrenia and nicotine use exists (15). As a result, when substance use is suspected, the clinician should obtain a complete medical and psychiatric history (emphasizing substance use history) before attempting to identify or label the patient's condition(s). Other addictive behaviors (e.g., compulsive gambling, sex addiction, eating disorders, or internet addiction) should be explored as well. Failure to identify such symptoms as a primary or contributing cause to the patient's distress and/or impairment may increase the chances of a misdiagnosis.

Treatment Considerations

There are several important considerations in the treatment of addictive disorders, including how to most effectively approach the patient and build rapport, determination of the most appropriate level of treatment, decisions regarding whether or not to utilize therapeutic or prophylactic medications, and referral for psychological treatment and/or participation in mutual-help groups. Each of these factors plays an important role in treatment acceptance, success, and relapse prevention.

Building Rapport

The doctor-patient relationship affords a unique opportunity to have a major impact on patients' lives with relatively little effort on the part of the physician. So-called "brief interventions," which may last just a few minutes in a primary care setting, have consistently proven beneficial in changing addictive behaviors (16). Common elements of brief interventions include assessment, feedback, negotiating, behavioral modification techniques, self-help bibliotherapy, follow-up, and reinforcement (17). When approaching the potentially uncomfortable topic of problematic or illicit substance use with a patient, it is often helpful to assure confidentiality, take a non-judgmental stance, express empathy, and provide hope (18). Building a cooperative alliance with the patient is more effective in changing behavior than taking an authoritarian stance (19).

Level of Treatment Required

In general, evaluation to determine the appropriate recommended level of treatment is best conducted by following the American Society of Addiction Medicine's publication, *ASAM Patient Placement Criteria for the Treatment of Substance-Related Disorders, 2nd Edition-Revised* (20). This approach evaluates the patient's status on six different dimensions in order to stratify their risk in a meaningful and reliable way. The first dimension deals with the patient's potential for experiencing significant withdrawal symptoms, whereas the second and third dimensions assess for the presence of medical and psychiatric comorbidities. The fourth dimension evaluates the patient's current readiness for change. Finally, the fifth and sixth dimensions assess the patient's potential for relapse and the presence or absence of a supportive environment. A trial of abstinence with outpatient psychotherapy may be considered initially if the patient has a strong support network, is in a safe environment, and there is no medical risk for withdrawal (10). However, if abstinence and outpatient psychotherapy are not adequate or appropriate, partial hospitalization or inpatient treatment at a medical hospital, psychiatric unit, or treatment center may be warranted.

Considerations in the Use of Pharmacotherapy

Regardless of the proper placement of the patient, there are several medication-related issues to consider when treating patients with substance use disorders. For example, although pharmacotherapy is a standard form of treatment for many psychiatric disorders, new evidence suggests that clinicians should consider the interaction of comorbid *substance usedisorders in order to maximize the effectiveness of the treatment and minimize potential negative consequences (21).* In addition, many medications that are commonly used for the treatment of psychiatric disorders should be avoided when possible in patients with co-occurring substance use disorders (22). However, in certain cases of medical necessity (e.g., alcohol withdrawal or trauma), potential drugs of abuse such as benzodiazepines or opiates may be used with caution (23).

In most cases, the goal of pharmacotherapy is to actively facilitate weaning from the substance of abuse as soon as tolerated and/or to reduce the likelihood of relapse to active use. In both cases, close monitoring of the patient is required. Substance dependence produces powerful cravings, which are experienced as distressing and may encourage patient efforts at self-medication (24). Given the potency of these medications and their potential lethality when combined with other substances, this is a serious concern. As a result, the choice of medication should be carefully considered before prescription. For example, in some situations it may be beneficial to utilize an agonist medication such as methadone as a maintenance treatment to facilitate abstinence from heroin or other opiates while minimizing withdrawal symptoms (25). Methadone is generally considered a safer alternative to short-acting opiates and can be used to promote elimination of illicit drug use and recruitment into a full detox and recovery program (25). In other cases, use of a combined agonist-antagonist medication such as buprenorphine (Suboxone, Subutex) may be preferable. These medications work to block the euphoric effects at the receptor level and to minimize withdrawal and subsequent drug seeking behavior (25). Finally, anticraving medications (naltrexone, acamprosate, etc.) can be very useful for patients who acknowledge their disease and are willing to actively participate in treatment (26). These medications are frequently used in treatment centers and early cessation programs. However, patients with a firm commitment to their recovery and/or a history of sustained sobriety may be successful without the assistance of these medications (10).

Other considerations in the use of pharmacotherapy relate to other symptoms commonly associated with substance use and negative side effects of the medications. For example, one common symptom in early abstinence is insomnia, but use of sedatives and sleep medications with potential for abuse (e.g., zolpidem, eszopiclone, zaleplon, diphenhydramine) should generally be avoided when treating patients with substance use disorders, due to the risk of instigating a relapse (27). Behavioral treatment methods are typically recommended (28); though use of sedating antidepressants such as trazodone or doxepin, which lack abuse potential, may be indicated for some patients (29). With regard to negative side effects of pharmacotherapeutics for substance use disorders, it is noteworthy that patients with comorbid pain can be particularly difficult to treat. Prescription of opiate medication may be contraindicated due to the potential for abuse (30), and dosing can be particularly challenging. Regular users of opiates will require a higher dose of medication for adequate acute pain management (30), as will individuals who are being treated with an opiate-antagonist medication (31). In either circumstance, the support of a pain management specialist familiar with both substance dependence and ancillary pharmacotherapy should be enlisted (30). Evidence shows that a relatively high rate of sobriety can be achieved through active participation in 12-step support groups (32).

Treatment of Specific Psychiatric Conditions with Comorbid Substance Use

The following section will explore individual psychiatric disorders and discuss which drugs may mimic psychiatric symptoms either in their use or withdrawal. Also discussed will be which drugs to avoid in the treatment of psychiatric symptoms or disorders in comorbid substance use disorders. Finally, a discussion of safe alternatives, goals, and protocols for therapy will be included.

Affective Disorders

The most common pathological psychiatric symptom from the use of central nervous system depressants is depression (10). Therefore, these chemicals (alcohol, benzodiazepines, barbiturates, etc.) can both mimic and exacerbate clinical depression during both active use and withdrawal. Acute depressed mood following cessation of stimulant, opiate, or sedative use is also extremely common (10). After appropriate detoxification efforts and abstinence from the drugs of abuse, the depressive symptoms will frequently ameliorate or remit within a short period of time. For example, alcohol-induced depression generally resolves within the first two or three weeks of abstinence (10). In a study of over 3000 alcoholics, researchers concluded that substance-induced depression (26%) was more prevalent than independent major depressive disorder (15%), that those with substance-induced depression had more severe alcohol and drug histories, and that those with independent depression had more first-degree relatives with affective disorders (33). In another study of male alcoholics, 42% displayed depressive symptoms upon admission, with rapid abatement of symptoms leaving only 12% symptomatic after two weeks (11). Other depressants, such as benzodiazepines and barbiturates, show similar periods of depressive symptom abatement. However, though substance-induced depression may dissipate rapidly, it is considered as dangerous as or more dangerous than major depressive disorder in terms of the risk of suicide and self-injurious behavior (10). In fact, some researchers report that alcoholic patients have up to a 120-fold greater risk of death by suicide than the general public (34).

Chemicals such as cocaine, amphetamines, and MDMA (Ecstasy) promulgate mania and may mimic and/or exacerbate bipolar disorder. The use of these chemicals provides an intense euphoria or "rush" with hyperactive behavior and speech, anorexia, insomnia, inattention, and labile moods (35). The dosage and route of administration of these drugs affect the intensity of the experience and its effect on mood (36). In addition, if several weeks of abstinence are maintained, many stimulant users report a dysphoric state marked by anhedonia which may persist for weeks (37).

Anxiety Disorders

Treatment of patients who have an anxiety disorder with comorbid substance use can be particularly challenging because several anxiolytic medications have high abuse potential. For example, the benzodiazepines are frequently used in the treatment of acute anxiety, but for patients predisposed to substance abuse and dependency (i.e., those with positive family history, early age of first use, etc.),

iatrogenic addiction is a significant concern. Therefore, in treating patients with comorbid substance use and anxiety disorders, alternative agents such as serotonin or serotonin/norepinephrine reuptake inhibitors (SSRIs, SNRIs), buspirone, anticonvulsants, antihypertensives, and even neuroleptics should be considered (38). If treatment with a benzodiazepine is clinically indicated, the risk can be minimized by choosing long-acting benzodiazepines such as clonazepam instead of shorter-acting (and more addictive) agents such as alprazolam (14). Beyond medications, the adjunctive and primary role of psychotherapy in the treatment of anxiety disorders (especially cognitive-behavioral therapy) should not be underestimated. Strong evidence suggests that, for several anxiety disorders, cognitive-behavioral therapy is as effective, if not more effective, than any medication (39).

Treatment of substance-induced anxiety is also complicated. For example, acute withdrawal from virtually any drug can precipitate symptoms of anxiety (40). Once appropriate detoxification has been achieved (to minimize physiologic concerns), treatment of the anxiety symptoms should be initiated. As indicated previously, use of benzodiazepines may be particularly dangerous for the patient with substance dependence, not only due to their potential as drugs of abuse, but also because their use is associated with lowered inhibitions and accidents (41). Use of benzodiazepines may provoke relapse, which is particularly dangerous in the case of relapse to alcohol use. The interaction between alcohol and benzodiazepines can result in agitation or even death by respiratory depression. As a result, the use of benzodiazepines in alcoholics (after detoxification) remains controversial, even in the face of severe anxiety (10).

The relation between anxiety and cannabis use is complex. Marijuana use is known to trigger heightened levels of anxiety and/or panic attacks in certain individuals either with or without a substance use disorder (42-47). Furthermore, researchers have noted both a higher incidence of panic attacks as well as an earlier age of onset of attacks among cannabis users (19 years old for cannabis users vs. 28 years old in cannabis naïve) (48). On the other hand, some marijuana users report that the drug helps them to feel "more normal" and experience a decreased level of anxiety (49). Clinical experience suggests that these individuals may have an underlying anxiety disorder which they are self-treating. As a result, a careful history should be conducted in order to elicit enough information to distinguish the two disorders.

Psychotic Disorders

Symptoms associated with psychosis frequently result from the acute effects of various psychoactive drugs. As a result, many individuals are misdiagnosed with a psychotic disorder following the use of hallucinogens, cocaine, amphetamines, or anticholinergics. The effects of these chemicals may mimic psychosis in the healthy patient; in addition, the chemicals themselves are prone to cause or exacerbate psychotic behavior (50). Indeed, in a study examining substance-induced psychotic disorders, researchers prospectively observed admissions to an acute psychiatric inpatient unit over the course of a year. During that time they found that 30% of admitted patients met DSM-IIIR criteria for organic mood disorder, 8% for organic hallucinosis, and 6% for organic delusional disorder (51).

In addition to the concerns related to acute intoxication effects, individuals occasionally become delusional or paranoid after prolonged heavy use of cocaine or amphetamine (10). In the paranoid state, the user may maintain intact abstract reasoning and linear thinking; whereas, they generally display delusions that are poorly developed and of a nonbizarre nature. Some stimulant users report visual hallucinations such as "coke snow" or tactile hallucinations (e.g., "coke bugs") (10). Sleep disturbances are prevalent among individuals who are under the influence of these drugs, which may contribute to psychotic behavior through sleep deprivation (52). Hallucinogens such as cannabis, LSD, PCP, Ketamine, dimethyltryptamine (DMT), dextromethorphan (DXM), mescaline, and psilocybin mushrooms produce visual distortions and overt hallucinations (53). First and second generation antipsychotics are frequently effective in controlling acute agitation and psychosis, but there is some indication that quetiapine may have some abuse potential and should be used with caution in the treatment of individuals with primary or comorbid substance use disorders (54).

Finally, the development of psychotic symptoms in individuals who suffer from alcohol dependence is a significant concern. Alcoholic hallucinosis is most notable in the withdrawal phase between 12 hours and 2 days (10). Both auditory and visual hallucinations are known to occur when the patient is alert and well oriented. The most common symptoms include command or threatening auditory hallucinations, which may cause the patient to become agitated and paranoid (23). Though the most typical time for emergence of psychotic symptoms is 2 days, some symptoms (particularly paranoia) have been reported to last for weeks to months and may be evidence of a predisposition to an independent psychotic disorder (55). Indeed, there can be tremendous similarity between alcohol-related psychotic symptomatology and symptoms of schizophrenia (50).

Attention Deficit Hyperactivity Disorder (ADHD)

Attention Deficit Hyperactivity Disorder is a common behavioral disorder in children and adolescents, which presents unique substance-related concerns. Behavioral disorders, such as ADHD, are frequently comorbid with substance use disorders (56-58). Evidence suggests that untreated ADHD is actually a risk factor for subsequent development of substance use disorders and that early intervention may serve as a protective measure (59). Since most drug use originates in adolescence or even childhood (60), some researchers conceptualize substance use disorders as similar to other developmental disorders. This would indicate that, like ADHD, the earlier treatment is initiated, the greater the likelihood of a successful treatment outcome (61). Since inadequate treatment of either disorder may potentially lead to poor

outcome for the comorbid condition, many clinicians have suggested that treatment of both disorders should ideally be provided in an integrated fashion (62, 63).

On the other hand, stimulant treatment of a patient predisposed to substance use disorders may hasten the development of the disorder or cause an iatrogenic substance use disorder. Ironically, side effects of methylphenidate (Ritalin) can mimic the very disease it is designed to treat (i.e., hyperactivity, difficulty concentrating, etc.), as can other stimulants like cocaine or amphetamine derivatives (64). As a result, in order to optimize treatment, the first step should be to confirm the diagnosis and attempt treatment using behavioral therapy methods or a nonstimulant medication (e.g., atomoxetine) (65). If these efforts are unsuccessful, the clinician may recommend prescription of a stimulant medication with lower potential for abuse, such as the prodrug lisdexamfetamine (Vyvanse). This practice allows patients the greatest likelihood of having their disorder adequately treated with agents that have the lowest potential for abuse. If other therapeutic methods fail, and stimulant therapy is initiated in the patient with a substance use disorder, close monitoring must be maintained. In addition, adequate structure should be established to ensure proper compliance (including avoidance of drug diversion activities) with the medication (65). More research is needed to develop clinical practice guidelines regarding *whether* and *when* stimulant treatment may be appropriate for patients with comorbid ADHD and substance use disorders (59).

Cognitive Disorders

It is important to recognize that substance use disorders can afflict individuals of any race, gender, or age. Particularly among elderly patients, substance use disorders, withdrawal symptoms, and even appropriate use of prescription medications can mimic dementia and/or delirium. In addition, substance use and other mental health conditions have been associated with an increased prevalence of falls and higher mortality rates among elderly individuals (66). However, avoidance, early detection, and treatment of substance-related disorders improved morbidity and mortality. According to the American Geriatrics Society, the British Geriatrics Society, and the American Academy of Orthopaedic Surgeons Panel on Falls Prevention, there is a consistent association between the use of benzodiazepines and falls, regardless of setting (i.e., community, long-term care, hospital, or rehabilitation center). Furthermore, data suggest that there is no difference in the rate of falls between long-acting vs. short-acting class II benzodiazepines (67). As a result, it is recommended that use of these medications be avoided in elderly patients.

Conclusion

Due to the high prevalence of both psychiatric and addictive disorders, recent emphasis has been placed on the coexistence of psychiatric disorders with substance use disorders and other addictive behaviors. Substance use and the effects of psychotropic drugs (whether in their active use or withdrawal syndromes) have been referred to as "the great mimicker" of mental illness. Consequently, these disorders have frequently been misdiagnosed or correctly identified but treated inefficiently. New evidence suggests that integrating treatment for addictive and psychiatric disorders offers a more promising outcome.

Understanding the role that substance use, abuse, dependence, and withdrawal can play in the incidence, comorbidity, and exacerbation of psychiatric symptoms facilitates the diagnostic process and optimizes the chances for treatment success. Conducting a thoughtful and thorough interview, with ancillary acquisition of therapeutic markers such as urine drug screens, collateral information, and evaluation for other addictive behaviors and psychosocial dynamics, will also help to ensure accurate diagnosis. Relatively few epidemiological data exist on substance-induced mental disorders and organic brain syndromes, but new strategies are emerging for optimal treatment of these concurrent disorders. Knowing the available treatment options helps to minimize risk to patients while still achieving a safer and therapeutic outcome than treating the disorders without consideration of the potential for interaction effects. For example, it is generally advisable to avoid prescribing any drug with abuse potential to patients at risk for, or with a known history of, addiction. Proper placement of the patient based on risk stratification using the ASAM criteria allows the patient to receive the appropriate level care in which to address addictive and psychiatric disorders simultaneously.

Author Information

William M. Greene, MD, currently works as Assistant Professor of Psychiatry at the University of Florida in Gainesville, FL. The majority of his work is clinical, currently managing an inpatient detoxification unit, in addition to outpatient evaluations and follow-up. Dr. Greene's main area of interest is in treating substance dependence as it relates to various psychiatric comorbidities. He is actively involved with evaluating and treating impaired healthcare professionals. He is also active in teaching medical students and residents. Dr. Greene received a BS in Biology from Wake Forest University in 1997 and completed medical school at the University of South Florida in 2003. Dr. Greene completed his psychiatric residency at University of Florida in 2007 and has been working in the field of addiction medicine since then. Dr. Greene serves on the University of Florida Alcohol and Drug Education Policy Committee, is a member of the American Society of Addiction Medicine, and has contributed to multiple publications related to substance abuse.

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Substance Abusing Patients in the Primary Care Setting: They Deserve Treatment Too

Kendall M. Campbell, MD

Abstract

The world of primary care can be complex and challenging. With an ever increasing body of medical knowledge, primary care physicians must make it a priority to think outside the box when diagnosing patients. This is especially true when it comes to the consideration of substance abuse as a diagnosis. Managing common medical problems such as hypertension and diabetes are familiarities of care, but substance abuse can be easily dismissed or overlooked. It is proposed that 20% of patients encountered for a primary care visit have a problem with substance abuse. Primary care providers should add substance abuse to differential diagnosis, treat when trained and refer when appropriate. Automatically discharging patients who are found to carry this diagnosis is inappropriate, as this patient population deserves and needs to be treated as much as any other patient population. This article will provide tips for the primary care physician to aid in the diagnosis of substance abuse and provide recommendations by which these patients can receive treatment.

Keywords: substance abuse, primary care

Substance abuse in the primary care setting is no strange bird. For the purposes of this article, substance abuse will be defined as any prescription or nonprescription substance that has abuse potential. Data indicates that about 20% of patients seen by family physicians have a substance abuse problem. (1) Tobacco use was excluded. In the everyday practice of medicine it is important to consider substance abuse as part of the differential diagnosis. Substance abuse can lead to significant social and family dysfunction and cause problems with finances, relationships and employment. Medical problems can be difficult to manage, and chronic conditions can be exacerbated, leading to increased morbidity and mortality. The prevalence of this problem in the primary care setting underscores the importance of its recognition and treatment. This article is written in reference to substance abusing patients in general and does not target any specific population such as the mentally ill, teen or geriatric.

Substance abuse in primary care can be a touchy subject for many reasons. There are concerns surrounding both illicit substance abuse as well as prescription medication abuse. Abuse in either setting is dangerous and produces adverse outcomes. Oftentimes the most concerning for physicians is prescription driven substance abuse, as the physician will have had a role in the abuser obtaining his or her substance of abuse. Concerns regarding prescription drug abuse settle around physician comfort with prescribing and facilitating misuse and diversion. The patient-physician relationship is one that is generally nurtured by both patient and physician, and certain responsibilities for each party are assumed. Substance abuse undermines the trust of this relationship and causes rapid deterioration with sometimes unsalvageable communication problems. In exploring reasons for prescription writing discomfort, data has demonstrated physician-perceived inadequate training for treatment of conditions requiring opiates or narcotics. (2) There is also concern that in those who are treated, the treatment course is difficult, and the satisfaction rate is low. (2)

The most concerning aspect for providing care for those who have substance abuse problems is recognizing the diagnosis as a problem. Primary care providers are known to be diagnosticians able to carefully weigh subjective and objective data to arrive at an assessment and plan of treatment. A problem is encountered when substance abuse is not entertained as part of the differential diagnosis, which causes a delay in diagnosis and treatment of a potentially life threatening problem. In a Great Britain study of general practitioner (GP) awareness of cannabis use, inquiry by the GP regarding use was noted to be rare, even though cannabis had long been known in Britain to be the most widely used and prevalent illegal substance.(3) Similarly, in a study performed by Saitz et al, patients who were underserved, without insurance and with mental illness were not likely to have their physician aware of their problem with substance abuse. (4) Recognizing substance abuse as a potential problem within the primary care arena begins by increasing physician awareness. Screening tests for prostate cancer, breast cancer and colon cancer are known standards of care likely due to the morbidity and mortality associated with the diseases. Screening for substance abuse should be just as much at the forefront of primary care offerings for our patient population. A thorough history for any ailment should involve questions that may lead to the diagnosis of substance abuse, whether this is the primary diagnosis or a secondary one. Searching for alcohol abuse may not be as difficult as looking for abuse of other substances, as tools have been developed specifically for alcohol to aid in diagnosis. When looking for other substances, checking for past history of substance abuse by patient admittance or through old records can be of great benefit. A family history of substance abuse can also raise suspicion of current substance abuse in a patient. The social

history is probably the most important to obtain, and questions that go beyond simply establishing use are important. In obtaining a social history, it is important to be specific regarding substances used, as it is surprising how patients classify substances in terms of abuse. It is not uncommon for a patient with a history of alcohol abuse to request narcotic pain medications by name and indicate in the history that the problem was with alcohol alone, and this should have nothing to do with benzodiazepine or narcotic prescribing. This categorization of addiction is oftentimes noted as patients will report a history of wine drinking, but report abstinence from beer and mixed drinks, as if this may change the treatment plan or cause different patient perception.

A most important aspect of the history is to look for concurrent or past mental illness. It is well established that substance abuse in the setting of mental illness is not a rarity, making it a priority for primary care providers to look for concurrent mental illness. Social disruption and dysfunction may also lead to substance abuse, as when patients are stressed. Relief is thought to be found in substances that can dull or numb the pain or provide temporary relief from a difficult situation or problem. Of social concerns that can impact abuse, financial strain and family dysfunction can be two of the most challenging, and it is important for the primary care provider to be aggressive in screening for these problems. Primary care physicians should be suspicious when requests for specific medications and strengths are made, and refill histories are inaccurate. It is well known that substance abusers may request refills early and ask for increasing quantities. Primary care providers need to be aware of behavioral changes as these can be signs of abuse. Sexual dysfunction is commonly caused by drugs of abuse and should be investigated as potentially caused by illicit substances. (5) It is important to remember that even if the diagnosis of substance abuse is refuted, history regarding this diagnosis is an ongoing duty, and persons who are suspected abusers should be followed regularly by the practice to ensure abuse is not a problem.

The physical exam may not lend itself to much utility in diagnosing substance abuse; however, track marks and changes in nasal mucosa can be indicators. The physical exam can expose stigmata of disease, and with these findings substance abuse must be entertained as a possible cause. Findings may include hypertensive urgency or emergency in the setting of usual normotension. There may also be skin cellulitis from injectable drug abuse or changes of chronic liver disease from alcoholism. In addition, laboratory and imaging data can be helpful in confirming a suspicion of substance abuse. The gamma-glutamyl transpeptidase (GGT) can be a helpful indicator in the setting of alcohol abuse as can the mean corpuscular volume. The urine drug assessment is always a helpful tool. Imaging may be helpful in diagnosing liver disease or pancreatitis, or even cerebellar degenerative changes from alcohol.

The importance of substance abuse recognition by the primary care physician is paramount as literature has demonstrated that treating substance abuse can be a successful venture. (6) There is literature to suggest that brief interventions can be of benefit within the constraints of a typical primary care visit. (7) Increasing primary care physician awareness of substance abuse as a problem can be approached methodically and intentionally, and there is data to show increased awareness as an outcome measure being possible. (8) Awareness can be increased by mandating substance abuse training as part of the curriculum of primary care residency training programs. Requirements can also be added to license recertification requirements and annual privacy and security renewals. Office methods to aid with managing substance abuse include chart review and targeted interventions for known abusers. For example, it is important to assign clinical staff to make scheduled calls to offer support, encouragement and for treatment. Referral for treatment is a viable option for any primary care physician who is inexperienced or desires to have no experience with managing addiction and substance abuse. It is important for the primary care physician to recognize addiction as a problem and refer promptly and appropriately. However, even if a patient is referred for treatment, the primary care provider should remain in contact with both the patient and treating physician as this allows for better continuity of care. Recommendations for treatment of a substance abuser are described in the figure.

In conclusion, increasing primary care physician awareness of substance abuse as a true and chronic condition will lead to more rapid diagnosis and better treatment, whether treatment occurs in the primary care office or in the office of the subspecialist. Substance abusers are people with chronic disease who need treatment too. Let's not dismiss or overlook this problem completely as we provide comprehensive care for our patients.

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Emergency Medicine and Addiction Medicine: Much in Common

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Abstract

Addiction Medicine and Emergency Medicine have much in common. Their greatest similarity is in the overlap of the patient population that they each serve. The substance abusing population is over-represented in the emergency room (ER), placing increasing demands upon financial and staff resources. Identification and proper intervention in the ER has been a focus of most joint research in the past, but other areas of investigation are open. Additionally, emergency medicine as a relatively new specialty has much in its history to share with addiction medicine as it strives for recognition. Emergency physicians are also finding themselves to be over-represented among the patients of the addiction medicine specialist.

Keywords: Addiction Medicine; Emergency Medicine

The association between emergency medicine and addiction medicine is apparent to the casual observer who walks through almost any emergency room (ER) on a Saturday night. The patients in the ER are often those who have previously been seen by the addictionologist or should be. Patients with alcohol and substance abuse related problems are disproportionately represented in the ER (1). 18% of patients seen in a typical ER shift were reported in one study to have alcohol related problems (2). Drugs and alcohol may be the direct cause of the visit as with the patient with cocaine induced chest pain or injuries sustained while driving an ATV while intoxicated. For others the connection to substance use may be less apparent, like the elderly woman who is brought into the ER by concerned family because of her recurrent falls and increasing confusion who has been secretly taking extra benzodiazepines to help her sleep.

A study published in the *Annals of Emergency Medicine* in 2004, however, demonstrated the need for a closer relationship between the emergency physician and the addictionologist. In a study of Tennessee hospitals, it was estimated that 27% of adult patients had unmet substance treatment needs (3). These patients were 81% more likely to require hospitalization during their ER visit and 46% more likely to have had another ER visit in the previous year. It was estimated that the cost in extra hospital charges for these patients was $777.2 million. The article describes the ER visit as "a teachable moment." It clearly illustrates the possible cost for a failure to take advantage of that moment.

As has been mentioned, patients with substance problems make up a disproportionate number of ER patients compared to the general population. The Drug Awareness Warning Network (DAWN) report shows a significant trend, however, in the types of drugs and the numbers of ER visits.There was a 21% increase in 2005 of visits related to the nonmedical use of pharmaceuticals - both prescription and over the counter (4). This would coincide with figures in *Addiction Medicine* showing that prescription drug addiction is the fastest growing segment of the treatment population (5). Benzodiazepines were up 19%, opiates other than methadone were up 24%, and methadone alone was up 29%. The combination of prescription and illicit drugs with alcohol accounted for 36% of ER visits. This combination of substances leads to effects and interactions that no drug company ever imagined. Dealing with the toxic side effects of this combination falls to the emergency physician.

Among patients presenting to the ER who require admission for causes unrelated to substances, it remains incumbent upon the emergency physician to recognize substance use issues. The American College of Surgeons has made documentation and screening for alcohol and substance problems a part of the requirements for Trauma Center Level I and II certification. The emergency physician must identify patients at risk for substance problems during their hospitalization. Failure to recognize alcohol dependence in a patient admitted for COPD or chest pain may lead to significant worsening of the patient's underlying problem as withdrawal progresses. That this patient in many community hospitals may not see another doctor until morning risks the development of withdrawal seizures or delirium tremens as well as deterioration of his primary medical condition. The problem with benzodiazepines is even more problematic in that a seizure may be the presenting symptom of sedative withdrawal without the preceding autonomic instability seen with alcohol (6). Awareness of the problem of substance dependence on the part of the emergency physician is the only preventive. While trained to deal with withdrawal, failure to identify dependence may put the emergency physician at a disadvantage. Part of the core competency in emergency medicine now required for board certification includes training and testing in dealing with these issues.

Emergency Medicine Research in Addiction Medicine

Most of the published research about emergency medicine and addiction has focused on brief intervention

with patients identified as problem alcohol drinkers. They make up, as previously noted, a significant ER patient population. In addition, studies have shown that self reporting of alcohol use among ER patients can be reliable as an indicator of actual alcohol consumption, making alcohol abusers a relatively easy population to study not requiring the use of drug screens or breath tests to confirm data (7). To date, little has been published about ER interventions with drug use. The research in alcohol has been based upon the recognition that, in the primary care setting, brief intervention with patients identified as drinking more than 14 drinks per week or 4 per occasion for men or 7 per week or 3 drinks per occasion for women (i.e. above the "low risk" guidelines from the National Institute of Alcohol Abuse and Alcoholism) changed their behavior, resulting in less drinking. It was reasoned that a similar approach should be tested in the ER setting. The SBIRT (screening, brief intervention, referral to treatment) Project was an academic collaborative emergency department (ED) study that attempted to use similar tools in an ER setting (8). At 3 months follow up there was about a halving of the total number of patients who still exceeded the low risk guidelines who received the intervention compared to controls. Another study published from Yale in June 2008, however, disputed this conclusion, showing essentially no benefit at 6 and 12 months for a similar ED based intervention protocol. In an editorial accompanying the paper, it was noted that "5 of 12 studies failed to show an intervention effect" (9). This stands in contrast to studies from primary care and trauma where interventions have been shown to be effective to the point that they are now the standard of care. Rather than suggesting that intervention is not worthwhile in the ER, however, it is possible that the ER represents a setting significantly different than either the inpatient trauma service or family doctor's office. The appropriate intervention technique has yet to be developed.

A criticism can be made from the addiction medicine standpoint concerning the standards by which these interventions are judged. They primarily use a public health standard of reduced drinking days or quantity consumed. This may be a helpful public health and large population measure but from the perspective of addiction medicine lacks usefulness in demonstrating that the interventions provide individuals with meaningful help. The diagnostic criteria used for alcohol abuse and dependence specifically do NOT include any mention of quantity of alcohol consumed. To suggest that an intervention that simply leads to less consumption is a success is a misunderstanding of the disease of addiction. It is not just a continuous spectrum disease where the more consumed the more severe the disease. Ultimately finding measures that focus on behaviors associated with drinking will prove most useful in that they will match more closely our understanding of the neurobiology of addiction. In that way interventions that result in meaningful change can be confirmed.

Addiction Screening in the Emergency Room

The ED is the perfect setting for the use of these screens since many of the patients are there as a direct or indirect result of their alcohol or drug use. Screening tests like the CAGE or AUDIThave been useful in both the primary care and ER setting (9). The interventions used have varied from scripted instructions (11) to training given to physicians who then do directed interviews (12). What follows these brief interventions has been perhaps the part that is most left to individual practice variation depending upon the ER setting. In one large city a special Alcohol Emergency Room was tried (13). At one time they were seeing 400 patients monthly and answering 270 calls for alcohol treatment referral, suggesting a possibility of funneling services through one provider. In the university hospital setting an addiction or psychiatric consultation may be available. In some large community hospitals social workers are in the ER helping with appropriate referral and placement once the patient is identified as needing addiction services. In some smaller hospitals referral to a community health center or tertiary center may be the only options. Addiction services are not always readily available to every ER patient. ER doctors may at times find dealing with substance patients time consuming and frustrating. To say the least, they can be resistant, belligerent and at times openly combative. Rarely are they the bright spot in the emergency physician's night. Developing a plan for intervention and management with the help of addiction services can make the encounter less traumatic for everyone.

Emergency Physicians as Patients

Emergency physicians are finding themselves interacting with addiction medicine on a more personal level as well. Data from physician health programs show that emergency physicians, along with anesthesiologists and family practitioners, make up the largest numbers of physicians dealing with substance problems (14). In Florida 18% of participants in 2007 were ER doctors compared to anesthesiologists at 21% and family medicine at only 6% (14). The reasons for this disproportionate representation are mostly a matter of speculation. More emergency medicine residents report having used illicit substances in the last year than any other specialty (15). Similar findings were made about practicing emergency physicians as well (16). In spite of this, the majority of emergency physicians have a drug of choice of opiates, as do surgeons and anesthesiologists. To date no studies have specifically addressed the ability of emergency physicians to return to the ER to practice following addiction treatment versus a need to practice in another setting or re-training. Generally, the decisions are made on an individual basis depending on history and comorbidities.

The Newest Specialties

Finally, addiction medicine is going through the process that emergency medicine endured only a short time ago in being recognized as a legitimate medical specialty. The American College of Emergency Physicians was founded only 40 years ago by physicians who, while trained in other fields, practiced primarily in the ER setting and saw a need for recognition as a separate type of practice with a need for specific professional standards and training. This is similar to the current path of addiction medicine acting

through the American Society of Addiction Medicine (ASAM). ASAM is working to develop certification and training standards that will meet approval from the American Board of Medical Specialties. The path from practitioners trained in other fields to academic departments of emergency medicine has been a rapid but at times difficult and controversial process. The specialty of addiction medicine as distinct from psychiatry, for whom it has always been a redheaded stepchild, has as difficult a task in carving its niche as a specialty.

Author Information

Dr Logan was raised in Kansas and graduated from the University of Kansas with honors in Political Science. He was a Summerfield Scholar (KU top academic scholarship for men) and received the Veta Lear Award (highest academic award for freshmen). He was in the political science honor society Phi Sigma Alpha and a member of Phi Beta Kappa. Dr Logan went to medical school at Baylor College of Medicine in Houston, graduating after three years. He was awarded a Texas Medical Association Scholarship. After initial training in Obstetrics and Gynecology at University of Kansas-Wichita and the Mayo Clinic in Rochester, MN Dr Logan started a career in Emergency Medicine. He practiced Emergency Medicine for 25 years and in 2007 was recertified by the American Board of Emergency Medicine. He has worked in small to very large community hospitals and large academic institutions as a staff physician, assistant director and department chairman. He has previously been medical director for the Franklin County (KS) EMS service. A mid-life career change started with work in the Addiction treatment field in Kansas and training at the University of Florida College of Medicine. He completed his fellowship in Addiction Medicine in February 2008 after working at the Florida Recovery Center under mentors Dr. Scott Teitelbaum and Dr. Kenneth Thompson. During his fellowship he worked with Dr. Mark Gold writing and editing educational programs for nurses and physicians on tobacco abuse and alcohol use in adolescents. He predicated in a study on a potential new surgical management of obesity. He also was a regular participant in the Department of Psychiatry Pain Management Clinic. As an Assistant Professor in the Addiction Medicine Division, College of Medicine, Dr Logan lectures to residents, physician assistant and medical students on topics of addiction related emergencies and smoking cessation. He has continued interest in the interface between addiction and emergency medicine and will holds appointments in both the Department of Psychiatry Division of Addiction Medicine as well as in Emergency Medicine as clinical faculty working on joint research and education projects. A rabid fan of Jayhawk basketball and football he is a member of the Kansas University Alumni Association. He is eligible to take the board exam in Addiction Medicine and is a member of the American Society of Addiction Medicine and the Florida Society of Addiction Medicine. He is a Fellow of the American College of Emergency Physicians and a Diplomate of the American Board of Emergency Medicine.

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Using the Theory of Planned Behavior to Predict Alcohol Consumption among College Students on Game Day

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Abstract

This study examined the utility of the Theory of Planned Behavior (TPB) in predicting alcohol consumption on game day among college students. Data were collected from a random sample of 740 college students who completed an anonymous online survey. Survey items assessed participants' motivations for consuming alcohol and the total number of drinks consumed on game day.

With the exception of Perceived Behavioral Control (PBC), each of the TPB constructs was statistically significant in predicting alcohol consumption. Behavioral Intentions to drink alcohol on game day predicted behavior. Intentions, in turn, were predicted by Attitude Toward the Behavior and Subjective Norm constructs. The TPB proved useful in explaining alcohol use on game day with college students. However, the applicability of the PBC construct within the TPB model remains in question. Additional research with more effective PBC measures is needed before more definitive statements can be made concerning the TPB's efficacy in predicting college student alcohol consumption on game day.

Keywords: alcohol, Theory of Planned Behavior, college student, celebratory event, high-risk drinking

Introduction

According to the Carnegie Foundation for the Advancement of Teaching, high-risk drinking represents the greatest single problem that America's universities must address (1). High-risk drinking or heavy episodic drinking is defined as the consumption of at least five or more alcoholic drinks in a row for men or four or more alcoholic drinks for women, at least once in the previous two weeks (2). Student death, injury, poor academic performance, property damage, vandalism, strained campus-community relations, and negative publicity are all issues related to alcohol abuse that university presidents and other senior administration officials must manage (3). Further, based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.), nearly one-third of college students meet the criteria for a formal diagnosis of alcohol abuse, and one in 17 can be classified as alcohol dependent (2). Ironically, epidemiological studies show that college-bound high school students drink less than their non-college-bound peers. However, upon arriving at institutions of higher education, college students drank more than their same age counterparts who did not attend college (4).

A particular area of concern on campuses involves the alcohol consumption patterns among college students during home football games also known as "Game Day." While a vast array of research exists on alcohol use and the associated negative outcomes related to high-risk drinking, a dearth of information exists pertaining to the specific drinking behaviors of college football fans on game days. Neal and Fromme's two year study, perhaps the most comprehensive research to date on the subject, examined the drinking behaviors of freshmen who attended the University of Texas. They implemented a web-based alcohol and drug survey semiannually and tracked students with a 30-day daily self-monitoring instrument at randomly assigned start dates. Relative to non-game Saturdays, student alcohol use was greater during both home and away games. The authors surmised that increased alcohol consumption occurred regardless of whether students attended the game. However, the increased drinking resulted only when school was in session, not during holiday or semester breaks (i.e., bowl games). High profile games against national and conference rivals resulted in more drinking than games against less competitive

teams. On average, more drinking occurred during away games than home games. The authors speculated that the game itself serves as a protective factor, because university policy prohibits alcohol consumption within the stadium, with the exception of luxury boxes (5).

Glassman and colleagues conducted a study assessing game day alcohol related behaviors and attitudes towards specific prevention initiatives. The results indicated that over half of college football fans surveyed reported that they do not typically drink on game day. Fans who did drink reported that they drank significantly more on game day than they did the last time they partied or socialized. Overall, males drank considerably more than females on game day. In addition, the more fans drink the less likely they are to support game day interventions. Nondrinkers were the most supportive of game day interventions followed by moderate drinkers, whereas heavy drinkers showed the least support. Compared to non-students, students were more supportive of designated tailgating areas where open containers are permitted. Not surprisingly, students were less supportive of increasing underage drinking enforcement efforts than non-students. The authors suggested that significant public support exists for prevention initiatives, and decreasing alcohol consumption on game day is fundamental to reducing the school's high-risk drinking rate during the fall semester (6).

To date, a lack of research exists utilizing health behavior theory to elucidate or predict alcohol use on game day. The Theory of Reasoned Action (TRA) and its extension - the Theory of Planned Behavior (TPB) - constitute an effective and well researched model for explaining health behavior. TRA/TPB incorporate relationships among beliefs, attitudes, intentions, and behavior (7). Theoretically, attitude (Attitude Toward the Behavior) and perceived acceptance of a behavior (Subjective Norm) influence a person's intention to engage or disengage in a behavior (Behavioral Intention). Behavioral Intention in turn, influences a person's decision to perform or refrain from the behavior of interest. The theory later expanded by adding Perceived Behavioral Control to the model (8). This enhancement allowed researchers to examine behaviors that are not totally volitional by taking into account factors such as resources and opportunities (9).

According to TPB, the construct Attitude Toward the Behaviorrepresents an individual's beliefs about the behavior coupled with the weighted evaluations of those outcomes. Behavioral Beliefs and Evaluation of Behavioral Outcomes constitute two indirect measures (sub-scales which link related concepts to the direct measures) which comprise the Attitude Toward the Behavior (ATB) construct. Behavioral Beliefs signify one's attitude towards performing a behavior. Evaluation of Behavioral Outcomes concerns the relative importance or assessment of engaging in the behavior of interest.

The Subjective Norm construct concerns peoples' beliefs about whether most referents (influential persons such as a family member, best friend, or spouse) approve or disapprove of their behavior as well as how motivated they are to comply with referents' expectations. Normative Beliefs and Motivation to Comply constitute the two indirect measures within the Subjective Norm construct. A person's Normative Beliefs depend on whether specific referents approve or disapprove of the behavior, whereas Motivation to Comply involves the individual's concern about what the specific referent thinks. For example, a male college student may perceive that his best friend approves of his drinking heavily and may be very motivated to drink heavily to comply with this belief. However, this same student may have a significant other who disapproves of his drinking heavily, but he may be less motivated by this referent. The Subjective Norm concerns an individual's overall assessments of whether key referents approval of the behavior of interest coupled with the Motivation to Comply with these referents.

The constructs that comprise Perceived Behavior Control (PBC) include Control Beliefs and Perceived Power (both indirect measures). Control Belief is the assessment one makes about the presence or absence of facilitators and barriers to performing the behavior. Perceived Power is the evaluation of each condition making the behavior more or less difficult. The construct of PBC is the overall assessment of one's power or control to perform or discontinue the behavior. According to Bandura, the PBC construct is analogous to self-efficacy's contribution to the Social Cognitive Theory (10). Finally, the most important determinant of behavior is Behavioral Intention, a person's likelihood of performing the behavior. In general, Behavioral Intention characterizes an individual's plan or probability of performing a behavior. Attitude, norms, and perceived control over the behavior each shape Behavioral Intention. The amount of influence each of these constructs has on Behavioral Intention differs among various populations and behaviors.

Several studies used the TRA/TPB to explain and predict alcohol consumption among college students. In a cross-sectional study, Wall, Hinson, and McKee employed the Theory of Planned Behavior to predict alcohol consumption among undergraduate students of legal drinking age (11). Consistent with Schlegel's and associates research (12), they found that the TPB was superior to the TRA in predicting problem drinking. Similarly, Norman and colleagues created a series of indirect measures for each construct as outlined in the TPB. Positive and negative Behavioral Beliefs, Normative Beliefs, and Control Beliefs were utilized. The regression analysis revealed the variables under consideration explained 38% of the variance in the frequency of heavy episodic drinking. Perceived Behavioral Control and positive Control Beliefs were the only significant independent predictors (13).

Conversely, in a series of three studies with undergraduates, Trafimow found that Attitude Toward the Behavior was a better predictor of drinking Intentions than Subjective Norms or Perceived Behavioral Control (14). Among other studies concerning college students and alcohol use, the TPB did not significantly add predictive powers above and beyond the TRA (15). Furthermore, Johnston and White

studied first-year female undergraduate students enrolled in an introductory psychology class at a large Australian university. Their results indicated only three statistically significant measures predicted high-risk drinking, including *Beliefs* about the costs associated with high-risk drinking (having a hangover/feeling sick, damaging health, behaving embarrassingly), *Evaluation of the Benefits* of drinking (relaxing/unwinding, having fun/socializing, reducing inhibitions), and *Normative Beliefs* (how key referents think about engaging in high-risk drinking). In this study perceived control was not statistically significant (16).

While these studies indicate that the TPB represents an appropriate model for examining drinking patterns, the literature conveys less clarity on the extent to which Perceived Behavioral Control influences high-risk drinking behavior among college students. There are also discrepancies concerning whether Attitude Toward the Behavior or Subjective Norm represents the most powerful construct in predicting Behavioral Intention with this population and behavior. These disparate results are at least partly due to the use of different questionnaires, items, and methods to investigate very similar constructs, behavior, and population groups.

The purposes of this study were to ascertain the extent to which the TPB predicts alcohol use among college students on game day, and determine the causal relationships among the TPB variables. In addition to enhancing the limited body of knowledge in this area, the results of this study can assist campus communities in efforts to design effective interventions to prevent negative consequences of problem drinking for their students.

Methods Procedures

The Game Day Survey, approved by the University's Institutional Review Board, was administered on November 20, 2006, the Monday after the final home football game of the season. The population for this cross-sectional research design included students enrolled at a large university in the southeast. The registrar provided a randomly selected list of e-mail addresses for 2,083 students ages 18-24. Participants received a pre-notification message one week prior to the survey implementation date and three follow up reminders in weekly increments. Participants reviewed the informed consent process and voluntarily accepted the terms before logging onto the survey. The first three, middle three, and last three students completing the incentive protocol received a $50.00 gift card to the campus bookstore. A total of 740 students responded to the anonymous electronic survey, yielding a response rate of 36%.

Participants

Table 1 contains demographic data for the participants as well as for the overall student population. Of the respondents, the majority were Caucasian (73.6%), followed by Hispanic or Latino (11.6%), Asian or Pacific Islander (6.9%), African-American (6.2%), American Indian/Alaskan Native (0.3%), and other ethnic groups (1.4%). Students were broadly distributed by grade classification (20.4% freshmen, 18.9% sophomore, 23.2% juniors, 27.2% seniors, and 10.2% graduate/professional students), and except for freshmen and graduate/professional students, these percentages also correspond to those for the student body as a whole. Females composed 60.8% of the sample, a somewhat higher value than the actual percentage of females on campus. Approximately one out every five participants (19.4%) was a member of a fraternity or sorority (referred to as part of the campus "Greek" system). The mean age of the sample was 20.30 years (*SD*= 1.66), with ages ranging from 18-24 years. The sample demographics corresponded to the overall student demographic population with the exception of a slight overrepresentation of females and Caucasians.

In terms of the game day habits of college students, approximately four out of five (80.1%) participants attended at least one home game during the 2006 college football season. The overall average number of drinks consumed on game day equaled 3.9 (*SD*= 5.06). Finally, while participants on average spent two and a half (2.55; *SD*=3.25) hours drinking on game day, one in five (21.4%) participants reported drinking for five or more hours.

Measures

In this study multiple variables from the Theory of Planned Behavior (TPB) were developed using the protocol designed by Ajzen and Fishbein (7). The alcohol consumption items were modified and adapted from the standardized Core Alcohol and Drug Survey Long Form developed by Presley and colleagues (17). The Game Day Survey was reviewed by a panel of experts including a college health promotion specialist, a student affairs administrator, an alcohol and drug researcher, and a distinguished professor in the college of pharmacy. Researchers pilot tested the Game Day Survey numerous times (18,6). This study describes the results from the third iteration of the instrument.

A test-retest assessment and Cronbach's Alpha analysis were conducted to determine the reliability of the Game Day Survey items. Overall, the test-retest results for the alcohol consumption items indicated good reliability, yielding an average of 0.77. The test-retest reliability of TPB measures was also good, yielding an average of 0.68. The internal consistency values of the scales were acceptable, ranging from good to excellent (19). The alcohol consumption reliability coefficients scale was 0.86, and the TPB scale was 0.84.

The 55 TPB survey items were developed based on a review of the literature (11, 13, 14, 20). Six items appraised Behavioral Beliefs, six items measured Evaluation of Behavioral Outcomes, six items measured Normative Beliefs, six items assessed Motivation to Comply, six items gauged Control Beliefs, six items

measured Perceived Power, and four items determined Behavioral Intention. For example, a Behavioral Belief item asked participants to indicate the likelihood that "I would have more fun if I got drunk on game day." All response options were on a seven point Likert-type scale. The alcohol consumption questions were measured by asking how many alcoholic beverages they typically consume on game day.

Analysis

Survey Monkey, a commercial internet survey software program, was used to collect the Game Day Survey data. Data were subsequently entered into SPSS (Statistical Package for the Social Sciences) version 14.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were conducted to describe the sample. All TPB items were coded 3 to -3 except the Motivation to Comply items, which were coded 1 to 7 as recommended by Ajzen and Fishbein (7). Statistical analyses for this investigation assumed a Type I error of 0.05.

A path analysis was conducted using Analysis of Moment Structures (AMOS) 6.0 to determine the causal links between the variables. The endogenous variable for this analysis is the response to the question: "How many drinks do you typically consume on Game Day?" The exogenous variables included the composite measures of the TPB constructs: Subjective Norm, Attitude Toward the Behavior, Perceived Behavioral Control, and Behavioral Intention. Consistent with a path analysis the following goodness-of-fit indices were calculated: Chi-square, Standardized Root Mean Square Residual (SRMR), relative fit index (RFI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). To correctly utilize the TPB, Ajzen and Fishbein (7) recommend that each indirect measure be multiplied by its corresponding item in the complimentary indirect scale, and then those products should be summed together to create a composite version of the direct measure. This modeling technique served to determine whether the pattern of inter-correlations among the variables is consistent with the TPB as it relates to alcohol consumption on game day.

Results

Table 2 illustrates the goodness-of-fit measures were acceptable. Although the conservative Chi-square test of model fit was statistically significant, $\chi 2$ (2) = 18.352, $p < 0.001$ the Standardized Root Mean Square Residual (SRMR) of 0.036, the relative fit index (RFI) of 0.844, and the Comparative Fit Index (CFI) of 0.972 all fall within the acceptable ranges for their respective indices (21). Since the Root Mean Square Error of Approximation (RMSEA) is a goodness-of-fit index with a known statistical distribution, the calculated value yields a p-value and a confidence interval for the population RMSEA. Hair and colleagues recommend an RMSEA less than .08 for studies with fewer than 13 observed variables and fewer than 250 observations. This analysis yielded an RMSEA of 0.161, $p < 0.001$ with a 90% confidence interval of (0.099, 0.223) suggesting an inadequate model fit. While the high RMSEA value warrants caution when interpreting the results from the path analysis, goodness-of-fit measures may vary from acceptable to unacceptable depending on the index used (21). Overall, the goodness-of-fit measures indicate that the TPB model represents an acceptable model for explaining alcohol consumption on game day.

Figure 1 illustrates the standardized causal links between the TPB variables when used to predict alcohol consumption among college students on game day. In the path analysis, correlations between variables are represented by double headed arrows, and a straight line with a single arrowhead denotes a direct causal effect (22). There was a modest correlation between Attitude Toward the Behavior and Subjective Norm ($r = 0.51$, $p< 0.001$) (19), but there were no statistically significant correlations found between PBC and the other TPB constructs. Further, intentions (Behavioral Intention) to drink alcohol on game day predicted actual behavior ($R2 = 0.52$) with a standardized path coefficient of 0.72 ($p< 0.001$). Intentions, in turn, were predicted by Attitude Toward the Behavior and Subjective Norm constructs ($R2 = 0.54$), with standardized path coefficients of 0.39 ($p< 0.001$) and 0.46 ($p< 0.001$), respectively. In general, positive expectancies concerning alcohol use (Attitude Toward the Behavior) and perceived acceptance of drinking (Subjective Norms) predicted intentions (Behavioral Intention) to drink alcohol on game day. The path analysis indicated that Perceived Behavioral Control (PBC) did not elicit any statistically significant path coefficients between Behavioral Intentions or the behavior (number of drinks consumed on game day).

Table 3 provides information on the direct and indirect effects on Behavioral Intention and behavior (number of drinks consumed on game day). The indirect effects on the number of drinks consumed from the constructs Attitude Toward the Behavior and Subjective Norm were significant - ($p< 0.001$) 0.278 and 0.330, respectively. Behavioral Intention served as the strongest predictor for the number of drinks consumed on game day and mediated the impact of the other constructs to some extent. In summary, Attitude Toward the Behavior and Subjective Norm contributed significantly to the explanatory capacity of the TPB model, while the Perceived Behavioral Control construct failed to elicit any statistically significant direct or indirect effects.

The path coefficients do not change when the PBC construct is removed from the TPB, nor do the goodness-of-fit measures vary substantially. The original Theory of Reasoned Action (TRA) does not include the PBC construct; thus its removal has precedent. A Chi-square difference test was conducted between the TPB and the TRA path analyses to determine the extent to which these two models differ. The results were not statistically significant, $\chi 2(5) = .906$, $p = .97$, indicating the more complex model (TPB with PBC construct) does not enhance model fit. The simpler TRA model sufficiently reproduces the observed correlations. Thus, the TRA constitutes a more parsimonious model for explaining alcohol consumption on game day.

Discussion

We examined college student alcohol consumption on "game day" at a large university in the southeast to enhance our limited understanding of this pervasive public health issue. The Theory of Planned Behavior (TPB) was employed to gain insight on the motivational factors associated with college student alcohol consumption on game day in an attempt to guide future prevention efforts. A multivariate analysis was conducted to predict alcohol use among college students on game day to determine which, if any, of the TPB constructs to utilize when designing interventions to decrease high-risk drinking by college students.

The results of the path analysis indicate that the original Theory of Reasoned Action (TRA) model may provide a better model than its extension, the Theory of Planned Behavior (TPB), for explaining alcohol consumption on game day. Behavioral Intention to get drunk on game day predicted drinking behavior. Intentions, in turn, were predicted by Attitude Toward the Behavior and Subjective Norm constructs. The Perceived Behavioral Control construct was not predictive of Behavioral Intention or self-reported drinking behavior on game day, as the TPB model suggests.

These findings are consistent with the research of O'Callaghan and colleagues who found that Perceived Behavioral Control (PBC) was not predictive of college students' intentions to drink alcohol or of their drinking behavior. The authors speculated that because most of the participants in their study were non-problem drinkers, they experienced high perceived control over their drinking. Thus while a substantial percentage of their sample intended to drink alcohol, they perceived their alcohol consumption to be within their control (15). This may explain why the PBC failed to elicit a significant influence in their research or in the present study. For these reasons, the TPB may be less applicable than other behavioral theories in alcohol research with college students.

The items used to assess the PBC construct may provide another possible explanation for its lack of statistical significance in the current study. Accurately assessing the PBC construct remains a challenge for researchers. A meta-analysis revealed that only a limited number of studies demonstrated a significant relationship between PBC and Behavioral Intention (8). As Reinecke, Schmidt, and Ajzen found, controlling for Behavioral Intention weakens the statistical support for the PBC construct (23).

Interpreting the findings from this investigation requires theoretical considerations as well. A weakness of the TPB is the underlying assumption that behavior follows a linear course of action. However, behavior optimizes a dynamic, extremely complex phenomenon (24). Certain predictive factors are not included in the TPB. For example, the theory does not address past behavior, which serves as a strong predictor of alcohol use among college students (15). One's attitude toward drinking may be based more on past drinking experiences than on future expectations concerning alcohol use. Perhaps it is more likely that one's past alcohol use creates the foundation for future alcohol expectancies. A similar pattern emerges with the construct Perceived Behavioral Control. One's previous performance of a behavior likely influences perception of personal control over the behavior, unlike the notion that Perceived Behavioral Control merely influences behavioral intention and behavior (25).

Behavioral Intentions may change or evolve as students drink on game day. For instance, a student may intend to drink in moderation on game day, but as the individual consumes more and more alcohol, situational cues for behavior become more salient. The pleasure of the drug, the excitement of the game, and the immediate influence of one's peers may shift the individual's Behavioral Intentions and, as a result, the behavior changes as well. A respondent's attitude, perceived acceptance of drinking, control of alcohol use, and intentions may fluctuate throughout the drinking encounter. In short, beliefs and attitudes are likely to shift before, during, and after the drinking experience. The present study, based on a simple linear model, measures the causal sequence after the entire episode and thus fails to address potential fluctuations in attitudes, beliefs, and behavior. Obtaining such information would shed additional insight into the complex and dynamic factors which influence behavior.

Finally, while the TPB allows researchers to measure systematically the role of factors perceived by respondents to be salient in their intentions and behaviors, it does not necessarily mean those perceptions are accurate. Cognitive biases among participants may result in an under- or overestimation of what truly motivates their behavior (26). For example, several key external factors may influence alcohol use on game day. The presence of law enforcement, the cost of alcohol, and the opportunity to tailgate may all impact behavior much more than respondents realize or are willing to admit. Creating interventions designed to change behavior based on respondents' perceptions may not be optimally effective. While the Game Day Survey included items which measured participants' perceptions, future studies should include an objective environmental assessment that more accurately measures the external influences mentioned above.

Limitations

This study has several limitations. First, self-reported data may include recall bias given that participants do not always report their behaviors or respond to questions accurately (19). Second, the modest response rate of 36% obtained for this survey may not be reflective of all students at the school; although, the sample matched the overall student population with the exception of a slight overrepresentation of females and Caucasians. Third, the large sample size may have contributed to Type II error, yielding a statistically significant Chi-square (n=316) value, suggesting poor model fit. However, when conducting a path analysis with a large sample, it is not uncommon for the Chi-square goodness-of-fit measure to be statistically significant, because the test is very sensitive to sample size (27). Fourth, the count data used

for the endogenous variable (number of drinks consumed on game day) resulted in a substantial number of abstainers and low-end drinkers, creating a positively skewed distribution, which may have contributed to the high Root Mean Square Error of Approximation value. The high RMSEA value warrants caution when interpreting the results from the path analysis, though these goodness-of-fit measures may vary from acceptable to unacceptable depending on the index used (21). Fourth, this sample was drawn from a large public university in the southeastern United States, with a staunch reputation as one of the preeminent football programs in the country as well as a standing of a "top party" school. Geographic and demographic differences may have revealed drinking patterns not representative of those at other universities. In addition, drinking rates change over time and are related to variables such as the football team's schedule (opponent), the time of day the games are played, the team's ranking, the school's football conference, the school's football history, and the weather. Fifth, thecross-sectional design employed for this study limits inferences concerning causality. It is not possible to assess whether TPB constructs (alcohol beliefs, attitudes, norms, and perceived control) lead to alcohol consumption on game day or whether previous drinking experiences influence TPB constructs. Causal relationships can only be established by using an experimental design (28).

Conclusions

To date, this is the first study to utilize a health behavior theory to examine game day drinking. The results from this exploratory study suggest that the TRA is a useful model for explaining alcohol consumption among college students on game day, while leaving in question the applicability of its extension, the TPB. Additional research with more effective PBC measures is needed before definitive statements can be made concerning the TPB's applicability in predicting college student alcohol consumption on game day.

The TRA model demonstrates a considerable degree of success in predicting alcohol consumption and in predicting Behavioral Intention in particular. The TRA's demonstrated parsimony and utility warrant its consideration when developing game day interventions. Thus prevention efforts should (a) focus on persuading students to set limits for themselves concerning their alcohol consumption on game day, (b) create attitudes and beliefs which are inconsistent with excessive alcohol consumption, and (c) highlight peer disapproval of inappropriate drinking behavior.

Author Information

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Commentary
Professor Calvina Fay

COMMENTARY

Lowering the Drinking Age: What Does the Research Say?

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It is inconceivable that anyone would ignore historical experience and solid research to advocate for a policy that is a proven failure. A small group of college presidents, including leaders from Middlebury, Dartmouth and Duke, is doing so, however, in support of the Amethyst Initiative which claims that "the 21-year-old drinking age is not working" and "has created a culture of dangerous binge drinking" (1).

As a nation we previously lowered the legal drinking age to eighteen and experienced the tragedy of an increase in preventable deaths of young people caused by driving while under the influence. By 1988, every state had raised its minimum legal age to 21 in order to purchase and possess alcohol. From then until 1995, alcohol-related traffic deaths amongst youth decreased 47% (2). According to the National Highway Traffic Safety Administration, approximately 900 lives a year are saved because of this higher age limit. That equals close to 17,000 people since 1988, when this higher age limit on drinking was adopted by all states (3).
An increase in alcohol-related deaths would not be the only devastating impact of the preposterous suggestion of the Amethyst Initiative. Alcohol addiction would most likely skyrocket as well. Studies have shown that early onset age of drinking is a strong indicator of successive alcohol addiction (4). Research has also shown that alcohol use at an early age could seriously damage the long and short term growth processes of the developing brain (5). This is proven science, not the opinion of a cluster of disillusioned college presidents.

One particular study done by an epidemiologist at Washington University School of Medicine found that more than 30 percent of those who began drinking at age 17 or younger became alcohol dependent, either presently or in the past. For study subjects who reported that they started drinking at age 21 or older, that number dropped to one in ten – a dramatic decrease in addiction (6).

Despite all of these staggering statistics, advocates for lowering the drinking age hypothesize that it will remedy binge drinking, a growing problem on college and university campuses. In proposing an age change, these university presidents overlook that binge drinking frequently begins in high school and not college. They also ignore that lowering the drinking age will put alcohol in the hands of more young people – many of whom are still in high school - growing the problem even further.

Dr. John McCardell, President of Choose Responsibility, a group advocating for the Amethyst Initiative and former president of Middlebury College in Vermont, argues that current underage laws force drinking underground, causing more problems than they solve. "The law is out of step with reality," he says. "The law is so obviously unjust and discriminatory. It ought to at least be the subject of debate." Unfortunately for Dr. McCardell, all legitimate historical and current evidence about the dangers of early age onset drinking discounts his theory.

If college presidents really want to help reduce binge drinking, they could discourage, or better yet, ban marketing materials associated with alcoholic products on campus, strengthen rather than weaken their drug and alcohol policies and incorporate mandatory education about drug and alcohol issues with each new freshman class. Simple actions such as banning beer kegs and offering substance-free housing send a very clear and strong message to students about school campus culture (7).

The Amethyst Initiative represents an insensitive and painful setback to all of those who have experienced the loss of a child from an alcohol-related incident. Would trying to change the college culture, so that falling down drunk is not deemed cool, be so much harder than encouraging a dangerous supposed rite of passage? For McCardell and others, it apparently is because they are ready and willing to throw in the towel. If you want to teach responsibility, giving in is not the way to do it.

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