

CAFFEINE-RELATED PSYCHIATRIC DISORDERS

Essay

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Caffeine is the most commonly used psychoactive drug throughout the world that has overcome resistance and disapproval to the extent that it is freely available for every one almost everywhere. Many people consider caffeine "harmless, and do not realize the potentially severe health effects it can lead to until they've overdosed. Psychiatrists rarely enquire about caffeine intake when assessing their patients. This may lead to a failure to identify caffeine-related problems and offer appropriate interventions when needed.

Four caffeine-related psychiatric syndromes are recognized in DSM –IV-TR: *caffeine intoxication; caffeine-induced anxiety disorder; caffeine-induced sleep disorder; and caffeine-related disorder not otherwise specified*. ICD-10 includes caffeine-related disorders in its “Other Stimulant” class which also includes amphetamines.

Two types of presentation for caffeine intoxication have been identified, the acute form (intoxication) and the chronic one (caffeinism). The condition is characterized by restlessness, agitation, excitement, incoherent, rambling thoughts and speech, and insomnia, flushed face, diuresis, GIT disturbance, muscle twitching, tachycardia or cardiac arrhythmia and periods of inexhaustibility. DSM-IV-TR also stipulates that recent consumption of caffeine, usually in excess of 250 mg (e.g., more than 2–3 cups of brewed coffee). Epidemiological data are lacking. However, high risk group includes persons who use caffeine to enhance academic or professional performance or to maintain alertness for extended periods of time, psychiatric patients especially the schizophrenic ones, and adolescents who tend to undergo vigorous advertising and huge marketing of energy drinks. For managing these patients, caffeine blood levels can be obtained,

but their practical use as a screening tool is limited. No other specific tests detect caffeine-induced psychiatric disorders. Persons with persistent insomnia, particularly if the history is inconclusive, might benefit from a referral for a sleep study. Cardiac irregularities, whether caffeine induced or not, should be investigated using ECG. Patients with caffeine intoxication generally have a good prognosis. However reassuring vital signs and serum electrolytes is crucial in some cases. Other methods of enhanced elimination encompass charcoal hemo-perfusion, hemo-dialysis, peritoneal dialysis, and exchange transfusion . Gradual reductions in caffeine use are recommended to avoid withdrawal. The use of decaffeinated alternatives and the programs based on techniques of behavior management have proved successful.

The sleep disruptive effects of caffeine, even at doses equivalent to a single cup of coffee, have been well documented. The sleep stage effects are unique, when compared to other stimulants, and are consistent with its mechanism of action, adenosine blockade. Stage III–IV sleep is decreased and EEG slow wave activity is suppressed by caffeine. In contrast, the psychomotor stimulants are more likely to suppress REM sleep. Caffeine has considerable effects on (PSG) sleep variables, producing prolonged sleep latency, reduced sleep efficiency, reduced SWS and increased awakenings during sleep. Numerous shifts between sleep stages are reported, and even agitation with higher doses.

Sleep disturbance related to caffeine can often be a feature of substance intoxication or withdrawal (although sleep disturbance does not typically occur with caffeine withdrawal), and caffeine-induced sleep disorder should be diagnosed in patients who are having caffeine intoxication only if the symptoms of the sleep disturbance are excessive relative to

what would typically be expected. Caffeine's effects on sleep can depend on a variety of factors, such as the dose of caffeine ingested, the time between caffeine ingestion and attempted sleep onset, and the ingestion of other psychoactive substances. Caffeine produced similar effects in young and middle-aged subjects. The heritability of coffee-attributed sleep disturbance (measured by self report) was approximately 0.40. To diagnose caffeine-induced sleep disorder, a prominent disturbance in sleep that is sufficiently severe to warrant independent clinical attention should be identified. In addition, evidences from the history, physical examination, or laboratory findings of either suggest that the disturbance developed during, or within a month of, substance intoxication or withdrawal or medication use is etiologically related to the sleep disturbance. Avoidance of evening consumption of caffeine is highly recommended. Zolpidem produces less withdrawal and tolerance effects than benzodiazepines. Bright light therapy is also included especially for elderly with secondary insomnia. Stimulus control therapy, sleep restriction, Sleep hygiene education, and cognitive therapy are non pharmacological treatments aiming at limitation of the time spent in bed to the actual time sleeping and to prolong sleep time, and increase sleep efficiency.

A caffeine-induced anxiety disorder can be panic disorder (especially with high doses), generalized anxiety disorder, social phobia, or obsessive-compulsive disorder. Caffeine has the potential for exacerbating the anxiogenic effects of stressful situations. Caffeine induced anxiety disorders in normals appear to be dose dependent. There is no known information on the course or natural history of caffeine-induced anxiety disorder. There are no studies on the treatment of caffeine induced anxiety disorder. However, an initial, careful assessment of caffeine consumption should be conducted. A suitable program of gradual decreasing caffeine

use should be instituted. Buspiron or other non sedative anxiolytics might be preferable in those patients.

The caffeine-related disorder not otherwise specified category is for disorders associated with the use of caffeine that are not classifiable as caffeine intoxication, caffeine-induced anxiety disorder, or caffeine-induced sleep disorder. An example is caffeine withdrawal. Caffeine dependence belongs to this category.

Cessation of daily caffeine consumption produces a withdrawal syndrome comprised of subjective symptoms and functional impairment, including headache (the most common), tiredness/fatigue, decreased alertness, decreased energy and difficulty concentrating. Some authors empirically validate caffeine withdrawal's symptoms, signs, incidence, severity, and associated features. However, some authors have been suggested that many of the side effects of caffeine withdrawal reported in the literature are artifacts related to the expectation of test subjects. In addition, data on the epidemiology of caffeine withdrawal are variable and may be inconsistent. For psychiatrists to diagnose caffeine withdrawal according to the DSM-IV-TR research criteria, the following criteria should be met: prolonged daily use of caffeine, abrupt cessation of caffeine use, or reduction in the amount of caffeine used, closely followed by headache and one (or more) of the symptoms mentioned before leading to significant functional impairment, and the symptoms are not due to the direct physiological effects of a general medical condition (e.g., migraine, viral illness) and are not better accounted for by another mental disorder. Analgesics can relieve the pain withdrawal symptoms of caffeine, as can a small dose of caffeine. The consumption of a caffeinated beverage on the day

of an operative procedure has been shown to decrease the rate of postoperative headache.

Studies in both adult and adolescent populations have shown that anywhere from 20 to 100% of regular caffeine consumers exhibit signs of caffeine dependence. The studies that have reported 100% of the participants exhibiting symptoms of caffeine dependence were conducted in small samples that were preselected for heavy caffeine use or in self-reported daily caffeine consumers which are not representative of the general population. In a study depended on telephone interviews of the general population, 61% of the respondents reported daily caffeine consumption. 11% of them reported withdrawal symptoms upon cessation of caffeine ingestion.

The controversy surrounding caffeine dependence is not limited to discrepancies in the data, but rather in whether the effects of caffeine abstinence are severe and consistent enough to warrant a DSM classification. Supporters of the caffeine dependence classification argue that there is substantial evidence to suggest that caffeine dependence is a real phenomenon deserves to be endorsed in DSM classification. The opponents argue that, although a subset of caffeine users experience symptoms of caffeine dependence, the percentages vary widely from study to study and often increase as awareness of caffeine abstinence increases. Even in studies that have specifically used deception to avoid awareness of the nature of the experiment, it may be difficult to maintain double-blind experimental procedures, given that caffeine may be detected by taste. Another argument against caffeine dependence is that the symptoms of caffeine dependence are often mild to moderate, subside within a short period of time. They are not comparable to those experienced during withdrawal from drugs such as cocaine and heroin.

Psychiatrists and primary care physicians can help those patients in reducing or eliminating caffeine use and to have patients determine their daily consumption of caffeine.

Caffeine may exacerbate psychosis in individuals with schizophrenia. Some researchers suggest that caffeine use should be included in the differential diagnosis of chronic psychosis. Two case reports describe the acute occurrence of psychosis after heavy ingestion of caffeine. On the other hand, some authors report a case that showed evidence of chronic psychosis. Several studies investigated the relationship between caffeine and other psychiatric disorders. For example, severe depression is correlated with high blood-caffeine levels. Patient with anorexia nervosa are among the groups which are at risk regarding higher rates of caffeine consumption. Caffeine may worsen the symptoms of restless legs syndrome and mania. Combining caffeine and stimulants to produce moderate levels of arousal in ADHD may produce better functioning than caffeine or stimulant drugs alone. Caffeine can be considered as an important factor affecting any drug response.

Regarding psychiatric medications, caffeine can markedly elevate blood levels of antipsychotic medications, increasing the probability of adverse effects. Caffeine intake was suspected to increase the plasma concentration of clozapine resulting in symptoms indicative of clozapine toxicity. Caffeine can interact with fluvoxamine, lithium, other antiepileptic drugs and regarding electroconvulsive therapy, pretreatment with caffeine prolongs the duration of ECT seizures.

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List of abbreviations

5-HT: 5-hydroxytryptamine
A2A: adenosine A2 receptors
ADHD: Attention Deficit Hyperactivity Disorder
ADO: Adenosine antagonism
AEDs: Antiepileptic Drugs
AF: Atrial Fibrillation
APA: American Psychiatric Association
BP: Blood Pressure
CHD: coronary heart disease.
CMNR: Committee on Military Nutrition Research
CNS: Central Nervous System
CS: Conditioned Stimulus
CYP: Cytochrome P450
DM: Diabetes Mellitus.
DRD2: dopamine receptors D2
DSM-III: Diagnostic and Statistical Manual of Mental Disorders -Third Edition.
DSM-IV: Diagnostic and Statistical Manual of Mental Disorders - IV (1994).
DSM-IV-TR: The fourth edition of The Diagnostic and Statistical Manual of Mental Disorders, Text revision.
ECG : Electrocardiogram.
ECT: Electroconvulsive Therapy
EEG: Electroencephalography
GABA: Gamma Amino Butyric Acid
GAD: Generalized Anxiety Disorder
GIT: Gastro Intestinal Tract
GSAD: Generalized Social Anxiety Disorder
HPA: hypothalamic pituitary adrenal axis
HPA: Hypothalamic Pituitary Adrenal Axis
ICD-10: International Classification of Diseases -10.

ICD-10: The International Statistical Classification of Diseases and Related Health Problems, 10
LTM: long-term memory
MINI: Mini International Neuropsychiatric Interview.
MRI: Magnetic Resonance Imaging.
NREM: Non Rapid Eye Movement
OCD: Obsessive Compulsive Disorder
PD: Panic Disorder
PDEs: phosphodiesterases
PSAD: Performance Social Anxiety Disorder
PSG: Polysomnography
PX: paraxanthine
REM: Rapid Eye Movement
SP: Social Phobia
STM: short-term memory
SWS: Slow Wave Sleep
TB: theobromine
TP: theophylline
WHO: World Health Organization

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