Caffeine Withdrawal and Dependence: A Convenience Survey Among Addiction Professionals

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Aims: Caffeine withdrawal was included in the research appendix of the DSM-IV to encourage additional research to assist with determining its status for the next version of the manual. Caffeine dependence was not included because of a lack of empirical research at the time of publication. This study assessed the beliefs of addiction professionals about the clinical importance of caffeine withdrawal and dependence.

Methods: A 6-item survey was developed and delivered electronically to the members of six professional organizations that focus on addiction. Open-ended comments were also solicited. Five hundred members responded.

Results: The majority (95%) thought that cessation of caffeine could produce a withdrawal syndrome, and that caffeine withdrawal can have clinical importance (73%); however, only half (48%) thought that caffeine withdrawal should be included in the Diagnostic and Statistical Manual of Mental Disorders (DSM). A majority (58%) believed that some people develop caffeine dependence; however, only 44% indicated that it should be in the DSM. Comments suggested that trepidation about inclusion of caffeine diagnoses was due to the concerns about the field of psychiatry being criticized for including common disorders with a relatively low clinical severity. Others, however, expressed an urgent need to take caffeine-related problems more seriously.

Conclusions: The majority of addiction professionals believe that caffeine withdrawal and dependence disorders exist and are clinically important; however, these professionals are divided in whether caffeine withdrawal and dependence should be included in DSM. Wider dissemination of the extant literature on caffeine withdrawal and additional research on caffeine dependence will be needed to provide additional guidance to policymakers and healthcare workers.

Introduction

CAFFEINE WITHDRAWAL and caffeine dependence are disorders currently included in the International Statistical Classification of Diseases (ICD) 10;¹ however, the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV-TR includes caffeine withdrawal in its research appendix and does not include caffeine dependence.² Regarding caffeine, the DSM-IV-TR states,

“A diagnosis of Substance Dependence can be applied to every class of substances except caffeine... The category of Substance Abuse does not apply to caffeine and nicotine... Some individuals who drink large amounts of coffee display some aspects of dependence on caffeine and exhibit tolerance and perhaps withdrawal. However, the data are insufficient at this time to determine whether these symptoms are associated with clinically significant impairment that meets the criteria for Substance Dependence or Substance Abuse... Recent evidence

also suggests the possible clinical relevance of caffeine withdrawal; a set of research criteria is included... (pp. 192,198, 231)”

A literature review before publication of DSM-IV and ICD-10 concluded, “Caffeine withdrawal but not caffeine abuse or dependence should be included as a diagnosis in DSM-IV and ICD-10. Future research should focus on whether some caffeine users exhibit clinical indicators of drug dependence”.³

Since the publication of the DSM-IV, multiple clinical and laboratory studies on caffeine withdrawal and a more limited set of studies on caffeine dependence have been summarized in published reviews.^{4–11} Most of these articles conclude that sufficient data are available to support inclusion of caffeine withdrawal in the DSM. These data show that caffeine withdrawal consists of a cluster of specific symptoms that (i) are valid and reliably observed; (ii) have an orderly timecourse

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consistent with a withdrawal syndrome; (iii) are pharmacologically specific to caffeine deprivation; (iv) are not rare; and (v) are associated with clinically important consequences. Perhaps most important, the clinical consequences (e.g., severe headache, leaving or missing work/school, fatigue, nausea, flu-like symptoms, failed quit, or reduction attempts) have been well documented in prospective experimental and retrospective survey studies.

The aforementioned reviews offer more cautious conclusions for caffeine dependence regarding its validity and appropriateness for inclusion in the DSM.^{5,6,8,9,11} Many basic similarities between caffeine and other drugs of abuse have been established (e.g., both have similar neurobiological effects on dopaminergic function, serves as a robust reinforcer in humans, and are influenced by genetic factors). A number of surveys show that a non-trivial proportion of caffeine users develops features of a substance dependence syndrome on caffeine; however, these studies have small sample sizes, and there is no true national population-based survey. Descriptions of caffeine dependence include the important and clinically significant features of continued use despite harm, unsuccessful efforts to cut down or quit caffeine, and continued use to avoid withdrawal symptoms. Case reports indicate that some caffeine users have failed to quit caffeine use despite repeated, serious attempts. A few studies also provide support for the predictive validity of a caffeine dependence disorder, showing that it is related to the inability to quit caffeine use, a more severe withdrawal syndrome, and caffeine reinforcement. Last, the few treatment surveys demonstrate that some individuals with caffeine dependence are sufficiently distressed to seek treatment. Larger studies focused on the prevalence and consequences of specific criteria would appear needed to determine whether caffeine dependence should be classified as a mental disorder, and if so, what might be the best diagnostic algorithm?

Among the different criteria proposed for identifying a true mental disorder,^{2,12,13} verification that the proposed disorder has sufficient clinical importance or severity is one of primary importance. Although the clinical importance and severity related to the caffeine-related disorders have been addressed in several articles since publication of DSM-IV,^{5,6,8,9,14–17} one possible approach to assessing clinical significance is to assess the beliefs of professionals in the addictions field (clinicians and researchers) about these disorders. Such beliefs to a large extent determine the level of assessment and intervention provided in the healthcare system and the amount of effort and resources directed toward research and prevention. Further, knowledge of the beliefs of the people who would be using these diagnoses in scientific and practice activities may provide guidance for educational and research targets, and identify the areas of concern that may arise when a change in diagnostic classification transpires. For example, if experts do not agree on the nature and severity of the problem, implementation of health care practice will lack uniformity, resulting in inconsistent support for developing priorities for addressing the problem.

This study comprised a convenience survey of beliefs about caffeine disorders among persons who belonged to addiction-focused professional organizations. Note that because DSM-5 will combine the substance abuse and dependence disorders into a unitary use disorder, we used the term “use disorder” in this article when referring to caffeine abuse or dependence.¹⁸

Methods

Participants

Participants were members of six clinical/scientific organizations that focus on addiction who chose to respond to an online survey (American Academy of Addiction Psychiatry [AAAP], American Psychological Association [APA] Divisions 28 [Psychopharmacology and Substance Abuse] and 50 [Society of Addiction Psychology], American Society of Addiction Medicine [ASAM], the College on Problems of Drug Dependence [CPDD], and Research Society on Alcoholism). We enlisted a representative of each organization to post via listserv or e-mail a request for members to take the survey. Combined, these organizations have ~8200 members; however, there is a substantial overlap in membership (we estimate under 5000 independent total persons). The recruitment message contained a link to the survey. Before answering any questions, a written preface informed participants that the study was approved by the University of Arkansas for Medical Sciences IRB; written informed consent had been waived; and we are not collecting any personal identifiers, including IP (Internet Protocol) addresses. To minimize repeat responding, the Internet survey program only allowed one response per IP address. Across organizations, 500 individuals completed the survey (i.e., ~10% of members). Participants designated themselves as psychologists ($n=161$), scientists ($n=156$), psychiatrists ($n=130$), family practice/internal medicine physicians ($n=53$), clinicians/other health professional ($n=65$), or students/trainees ($n=51$). These choices were not mutually exclusive.

Measure

The survey comprised six questions, each of which required a response on a 7-point scale. Item anchors were 1=certainly not, 4=not sure, and 7=most certainly. The items, verbatim, were:

1. Do you think cessation of caffeine can produce a withdrawal syndrome?
2. Do you think caffeine withdrawal can have clinical importance (e.g., contribute to anxiety problems, contribute to failed quit attempts, disrupt work or school performance, and instigate need to take medication)?
3. Do you think a caffeine withdrawal disorder should be listed in the DSM alongside the other substance use withdrawal disorders?
4. Do you think some people develop a caffeine use disorder/addiction (abuse or dependence as defined in DSM-IV/ICD10)?
5. Do you think a caffeine use disorder should be listed in the DSM alongside the other substance use disorders?
6. Do you think some people could benefit from professional help (treatment) for quitting or reducing their caffeine use?

Following item 6, the survey solicited open-ended comments without restriction on the length of response via a text box labeled, General or Specific Comments.

Data analysis

Descriptive statistics provided an overall indication of the frequency of responding in the positive (item ratings of 5–7) or negative (item ratings of 1–3) direction for each question.

We conducted only two between-profession comparisons, because sample sizes of some professions were small. T-tests compared the response differences between psychiatrists and psychologists. T-tests were used to compare scientists' responses with all other respondent professions combined after eliminating those who acknowledged more than one professional category ($n=94$ omitted).

Responder comments were categorized into one of four themes: general comments about caffeine as a problematic or nonproblematic substance, specific comments on withdrawal, specific comments on caffeine use disorder (abuse/dependence), and comments related to inclusion in the DSM. Comments that addressed more than one category were counted in each category for the purposes of reporting the percentage of comments addressing each theme.

Results

Caffeine withdrawal

Table 1 shows that the majority of respondents (95%) thought cessation of caffeine could produce a withdrawal syndrome, and 73% thought that caffeine withdrawal can have clinical importance. About half (48%) of the respondents thought that caffeine withdrawal disorder should be included in the DSM, and 28% thought it should not. Further analysis showed that among those who thought that caffeine withdrawal exists, 49% did not indicate that it should be listed in the DSM along with the other substance withdrawal disorders (25% negative response and 24% unsure). Among those who thought caffeine withdrawal was clinically important, 38% did not indicate that it should be in the DSM (14% negative response and 24% unsure).

Caffeine use disorder

The majority of respondents (58%) believed that some people develop a caffeine use disorder as defined using the DSM or ICD criteria, and 44% indicated that it should be listed in DSM-5, while 38% thought it should not. Of note, these data show that 30% of those who thought caffeine use disorder exists did not indicate that it should be listed in the DSM (12% negative response and 18% unsure). Similarly, among those who thought that some people could benefit from treatment, 40% did not indicate that it should be in the DSM (20% negative response and 20% unsure).

Between-profession comparisons

Item means and comparisons by response group are presented in Table 2. Psychiatrists were more positive than psychologists in response to all three caffeine withdrawal items ($p's < 0.05$), but not on the three caffeine use disorder items. Scientists provided significantly lower (more conservative) ratings than those of the combined ratings of the other groups on five of the six items ($p's < .01$).

Responder comments

Of the 500 respondents, 131 provided a written comment. Twenty-five (19%) were considered general comments with the majority of these reflecting clinical observations describing concerns about abuse and adverse effects of caffeine by adults and teens, and the minority mentioning caffeine's potential positive effects and how its negative effects are fairly benign. Twenty comments (15%) were specific to caffeine withdrawal. About a third of these affirmed its existence and significance. The remainder acknowledged its existence, but added comments about most cases being of low severity compared to other withdrawal syndromes, and most cases not needing professional intervention or medication.

Eighty-six comments (55%) focused on caffeine use disorder (dependence/abuse) and its severity, with many of these either directly or indirectly addressing the issue of whether or not it should be classified as a disorder and included in the DSM. The minority ($n=17$, 20%) of these confirmed it as an important syndrome and expressed a need for more recognition of caffeine use disorder as a potentially important clinical disorder. The majority ($n=58$, 67%) of these comments, however, either questioned its clinical importance (e.g., not severe enough to consider a disorder; not sure what diagnostic criteria should be) or raised concerns about its inclusion in the DSM (e.g., only rare cases are clinically important; would trivialize other substance use and psychiatric disorders; might be perceived as an example of psychiatry over pathologizing human behavior; might cause problems with billing for disorders).

Discussion

This convenience survey suggests that most individuals working or training in the addiction's field agree that caffeine withdrawal exists, and many believe it can be clinically significant, but only half (48%) asserted that it should be included

TABLE 1. MEANS AND PERCENTAGES OF RESPONSES TO THE SIX SURVEY QUESTIONS ($N=500$)

Items	Mean (SD) ^a	Positive (rating = 5–7)	Unsure (rating = 4)	Negative (rating = 1–3)
Withdrawal items				
1. Caffeine cessation produces a withdrawal syndrome?	6.4 (1.0)	95%	3%	2%
2. Caffeine withdrawal can have clinical importance?	5.2 (1.5)	73%	14%	13%
3. Caffeine withdrawal Disorder should be listed in the DSM?	4.4 (1.9)	48%	24%	28%
Use disorder items				
4. Some people develop a caffeine use disorder?	4.6 (1.8)	58%	15%	27%
5. Caffeine use disorder should be listed in the DSM?	4.1 (2.0)	44%	18%	38%
6. Some people could benefit from professional help for quitting or reducing caffeine use?	4.7 (1.7)	60%	16%	24%

^aEach item rated on a 7 pt Scale.

Anchors: 1 = certainly not, 4 = unsure, 7 = most certainly.

DSM, Diagnostic and Statistical Manual of Mental Disorders.

TABLE 2. QUESTIONNAIRE ITEM MEANS AND STANDARD DEVIATIONS BY PROFESSIONAL GROUP

	<i>n</i>	1. Caffeine cessation produces withdrawal syndrome?	2. Caffeine withdrawal can have clinical importance?	3. Caffeine withdrawal disorder should be in DSM?	4. Some people develop a caffeine use disorder?	5. Caffeine use disorder should be in the DSM?	6. People could benefit from treatment for quitting or reducing?
All participants	500	6.4 (1.0)	5.2 (1.5)	4.4 (1.9)	4.6 (1.8)	4.1 (2.0)	4.7 (1.7)
Psychologist ^a	161	6.2 (1.1)	5.0 (1.5)	4.2 (1.9)	4.6 (1.9)	4.0 (2.0)	4.6 (1.7)
Scientist ^b	156	6.24 (1.20)	4.85 (1.62)	3.94 (1.82)	4.32 (1.86)	3.62 (1.85)	4.37 (1.65)
Psychiatrist	130	6.5 (0.8)	5.5 (1.4)	4.9 (1.9)	4.7 (1.9)	4.4 (2.0)	5.0 (1.8)
Internist/family physician	53	6.7 (0.7)	5.6 (1.5)	4.8 (2.1)	4.9 (1.9)	4.6 (2.1)	4.8 (1.9)
Clinician	51	6.4 (1.0)	5.4 (1.8)	4.3 (2.2)	4.6 (2.0)	4.1 (2.2)	4.4 (1.9)
Student/trainee	50	6.5 (1.0)	5.5 (1.3)	4.5 (1.4)	4.9 (1.4)	4.1 (1.5)	4.7 (1.6)
Other health professional	12	6.08 (1.24)	4.75 (1.71)	3.42 (1.56)	4.42 (1.68)	3.17 (1.80)	4.42 (1.62)

Total *n* across group categories >500 due to 19% indicating multiple professional roles. Comparisons between groups excluded participants who selected more than one category.

^aSignificant mean differences between psychiatrists and psychologists on all three caffeine withdrawal items (p 's < 0.05).

^bScientists' means were significantly lower than the means for the other groups combined for all items (p 's < 0.01); except item 1, caffeine cessation produces a withdrawal syndrome.

in DSM-5. For caffeine use disorder, a smaller majority (58%) agreed that it exists, with approximately the same percentage (44% vs. 48%) responding that it should be included in DSM-5. A somewhat greater proportion (38% vs. 28%) thought that caffeine use disorder should not be included in DSM-5, suggesting greater ambivalence. The large accumulation of laboratory data on the potential for and expression of caffeine withdrawal⁴ may account for the high-proportion acknowledging it as a real phenomenon. The slightly lower positive response rate for clinical importance of withdrawal (73%) may be due to the smaller amount of supportive clinical literature on this topic.^{4,6-9} The relatively sparse epidemiological and clinical literature on caffeine use disorder (although supportive of a clinically important disorder^{8,14,16,17}) may account for the divergent responses related to its acceptance as a disorder that warrants inclusion in the DSM. Additional larger epidemiological studies and studies of clinical significance would appear needed to evaluate specific diagnostic algorithms and the clinical importance and prevalence of caffeine use disorder.

As one might expect, scientists were the most skeptical, generally providing lower ratings across items, perhaps illustrating a concern or lack of awareness of sufficient data to adequately address these questions. Psychiatrists and internists (the MDs) provided the highest ratings (i.e., supportive of clinical importance and DSM inclusion), perhaps reflecting greater awareness of clinical issues related to caffeine misuse and the need to increase cognizance of its addictive potential and availability of assistance for those who desire or need to quit or cut down.

Of interest, for both caffeine withdrawal and caffeine use disorder, a larger proportion of respondents acknowledged the existence of the disorders and their clinical significance than believed that they should be included in the DSM. As mentioned in respondent comments, this likely reflects trepidation about inclusion of a diagnosis that might have a high incidence (given that 90% of the U.S. adults consume caffeine daily), but low severity, and this might trivialize other substance use or psychiatric disorders that have more compelling consequences. Historically, this might be perceived as somewhat analogous to past diagnostic tribulations related to nic-

otine (i.e., tobacco) disorders when its daily use was highly prevalent and there existed much societal resistance to designating it as potentially problematic substance.¹⁹ However, this changed with convincing evidence that many smokers who had life-threatening problems from nicotine use continued to smoke.²⁰ Such data regarding severe medical consequences associated with caffeine use do not exist; however, medical professionals often recommend those with anxiety or insomnia, arrhythmias or palpitations, or who are pregnant reduce or not use caffeine.²¹

Association with severe medical consequences is only one measurement of a substance use disorder that defines its clinical importance.¹² A number of responder comments implied that if the DSM was to include caffeine withdrawal or use disorder, the text should clearly convey that the designated criteria are counted toward the diagnosis only if they are causing significant distress or functional impairment, or alternatively standard substance use disorder criteria could be modified to ensure that only clinically important cases would meet diagnostic criteria. The requirement that the disorder cause significant distress or functional impairment has always been part of the DSM substance dependence criteria (e.g., Criterion A: *...A maladaptive pattern of substance use, leading to clinically significant impairment or distress.*; APA, 2000). This suggests that much of the concern regarding inclusion of caffeine withdrawal or caffeine use disorder relates not to whether or not some individuals may have a clinically important disorder, but rather concern that diagnoses will be made without careful attention to the clinical significance component of the criteria. Such liberal interpretation of the criteria could result in a misleadingly inflated number of cases, given the large percentage of the population who have likely developed tolerance, experienced some withdrawal symptoms, and have tried to reduce or quit their caffeine use.

Interestingly, the proposed changes to DSM-5 related to caffeine-related disorders appear fairly consistent with these survey results.¹⁸ Caffeine withdrawal disorder will be moved from the supplemental research section of the manual to the actual substance use disorder section. Caffeine use disorder will be included in the supplemental research section, and will include suggested criteria that are more stringent

than those used for other substance use disorders to address the concerns of over diagnosis of nonclinical cases, and will add new diagnostic criteria in an attempt to provide a measure of the severity of the disorder.

The major weaknesses of this survey study are the relatively small sample size, the convenience sampling methods, contact through email and list serves rather than in person, and the relatively low response rate. Also, note that the between-profession comparisons were based on participant self-categorizations that allowed for, but did not instruct participants to select more than one profession category. As such, the interpretation of these findings warrants caution.

A survey of obstetrician-gynecologists on caffeine knowledge and assessment practices revealed a wide range of opinions regarding caffeine recommendations before and during pregnancy, many of which were not concordant with the existing literature.²² Thus, we recommend additional qualitative and quantitative research exploring issues such as (i) the level of awareness of the literature on phenomenology and clinical significance of caffeine-related disorders; (ii) more systematic quantification of the rationales behind some believing in clinical importance, but not thinking that it should be included in the DSM; and (iii) what types of research would help resolve discordances among professionals about caffeine withdrawal and use disorders. Increased epidemiological and clinical research on caffeine withdrawal and caffeine use disorder and increased education and dissemination of the empirical data on these diagnoses are needed to better inform those creating policy and programming as well as healthcare workers who must advise and intervene on caffeine-related problems.

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