



A systematic review of the Diagnostic and Statistical Manual diagnostic criteria for nicotine dependence

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ABSTRACT

The Diagnostic and Statistical Manual diagnostic criteria for nicotine dependence (DSM-ND) are based on the proposition that dependence is a syndrome that can be diagnosed only when a minimum of 3 of the 7 proscribed features are present. The DSM-ND criteria are an accepted research measure, but the validity of these criteria has not been subjected to a systematic evaluation.

To systematically review evidence of validity and reliability for the DSM-ND criteria, a literature search was conducted of 16 national and international databases. Each article with original data was independently reviewed by two or more reviewers.

In total, 380 potentially relevant articles were examined and 169 were reviewed in depth. The DSM-ND criteria have seen wide use in research settings, but sensitivity and specificity are well below the accepted standards for clinical applications. Predictive validity is generally poor. The 7 DSM-ND criteria are regarded as having face validity, but no data support a 3-symptom ND diagnostic threshold, or a 4-symptom withdrawal syndrome threshold. The DSM incorrectly states that daily smoking is a prerequisite for withdrawal symptoms. The DSM shows poor to modest concurrence with all other measures of nicotine dependence, smoking behaviors and biological measures of tobacco use.

The data support the DSM-ND criteria as a valid measure of nicotine dependence severity for research applications. However, the data do not support the central premise of a 3-symptom diagnostic threshold, and no data establish that the DSM-ND criteria provide an accurate diagnosis of nicotine dependence.

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1. Introduction

In 1980 the American Psychiatric Association (APA) proposed a diagnostic criteria for nicotine dependence (DSM-ND) in the 3rd edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM). (American Psychiatric Association, 1980b) These were developed based on the DSM criteria for alcoholism with only minor modifications, (Cottler, Helzer, Mager, Spitznagel, & Compton, 1991) reflecting a theory that all substance use disorders can be diagnosed using a single set of “generic” criteria (Benowitz, 1999; Cottler, 1993; Hughes, Oliveto et al., 2004; Woody, Cottler, & Cacciola, 1993). The DSM-ND criteria were changed in 1987, again in 1994, and are currently under review for another revision in DSM-V (American Psychiatric Association, 1987, 1994). The DSM is a nosology, i.e., a theoretical systematic classification of diseases, one of the many proposed for mental disorders over the years (World Health Organization, 1992). According to those involved, “DSM-III and III-R were developed by committee, without a systematic effort to collect reliability, validity and other comparative data.” (Cottler et al., 1991).

The DSM uses a “syndromal” approach to the diagnosis of nicotine dependence in which “the essential feature of this disorder is a cluster of cognitive, behavioral, and physiologic symptoms that indicate that the person has impaired control of psychoactive substance use and continues use of the substance despite adverse consequences.” (American Psychiatric Association, 1987). When the DSM-ND criteria were last revised in 1994, research had not yet identified the pathophysiology of nicotine dependence, and the generic alcoholism criteria were retained for nicotine dependence. The first published case series recently revealed that nicotine dependence is characterized by a compulsion to use tobacco that recurs with a predictable periodicity after each cigarette (DiFranza, Ursprung, & Carlson, 2010). The symptoms of this compulsion are wanting, craving or needing to smoke. Instruments that measure this compulsion predict the clinical course of nicotine dependence with 98% sensitivity and 98% specificity (DiFranza et al., 2007; DiFranza et al., 2002). It has been proposed that the recurrent compulsion to use tobacco is pathognomonic for nicotine dependence, and on this basis it has been proposed that the identification of this symptom is all that is required to make a diagnosis (DiFranza et al., 2010). Reliance on a single diagnostic criterion conflicts with the DSM approach which requires a minimum of 3 diagnostic criteria.

Given this controversy, we undertook the first systematic review of the DSM-ND criteria to examine the evidence that they accurately diagnose nicotine dependence. Accordingly, we have applied to the DSM-ND criteria the same critical evaluation that is applicable to all measures of nicotine dependence (Colby, S., Tiffany, Shiffman, & Niarua, 2000). We examined properties relevant to clinical diagnosis, such as sensitivity, specificity, accuracy and predictive validity. As there is concern that DSM-ND criteria may under-diagnose dependence in blacks, (Strong, Kahler, Ramsey, & Brown, 2003) we also examined the evidence relevant to this concern. In relation to research applications we considered theoretical foundation, face validity, factor structure, internal reliability, test–retest reliability, concurrent validity, and concordance among the three editions of DSM (III, III-R, and IV) and between these and other measures of dependence such as the Fagerström Tolerance Questionnaire (FTQ) and the International Classification of Diseases (ICD).

2. Materials and methods

A systematic search of the literature was conducted for articles published between 1980 and October 2008 that mentioned the DSM-III, DSM-III-R, or DSM-IV ND criteria. Databases searched included: Index Medicus, Medline, the Educational Resources Information Center (ERIC), the Cochrane Library, the American Psychological Association's PsychInfo/PsychLIT Database, Indmed, Koreamed, the World Health Organization Library Information System (WHOLIS), the World Health Organization's Network of Health Science Libraries across Asia (HELLIS), Latin American and Caribbean Health Sciences (LILACS), the Pan American Health Organization's Head Quarters' Library Catalog (PAHO), Caribbean Health Sciences Literature Database (MEDCARIB), Disaster Documentation Center Collection (DESASTRES), Latin American and Caribbean History of Public Health (HISA), Database of the Regional Program on Bioethics PAHO/WHO (BIOETHICS), and the Association for Health Information and Libraries in Africa (AHILA). Search terms included every combination of the following: addiction, Diagnostic and Statistical Manual, DSM, cigarettes, dependence, nicotine, smoking and tobacco. Retrieved articles were reviewed for relevant citations. An appeal for citations was posted on the Society for Research on Nicotine and Tobacco Listserv.

We considered all English language articles that could be retrieved online, through interlibrary loan, or by contacting the authors. As we

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