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ORIGINAL ARTICLE

Epidemiology of behavioral dependence: literature review and results of original studies

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Summary – The extension of the definition of dependence leads to the consideration of some impulsive disorders as a form of dependence disorder. This pathological condition is characterized by the repetitive occurrence of impulsive and uncontrolled behaviors. Other clinical characteristics are failure to resist an impulse, drive or temptation to perform some act harmful to oneself and/or others, an increasing sense of tension or excitement before acting out, and a sense of pleasure, gratification or release at the time of the behavior or shortly thereafter. Behavioral dependences most often described are pathological gambling, kleptomania, trichotillomania and compulsive buying.

Studies using a specific assessment scale, the South Oaks Gambling Screen, distinguished problem gambling from pathological gambling. Social gamblers spend 5% of their money and pathological gamblers 14 to 45%. Prevalence of 'problem gambling' is 4% and pathological gambling 2%. Several studies have suggested that the incidence of pathological gambling is eight to ten times greater in alcohol-dependent patients than in the general population.

No systematic study has assessed the prevalence of kleptomania. Data come from case reports. Among subjects arrested after a theft, prevalence of kleptomania varied between 0 and 24%. Trichotillomania prevalence rate is 0.6% among students. Studies using less restrictive diagnostic criteria found a prevalence rate of 3.4% in women and 1.5% in men. The disorder is often unrecognized; 40% of the cases are not diagnosed and 58% of the patients have never been treated.

Prevalence studies of compulsive buying found a rate between 1 and 6% in the general population. Compulsive buying is significantly more frequent among women (90% of the cases). Study of family history of compulsive buyers showed a high frequency of alcohol-dependence disorder (20%) and depression (18%). In all cases of behavioral dependence disorders, a high level of impulsivity and sensation-seeking could determine an increased risk. © 2000 Éditions scientifiques et médicales Elsevier SAS

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Behavioral dependence is a clinical entity recently identified and studied. This article proposes to summarize results from epidemilogic studies on the topic. It will also present original data from studies conducted in alcohol-dependent patients.

LITERATURE REVIEW

The clinical concept of behavioral dependence

DSM classification has adopted a bio-behavioral concept of dependence (pathological use, social

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Table I. Behavioral addiction features (adapted from Marks, 1990 [19]).

Urge to engage in a counterproductive behavioral sequence (= craving).
Mounting tension unless the sequence is completed.
Completing the sequence rapidly switches off the tension temporarily.
Return of the urge and tension over hours, days or weeks (= withdrawal symptoms).
External cues unique to a given addiction syndrome.
Secondary conditioning by external and internal cues (dysphoria, boredom).
Hedonic tone in early stage of addiction.

impairment, tolerance and withdrawal). Symptoms of dependence, according to DSM-IV classification, are tolerance, withdrawal, use of a substance in larger amounts or over a longer period than intended, persistent desire or unsuccessful efforts to cut down or control substance use, great deal of time spent to obtain the substance, use it or recover from its effects, important activities given up or reduced because of substance use, continued use despite knowledge of having a persistent or recurrent physical or physiological problem that is caused or exacerbated by the substance [9].

Patterns of physiological dependence are identified as diagnostic criteria. Their presence, however, is not necessary to establish the diagnosis of dependence. This evolution of the clinical concept of dependence allows us to diagnose as dependent patients without physiological dependence. Such a nosographic evolution permits us to include in the field of dependence 'behavioral dependences' [19].

Behavioral dependence is understood as a repetitive occurrence of impulsive behaviors. Other clinical characteristics are failure to resist an impulse, drive or temptation to perform some act harmful to oneself and/or others, an increasing sense of tension or excitement before acting out, a sense of pleasure, and gratification or release at the time of the behavior or shortly thereafter. Marks listed patterns common to behavioral and chemical addictions *(table I)* [19]. Some patients, in addition, present their desire to accomplish their behavioral sequence as being "like a hunger", even "animal-like". Other subjects described feelings of "hot flashes" and excitement which was likened to "falling in love with a product" or "like taking cocaine", or "like taking a narcotic". Impulse urges toward immediate gratification discourage consideration of the behavior's potential consequences. They provoke behavioral impulses despite an awareness of potentially negative consequences. The subject only seeks to reduce his psychological tension [12].

Behavioral dependences most often described are kleptomania, trichotillomania, pyromania and pathological gambling. Compulsive buying can also be considered as a form of behavioral dependence [18].

Pathological gambling

Several studies have studied the incidence of pathological gambling in the general population. Most of them assessed gambling behavior with a specific rating scale, the South Oaks Gambling Screen. They found a prevalence rate for 'problem gambling' between 3.9 and 4.2% and for pathological gambling between 1.2 and 2.3% [22]. Volberg and Steadman studied the prevalence of pathological gambling in the state of New York [21]. They showed that gambling was more frequent in men and in young subjects (38% of cases). Among students from Connecticut, prevalence of pathological gambling is 2.5% [8]. The accessibility to casinos and slot machines is associated with an increased prevalence of pathological gambling, especially among young subjects [23]. Westphal and Rush, using the South Oaks Gambling Screen, distinguished problem gambling from pathological gambling in terms of severity and age repartition *(table II)* [23]. Social gamblers are more often younger and they spend 5% of their money. Pathological gamblers are older and spend 14 to 45% of their money.

Study of socio-demographic factors associated to pathological gambling confirms that prevalence of the

Table II. Prevalence of pathological gambling in general population from Louisinia (adapted from Westphal and Rush, 1996 [23]).

	Subjects 21 years old or older	*Subjects between 18 and 21 years*
Pathological gambling	1.4 %	3.1 %
Problem gambling	3 %	11.2 %

disorder is higher in men (5.7%) than in women (0.6%). Women are more exposed to pathological gambling when they are depressed. Depression does not appear to be a significant risk factor in men. Factors influencing pathological gambling in men are:

– Family history of pathological gambling or alcohol dependence,
– Gambling behavior beginning early in life,
– Family perturbation (authority, communication) [3].

Of particular interest is the interaction of pathological gambling with alcohol dependence. Both conditions have been conceptualized as addictive disorders and share characteristic patterns of behavior such as impulsivity, craving, sensation-seeking and euphoria. The incidence of pathological gambling in patients with alcohol dependence is substantially higher than that in the general population. The prevalence of pathological gamblers among hospitalized substance abusers is reportedly eight to ten times the rate observed in the general population [15]. Lesieur and Heineman studied pathological gambling among 100 alcohol- and drug-dependent adolescent inpatients (average age 17 years old). They found that 14% met diagnostic criteria for pathological gambling, and an additional 14% had gambling-related problems [15].

Kleptomania

No systematic study has assessed the prevalence of kleptomania in the general population. A recent review [11] suggested that the estimated prevalence rate of kleptomania could be 0.6%. The same authors noted that the prevalence rate of kleptomania is probably underestimated because many patients are never recognized as kleptomaniacs. Among subjects arrested after a theft, prevalence of kleptomania varied between 0 and 24%. Most patients presenting kleptomania are women. Stressful life events during childhood and social withdrawal are often associated to kleptomania. Bulimia is also often present in patients presenting kleptomania (prevalence of 25%). McElroy et al. [16] have studied clinical characteristics of 21 psychiatric inpatients presenting kleptomania. All patients had a history of depression, 16 had presented a panic disorder and 12 bulimia. Sarasalo et al. [20] have confirmed the association between kleptomania and depression. They also showed that patients with kleptomania presented a high level of monotony avoidance and a low degree of socialization.

Trichotillomania

Christenson et al. [4] have systematically assessed prevalence of trichotillomania among 2,579 students. They found a prevalence rate of 0.6% in men and in women. Using less restrictive diagnosis criteria, they found prevalence rates of 3.4% in women and 1.5% in men. Many cases of trichotillomania are not recognized until a significant alopecia reveals the disease. Cohen et al. [7] have studied 123 patients presenting trichotillomania. They showed that 40% of cases are not diagnosed and that 58% of the patients have never been treated.

Trichotillomania most often appears between 13 and 20 years of age. The disorder is often associated to another psychiatric disorder. Christenson and Crow [6] found, among patients presenting trichotillimania, the following lifetime prevalence rates:

– major depression: 52%
– generalized anxiety disorder: 27%
– alcohol abuse or dependence: 19%
– simple phobia: 19%
– social phobia: 11%

Depression is strongly associated to trichotillomania. An inverse relation between the level of self-esteem and frequency of hair-pulling has been demonstrated. Personality disorders are also associated to trichotillomania. Personality disorders most often diagnosed are:

– histrionic personality (28%)
– borderline personality (18%)
– passive aggressive personality (16%)

Compulsive buying

Compulsive buying is defined by the presence of repetitive impulsive and excessive buying episodes leading to personal and familial distress. It represents an important form of behavioral dependence. McElroy et al. [16] proposed diagnostic criteria *(table III)* patterned after DSM-III-R criteria for obsessive compulsive, impulse control, and substance abuse disorders. They excluded buying sprees by manic patients which are related to euphoria, hyperactivity, grandiosity and poor judgment.

Patients typically experience repetitive, irresistible and overpowering urges to buy items, uncontrollable needs and mounting tension which may only be relieved by buying [5]. The tension temporarily assuaged by the purchase is quickly replaced by a feeling of guilt. Christenson et al. noted that the disorder regularly

Table III. McElroy's et al. diagnostic criteria for compulsive buying (adapted from McElroy et al., 1994 [17]).

Maladaptative preoccupations with buying or shopping, or maladaptative buying or shopping impulses or behavior, as indicated by at least one of the following:
Frequent preoccupation with buying or impulses to buy that are experienced as irresistible, intrusive, and/or senseless.
Frequent buying of more than can be afforded, frequent buying of items that are not needed, or shopping for longer periods of time than intended.
The buying preoccupations, impulses or behaviors cause marked distress, are time-consuming, significantly interfere with social or occupational functioning, or result in financial problems (e.g., indebtedness or bankruptcy).
The excessive buying or shopping behavior does not occur exclusively during periods of hypomania or mania

induces large debts (58.3%), inability to meet payments (41.7%), feedback from acquaintances (33.3%), legal and financial consequences (8.3%), criminal legal problems (8.3%) and guilt feelings (45.8%) [5].

Very few studies assessed the prevalence of uncontrolled buying in the general population: Faber and O'Guinn [10] found a 1.1% prevalence rate for compulsive buying. The mean age is 39, with a mean age of 30 at onset of the disorder. Compulsive buyers are more often women (92% of women). Compulsive buyers, as compared with controls, have statistically more often lifetime histories of anxiety disorders (50%), substance abuse/dependence disorders (45.8%), and eating disorders (20.8%) [5]. McElroy et al. found, among 20 patients answering to the criteria cited above, that all subjects also met DSM-III-R criteria for two or more co-morbid lifetime Axis 1 psychiatric disorders [17]. Nineteen patients met DSM-III-R criteria for a lifetime diagnosis of a major mood disorder – most commonly bipolar disorder. The onset of mood disorder preceded the onset of uncontrolled buying by at least one year in 14 patients, and occurred at least one year after the onset of overbuying in six patients. Other psychiatric disorders were anxiety disorders (panic disorder, phobias, obsessive compulsive disorder), psychoactive substance use disorders, and impulse control disorders. Bulimia was often associated, and the term 'multi-impulsive bulimia' has been coined for bulimic patients who display more than one impulsive symptom. Among these patients, shoplifting (35% of the cases) is more frequent than compulsive buying.

Black et al. [1] have studied the familial psychiatric history of 33 patients presenting compulsive buying. They showed a high frequency of alcohol-dependence disorder (20%) and depression (18%). This result suggests that compulsive buying can be included in a familial and probably genetic 'clinical spectrum' of addictive and depressive disorders.

RESULTS OF PERSONAL STUDIES

Our studies assessed compulsive buying in depressed patients and all types of impulse control disorders in alcohol-dependent patients.

Behavioral dependence and alcoholism

We studied the prevalence of all impulse control disorders in 79 patients, all of whom met DSM-IV criteria for alcohol dependence disorder [14]. Mean age of the sample was 43.1 (SD 9.2, range 22-66). The population consisted of 48 men (60%) and 31 women (40%). Thirty-two (40%) of them were married, or living maritally. Among the 79 patients included, 30 (37.9%) met criteria for behavioral dependence: 19 cases of intermittent explosive disorder, seven cases of pathological gambling, three cases of kleptomania, and one case of trichotillomania. Patients with co-occurring behavioral dependence were significantly younger (mean age of 40.7 vs 44.5 years in the group without behavioral dependence, $P = 0.03$). Patients with co-occurring pathological gambling were younger at the onset of alcohol dependence than patients without behavioral dependence (mean ages of 19.5 and 25.9 years respectively, $P = 0.0008$). Pathological gamblers have a significantly longer duration of alcohol dependence compared to the patients without behavioral dependence (26 and 17.9 years, respectively). Pathological gamblers had a higher mean number of detoxifications (7 and 1.7, respectively, $P = 0.03$). Patients with co-occuring intermittent explosive disorder had shorter time of duration of alcohol dependence (9.9 years). Prevalence of antisocial personality disorder was not different in patients with or without co-occurring behavioral dependence. Pathological gamblers were more often men (six men and one woman).

Because of the small size of the population studied, statistical differences could not be determined.

Compulsive buying and depression

In order to specify the relation between compulsive buying and depression, we assessed compulsive buying among 119 inpatients answering to DSM-III-R criteria of major depressive episodes. We also evaluated the co-morbidity in the patients suffering from compulsive buying (CB +) and in those who were free from this disorder (CB-) [13].

The prevalence of compulsive buying was 31.9%, 38 of the 119 depressives being diagnosed as compulsive buyers. Patients from the CB + group were younger, more often women and unmarried. They presented more often than others recurrent depression (relative risk = 1.4), impulse control disorders as kleptomania (RR = 8.5) or bulimia (RR = 2.8), benzodiazepine abuse or dependence disorder (RR = 4.68), and associations of dependences (RR = 1.99).

Impulsivity and sensation-seeking in behavioral dependence

Impulsivity is an important dimension of behavioral dependence. Behavioral addictions are determined by a strong, sometimes irresistible urge and a sudden inclination. In some cases, the impulse arises immediately upon confrontation with a certain stimulus, especially a visual confrontation. Other subjects describe sitting at home and suddenly experiencing the urge to steal, buy something or pull their hair. Once triggered, the impulse encourages immediate action, and it may be powerful and persistent. Behavioral dependence is thus an expeditive experience, more emotional than rational. Impulses, in addition, may be difficult to resist because they involve anticipated pleasurable experiences.

Sensation-seeking is another dimension of personality often associated to behavioral dependence. Zuckerman [24] suggested a relationship between gambling and other impulsive behaviors and the trait of sensation-seeking in which "individuals entertain the risk of monetary loss for the positive reinforcement produced by states of high arousal during the periods of uncertainty, as well as the productive arousal produced by winning".

Sensation-seeking is assessed with the Zuckerman 72-item scale. This scale measures five features: F1: general factor; F2: thrill- and adventure-seeking; F3: experience-seeking; F4: disinhibition; and F5: boredom susceptibility. Patients presenting behavioral dependence have a higher level of sensation-seeking. We compared the levels of sensation-seeking in depressed patients with and without compulsive buying [13]. Subscores of experience-seeking using the Zuckerman Sensation-Seeking Scale were significantly higher ($P = 0.04$) and scores of impulsivity were much higher (difference statistically significant, $P < 0.0001$).

Dependent patients with high levels of experience-seeking and disinhibition could benefit from specific psychological interventions aimed at developing skills to manage urges of damaging behavior like alcohol or drug ingestion, pathological gambling or compulsive buying. Group treatments allowing for increased insight, tension relief and behavioral control are also indicated in these cases [2].

We also compared the level of impulsivity and sensation-seeking in alcohol-dependent patients presenting behavioral dependence with those of alcoholics without behavioral dependence. Thirty alcohol-dependent patients with behavioral dependence were compared to a group of 30 alcoholics without behavioral dependence matched for gender and age with 30 controls. All patients presented alcohol dependence and were hospitalized for alcohol detoxification [14].

All patients completed the Zuckerman Sensation-Seeking Scale and the Barratt Impulsiveness Rating Scale (BIS). Mean scores of general factor from the sensation-seeking scale were higher in patients with behavioral dependence than those without (11.2 and 8.6 respectively, $P = 0.01$). Values from the control group were equivalent to those from the alcoholics without behavioral dependence (8.96) and significantly lower than those from the group with behavioral dependence ($P = 0.01$). Scores of the general factor were also significantly higher in patients presenting intermittent explosive disorder (11.3 and 8.6 respectively, ($P = 0.02$). Subscores of disinhibition were higher in patients with behavioral dependence (6.2 and 5 respectively, $P = 0.04$). The level of experience-seeking was higher in patients with behavioral dependence (8.2 and 6.5 respectively, $P = 0.04$). Scores for sensation-seeking are relevant for distinguishing between alcohol-dependent patients presenting with and without behavioral dependence.

It can be concluded from our studies that:

– Behavioral dependence are often associated to depression and/or alcohol dependence

– Levels of sensation-seeking, disinhibition and experience-seeking are higher in alcoholic or depressed patients presenting behavioral dependence.

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