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Kleptomania on the impulsive–compulsive spectrum. Clinical and therapeutic considerations for women

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The current literature regarding kleptomania (KM) is scarce, especially regarding treatment approaches and outcomes. The aims of the present study involved: (1) exploring characteristics of people with KM (with and without co-occurring eating disorders (EDs)); (2) considering KM along an impulsive-compulsive spectrum; and, (3) investigating treatment outcomes in a clinical sample of female patients with KM. The study sample included 150 female participants with either a diagnosis of KM only (*n* = 13), co-occurring KM and EDs (*n* = 71), or healthy control individuals (HCs) (*n* = 66). The KM-only group was diagnosed using DSM-5 criteria and by a face-to-face clinical interviewed. EDs were diagnosed through a face-to-face semi-structured clinical interview based on DSM-5 criteria, and co-occurring KM was self-reported by patients. Psychopathology, impulsivity and personality features were assessed. Clinical groups received cognitive behavioral treatment. Compared to HCs, both KM groups reported more psychopathology, higher impulsivity, and more dysfunctional personality features. Relative to the clinical groups, that with KM + ED was more impulsive; in contrast, harm avoidance scores were higher in the KM-only group. Both clinical groups present poor treatment outcomes. KM can present impulsive and compulsive features, and these may impact treatment outcomes. Co-occurring KM and EDs may worsen clinical profiles and warrant specific interventions.

Keywords Kleptomania, Impulsive behaviors, Compulsive behaviors, Eating disorders, Treatment outcome

Currently, the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)[1] and the International Classification of Diseases 11th Revision (ICD-11)[2] classify kleptomania (KM) as an impulse control disorder (ICD). Both nomenclature systems consider as central features of KM difficulties resisting impulses to steal items that are not needed for personal use or monetary gain, together with an increase in emotional tension or arousal before the theft and a feeling of pleasure, satisfaction or relief when the theft is committed. Nonetheless, once the behavior is completed, feelings of guilt, remorse and/or shame often appear. KM has been more commonly

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reported in women than men, with a 3:1 ratio[3,4], with an onset in adolescence or early adulthood[3–5]. Although KM may be chronic, exacerbations are often modulated by mood states[6].

Several debates about KM persist. While KM has been considered a rare disorder[7,8], other authors have suggested that it is underdiagnosed[3], considering that the stigma and shame linked to KM may interfere with seeking treatment[9]. Most patients with KM seek treatment due to external motivations, such as KM-related legal troubles, pressure from family members or by requesting treatment due to other psychiatrics conditions[3,10–12], which may also lead to a late diagnosis, even with an early development of the disease[13]. Prevalence among the general population is relatively low, varying between 0.3% and 2.6% [3,5,7,8,10], with increases to between 4 and 24% in theft cases[7].

Although KM is currently considered as an ICD[1,2], alternative hypotheses have been propose, mentioned it as a compulsive disorder[14–16].

Impulsivity has been defined as the tendency to respond with little forethought, despite the negative consequences that may imply for the individual or others[17]; while, compulsivity has been defined by the performing of an act persistently and repetitively, that is also inappropriately to the situation and do not present an obvious relationship to the overall goal, the sense of being *forced* to complete the behavior lead to considering impairment[18].

Therefore, when considering the impulsive–compulsive spectrum disorders, some authors initially proposed a continuous spectrum, with one side including disorders with more compulsive natures, such as Obsessive Compulsive Disorder (OCD) or Anorexia Nervosa (AN), and another side with more impulsive traits, such as addictive or binge-spectrum disorders[19]. However, it has been observed that both impulsiveness and compulsiveness may co-occur whether it's simultaneously in one disorder, or at different moments within the same disorder[20], even at neurocognitive level[21], leading to more orthogonal conceptualizations of impulsivity and compulsivity and considerations of interactions in transdiagnostic models[20,22].

In the case of KM, the debate is still open, being the literature seems to present opposite results that may suggest the presence of both, impulsive and compulsive, traits.

Considering neurobiological and psychological data, first-degree relatives of people with KM have shown elevated odds of obsessive-compulsive disorder (OCD) and substance use disorders (SUDs)[23]. Likewise, KM is also frequently present with behavioral addictions such as gambling disorder (GD), eating disorders (EDs), attention deficit/hyperactivity disorder[24,25] and other ICDs[5,7,8,10,26,27]. As well, KM may overlap with OCD and anorexia nervosa (AN)[16], both of which have compulsive features, as well as compulsive buying and compulsive work[28].

Also, the influence of the impulsive or compulsive traits over the severity of the disorder has been investigate, however, the literature is not conclusive. Feelings of relief from stealing (as seen with compulsive behaviors in OCD) and the co-occurrence of OCD and AN are associate with greater KM severity[16], but, also, higher impulsivity scores in patients with KM, more so than in other ICDs or SUDs, have been linked to increased severity[29]. Similar inconclusive results regarding personality features have been reported. Those often observed in ICDs, SUDs and behavioral addictions have been implicated in KM (e.g., reward dependence and sensation seeking) rather than those often linked to OCD (e.g., harm avoidance)[13,30,31].

The suggested complexity of KM impact on the treatment of the disorder, which, to date, keep represent another important gap in the literature[32]. Most treatment studies involve individual cases or small samples, mostly centered in pharmacological treatment[33–36], making it difficult to generalize conclusions from the results. A better understanding of KM may help to fill this gap, considering that the current lack of evidence of the used treatment, jointly the undefined nature of KM, makes it difficult to decide on one therapeutic approach over another[37].

Finally, as mentioned above, the fact that KM may co-occur in the presence of other conditions, both, with impulsive and compulsive nature, the study of this comorbidities may help to understand KM. Over these comorbidities, KM and EDs may be of interest, being that EDs may present both, impulse and compulsive tendencies according their subtypes. Previous studies have shown a high female predominance of KM and EDs[3,4]. As well, it has been suggested that individuals with EDs, mainly binge-spectrum disorders, and KM could share similar impulsive tendencies[38,39] and, therefore, be more prone to engage in other dysfunctional impulsive behaviors such as SUDs[27,40]. Moreover, the confluence of KM and EDs and/or SUDs has also been associated with mood disturbances[29] that may also precede the onset of EDs[26]. Even more, it has been suggested that ED and SUD symptomatology together with stealing might also represent maladaptive strategies to cope with undesirable emotions, as stress, anxiety, frustration, dissatisfaction, anger and other mood disturbances[6,32], but further research is needed. As well, the impact of the comorbid presence of KM and EDs on the treatment result remains unclear. Therefore, considering co-occurring EDs may promote better understanding of the underlying mechanisms of KM, as well as provide practical clinical information[26,27,40,41].

Aims and hypotheses

Considering the above, KM is a complex disorder that requires further research to be more fully understood, not only by itself, but also when it is comorbid with other disorders as EDs. Thus the present study aimed to: (1) characterize KM based on clinical data (i.e., general psychopathology and personality features) with and without co-occurring EDs; (2) consider KM within an impulsive-compulsive spectrum; and, (3) explore treatment outcomes in a clinical sample of female patients with KM.

We anticipate that the present study may fill some of the aforementioned knowledge gaps, providing new insights into the characteristics of women with KM and provide potential support for it as a disorder that present both, compulsive and impulsive traits, which may have implications for treatment development.

We hypothesized that female patients with KM would present a more dysfunctional personality profile, exhibit both impulsive and compulsive features, and more psychopathology relative to HCs. We also hypothesized that

female KM with co-occurring EDs versus KM only would be associated with more psychopathology. Regarding treatment response, we hypothesized that female patients with co-occurring KM and EDs versus KM only would exhibit poorer treatment outcomes.

Methodology

Participants

The total study sample included 150 female participants, $n = 13$ (M age = 42.77 years) with a diagnosis of KM; $n = 71$ (M age = 30.82 years) with co-occurring KM + ED, and $n = 66$ (M age = 34.05 years) healthy control women without any psychiatric condition. Among the KM + ED group, all ED subtypes were included [anorexia nervosa (AN) $n = 10$, bulimia nervosa (BN) $n = 31$, binge eating disorder (BED) $n = 6$, other specified feeding or eating disorders (OSFED) $n = 24$]. Onset and duration of the disorder were registered only for the KM group; mean age of onset was 32.46 years old, with a mean age of 5.54 years of duration. See Table S1 for further information regarding sociodemographic features.

Measures

Besides collecting sociodemographic, such as age, and clinical data, as substance use or the presence or history psychiatric disorders, all participants completed the following questionnaires:

Symptom Checklist-Revised (SCL-90-R)[42], Spanish adaptation The SCL-90-R is a 90-item self-report questionnaire used to assess psychological and psychopathological symptoms in 9 dimensions: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The SCL-90-R includes the following scores: a global severity index (GSI), a positive symptom distress index (PST), and a positive symptom total (PSDI). The Spanish adaptation[43] was used for this study. In the present study sample, the consistency indices ranged from good ($\alpha = 0.842$ for the paranoia subscale) to excellent ($\alpha = 0.990$ for global indexes).

Temperament and Character Inventory—Revised (TCI-R)[44], The TCI-R is a 240-item self- report questionnaire that assesses seven personality dimensions, four associated with temperament (novelty seeking, harm avoidance, reward dependence and persistence) and three with character (self-directedness, cooperativeness and self-transcendence). The Spanish version was used here[45]. In the present study, the consistency was good (ranging from $\alpha = 0.749$ for reward dependence to $\alpha = 0.891$ for harm avoidance).

Impulsive behavior scale (UPPS-P)[46], The UPPS-P a 59 item self- report questionnaire developed to evaluate five facets of impulsive behavior: negative urgency, positive urgency, lack of premeditation, lack of perseverance and sensation seeking. The Spanish version was used here[47]. In the present study, the consistency indices ranged from good ($\alpha = 0.838$ for lack premeditation) to excellent ($\alpha = 0.942$ for total score).

Procedure

Participants in the two clinical groups voluntarily sought treatment at the Behavioral Addictions (KM only group) and Eating Disorder (KM + ED), units of the Clinical Psychology Service of the University Hospital of Bellvitge, and were recruited between 2016 and 2023. The KM-only group was diagnosed using criteria established in the DSM-5 [1] and confirmed by a face-to-face clinical interviewed. EDs were diagnosed through a face-to-face semi-structured clinical interview based on DSM-5 criteria[48], and co-occurring KM was self-reported by patients during that interviewed when exploring for other possible comorbidities. Interviews and diagnosis were conducted by a group of psychologists and psychiatrists with considerable clinical expertise. HCs were recruited from the same catchment area as the clinical population, their participation was voluntary, and they do not receive any type of retribution. The three groups answered the psychometric questionnaires in one session of one hour of duration, carried out by expert psychologists at the University Hospital of Bellvitge, in the case of the clinical groups, the assessment were carried out before the start of their treatment. For the clinical groups, do not met DSM-5 diagnostic criteria for the studied disorders (EDs or KM) was an exclusion criteria for the present study. As well, the presence of an organic mental disorder, intellectual disability, neurodegenerative disorder (such as Parkinson's disease) or active psychotic disorder, were motive of exclusion for the study. Each clinical group was treated in the corresponding unit and the treatment was directed to the main reason for consultation, in the case of KM for KM (Behavioral Addictions Unit), and in the case of ED + KM for ED (Eating Disorders Unit). However, since both units maintain a close relationship, those patients that after their treatment directed to the ED required or ask for KM treatment they were referred to the Behavioral Addictions Unit, however, the result of the second treatment were not considered for the present study.

Ethics

According to the Declaration of Helsinki, the present study was approved by the Clinical Research Ethics Committee of Bellvitge University Hospital. Signed informed consent was obtained from all participants before completing the psychometric assessment and initiating outpatient treatment.

Treatment

KM treatment protocol

The treatment consisted of 16 weekly sessions of individual CBT intervention. The CBT program included the following: psychoeducation about the disorder (onset and development of the disorder, vulnerability factors, and diagnostic criteria), stimulus control (avoidance of possible triggers), response prevention (alternative and compensatory behaviors), cognitive restructuring, emotional regulation skills training and other relapse prevention techniques. All sessions were structured and conducted within an outpatient program at the Behavioral Addictions Unit. The entire program was presented and developed by qualified clinicians, experts in the field of behavioral addictions and other psychiatric disorders, with more than 20 years of experience.

Changes in KM behaviors were evaluated by analyzing possible relapses, stabilization in other areas of the patient's life such as familial, professional, social and emotional, and the level of compliance within the treatment guidelines. An important factor in assessing treatment outcomes was the absence of KM episodes, dropouts and relapses. A dropout was defined by missing three consecutive sessions without informing the therapist. A relapse meant that patients had an episode of KM.

ED treatment protocol

Participants received 16 weekly outpatient sessions of CBT, in individual or group formats, which were conducted by experienced clinicians. The main treatment objectives were: cognitive restructuring, problem-solving, emotion management techniques, and normalization of eating behavior, as previously described[49]. As in the case of KM, the criterion for dropping out of treatment was not attending three consecutive sessions. Regarding treatment outcome, the following categorization was used: full remission, involving a total absence of ED symptoms for at least 4 consecutive weeks; partial-remission, consisting of substantial symptomatic improvement, but with residual symptoms (could be a cessation of behavioral symptoms, such as purging, or restriction, but persistent residual cognitive distortions, or intense fear of weight gain may still be present); lastly, non-remission, where the patient continued to meet full ED criteria.

Data analysis

Statistical analysis was done with Stata17 for Windows[50]. Chi-square procedures (χ^2) assessed between-group differences for categorical variables (exact test were used for expected frequencies lower than 5), and analysis of variance assessed differences for quantitative variables (to test whether the data are normally distributed, particularly for the KM-subsample, the Kolmogorov-Smirnov method with Lilliefors correction was employed). Effect sizes for proportional differences were estimated with Cramer's-*V* coefficient (moderate association was considered for *C-V* > 0.20 and large for *C-V* > 0.40) and effect sizes for mean differences were estimated with Cohen's-*d* coefficient (moderate effect size was considered for $|d|>0.50$ and large for $|d|>0.80$)[51]. Kaplan-Meier products were employed to obtain the cumulative survival function relating to dropout during the treatment. This procedure provides the probability of patients "surviving" without the presence of the outcome (e.g., dropout from the study) for a certain amount of time after the beginning of therapy[52]. Log Rank (Mantel-Cox) tests compared the survival curves for patients within the KM-only versus the KM + ED groups. The Finner method controlled for Type-I error due to the use of multiple statistical tests[53].

Results

Clinical profiles at baseline

Table 1 displays psychopathology scores (SCL-90R), impulsivity levels (UPPS-P), personality domains (TCI-R), and substances used (tobacco, alcohol and illegal drugs). As compared to HCs, both the KM-only and KM + ED groups reported more psychopathology, higher impulsivity levels, and more dysfunctional personality features. In addition, the clinical groups showed greater likelihood of use of tobacco and illegal drugs compared with HCs. Compared to the KM-only group, the KM + ED group also reported worse psychopathology (except for depression and anxiety subscales) and higher impulsivity (except for sensation seeking). Regarding specific compulsive and impulsive related variables, statistically significant differences were found between both clinical groups in total UPPS scores and in the positive and negative urgency subscales, with the KM + ED group demonstrating the highest scores; in contrast, harm avoidance scores were significantly higher in the KM-only group vs. KM + ED one. Greater likelihoods of use of tobacco, alcohol and other drugs were observed in the KM + ED group.

Figure 1 shows graph-lines with T-mean scores for the psychological scales, which visually display between-group differences for the main study variables.

Figure 2 visually displays the positions of the groups along a compulsivity-impulsivity spectrum, according to the variables selected in this study as the most strongly related with this range: obsessive-compulsive SCL-90 subscale and harm avoidance (in the compulsivity bound) and novelty seeking and positive and negative urgency (in the impulsivity bound). As shown, the KM group ranks high in both compulsive and impulsive criteria, while the KM + ED group demonstrates more impulsive motivations and low harm avoidance.

Treatment outcome

Table 2 reports proportions of dropout and poor outcome (this result was considered for the presence of relapses, non-remission or dropout at the end of the intervention). No differences between the clinical groups were found.

Figure 3 shows the cumulative survival functions for the rate of dropout. Differences between the groups emerged ($p = .023$). The KM-only group demonstrating greater speed in registering dropouts, with a probability of 50% of withdrawal during the first 5 weeks (compared to the probability of 50% of dropout during the 15 weeks in the KM + ED condition).

Discussion

The aims of the present study were to characterize KM with and without co-occurring EDs in treatment-seeking women, to consider KM along an impulsive-compulsive spectrum, and to explore treatment outcomes in a clinical sample of female patients with KM with and without co-occurring EDs. Aims and hypotheses were largely supported; implications are discussed below.

Regarding sociodemographic aspects, we found that the onset of the disorder in the only KM group could be at early ages, even if the proper diagnosis was stablish after several years of presenting the symptoms. This is congruent with the literature that stablish that, considering the stigma or the embarrassing of the KM, most

	KM ($n=13$)		KM + ED ($n=71$)		HC ($n=66$)		KM vs. KM + ED		KM vs. HC		KM + ED vs. HC	
	Mean	SD	Mean	SD	Mean	SD	*p*	|d|	*p*	|d|	*p*	|d|
SCL-90R somatization	1.56	0.82	2.30	0.90	0.68	0.67	**0.003***	**0.85†**	**0.001***	**1.19†**	**0.001***	**2.05†**
SCL-90R obsessive-comp.	1.79	1.06	2.38	0.80	0.80	0.63	**0.010***	**0.63†**	**0.001***	**1.14†**	**0.001***	**2.20†**
SCL-90R personal sensit.	1.34	0.87	2.50	0.91	0.60	0.58	**0.001***	**1.30†**	**0.002***	**1.00†**	**0.001***	**2.48†**
SCL-90R depression	2.27	1.13	2.68	0.85	0.72	0.72	0.101	**0.51†**	**0.001***	**1.64†**	**0.001***	**2.50†**
SCL-90R anxiety	1.73	0.96	2.17	0.87	0.56	0.54	0.052	**0.48†**	**0.001***	**1.50†**	**0.001***	**2.24†**
SCL-90R hostility	1.13	0.89	1.95	1.24	0.43	0.63	**0.007***	**0.75†**	**0.022***	**0.90†**	**0.001***	**1.54†**
SCL-90R phobic anxiety	1.02	0.84	1.54	1.06	0.18	0.37	**0.034***	**0.54†**	**0.001***	**1.30†**	**0.001***	**1.72†**
SCL-90R paranoia	1.36	0.83	1.87	0.84	0.52	0.62	**0.025**	**0.61†**	**0.001***	**1.15†**	**0.001***	**1.84†**
SCL-90R psychotic	1.22	1.02	1.78	0.90	0.31	0.44	**0.014***	**0.58†**	**0.001***	**1.16†**	**0.001***	**2.08†**
SCL-90R GSI	1.60	0.83	2.22	0.75	0.57	0.52	**0.003***	**0.77†**	**0.001***	**1.49†**	**0.001***	**2.54†**
SCL-90R PST	57.38	22.72	72.07	12.98	31.38	20.66	**0.007***	**0.79**	**0.001***	**1.20†**	**0.001***	**2.36†**
SCL-90R PSDI	2.44	0.59	2.69	0.58	1.50	0.47	0.126	0.42	**0.001***	**1.76†**	**0.001***	**2.25†**
UPPS-P lack premeditation	24.77	3.92	28.07	2.80	21.89	5.35	**0.010***	**0.97†**	**0.026***	**0.61†**	**0.001***	**1.45†**
UPPS-P lack perseverance	23.00	5.93	26.99	2.53	19.77	5.23	**0.002***	**0.87†**	**0.013***	**0.58†**	**0.001***	**1.76†**
UPPS-P sensation seeking	27.23	7.50	26.06	3.86	27.02	7.85	0.534	0.20	0.909	0.03	0.370	0.16
UPPS-P positive urgency	31.15	9.02	36.93	3.95	22.26	7.58	**0.003***	**0.83†**	**0.001***	**1.07†**	**0.001***	**2.43†**
UPPS-P negative urgency	33.92	4.50	38.28	2.95	24.65	6.26	**0.003***	**1.15†**	**0.001***	**1.70†**	**0.001***	**2.79†**
UPPS-P impulsivity total	140.08	21.87	157.90	9.10	115.59	21.58	**0.001***	**1.06†**	**0.001***	**1.13†**	**0.001***	**2.56†**
TCI-R novelty seeking	109.15	9.44	108.28	15.30	100.50	13.37	0.837	0.07	**0.044***	**0.75†**	**0.001***	**0.54†**
TCI-R harm avoidance	113.00	16.43	101.01	17.77	97.08	15.11	**0.018***	**0.70†**	**0.002***	**1.01†**	0.166	0.24
TCI-R reward depend.	89.77	12.21	96.35	11.18	104.41	13.40	0.078	**0.56†**	**0.001***	**1.14†**	**0.001***	**0.65†**
TCI-R persistence	94.15	14.70	104.25	22.55	112.65	16.16	0.086	**0.53†**	**0.002***	**1.20†**	**0.012***	0.43
TCI-R self-directedness	117.23	15.72	120.75	19.55	144.68	17.24	0.524	0.20	**0.001***	**1.66†**	**0.001***	**1.30†**
TCI-R cooperativeness	125.08	11.67	113.48	13.42	139.11	11.88	**0.003***	**0.92†**	**0.001***	**1.19†**	**0.001***	**2.02†**
TCI-R self-transcendence	68.85	6.26	67.07	14.35	64.36	17.16	0.699	0.16	0.333	0.35	0.300	**2.05†**
	n	%	*n*	%	*n*	%	*p*	C-V	*p*	C-V	*p*	C-V
Tobacco use-abuse	4	30.8	20	28.2	3	4.5	0.849	0.021	**0.002***	**0.342†**	**0.001***	**0.316†**
Alcohol use-abuse	0	0.0	22	31.0	2	3.0	**0.019***	**0.255†**	0.525	0.072	**0.001***	**0.367†**
Other illegal drugs	2	15.4	29	40.8	2	3.0	0.080	**0.191†**	0.063	**0.209†**	**0.001***	**0.452†**

Table 1. Clinical characteristics. *KM* kleptomania, *KM + ED* kleptomania and eating disorder, *HC* healthy control, *SD* standard deviation. *Bold: significant comparison. †Effect size within the ranges mild-moderate to high-large.

patients do not seek treatment unless an external motivation exists (as legal problems or pressure from the family), which may lead to a late diagnosis, even if the onset of the disorder was many years ago[3,10,13].

Worse psychopathological states and higher impulsive tendencies were present in the clinical groups, which could drive difficulties resisting impulses to steal[30,54]. High impulsivity was reflected in positive and negative urgency and lack of perseverance, especially in the KM + ED group, but also in personality features such as high novelty seeking, present in both clinical groups (KM-only and KM + ED). Moreover, low self-directedness, present in the KM-only group, could imply higher difficulties in setting clear goals, planning and organization, making decisions, and belief in one's own abilities; in sum, limited tendencies to manage one's own life. This personality feature is shared with other impulsive-compulsive-spectrum disorders[55]. The aforementioned characteristics could also modulate the psychological state of the participants of the clinical groups, who especially reported higher scores in anxious and depressive symptoms reflected in the SCL-90 questionnaire, which is concordant with the literature, being that KM has been frequently related to anxiety and mood disturbances[14]. In fact, affective symptoms could be a trigger for stealing, whereas poor control over stealing and related negative consequences may, in turn, interfere with emotional well-being. In this vein, the presence of emotional distress could exacerbate and maintain stealing behavior[6] as reflected in emotion-related impulsivity (high negative and positive urgencies).

Both clinical groups (KM-only and KM + ED) presented higher scores on the obsessive-compulsive subscale of the SCL-90. In contrast to the KM + ED group, the KM-only group presented high harm-avoidance scores. This latter measure has been typically recognized as an obsessive-compulsive feature, with biological correlates across the impulsive-compulsive spectrum, such as OCD[56] and also behavioral addictions or ICDs[57,58]. Contrasting the compulsive and impulsive variables of interest for this study (harm avoidance for compulsivity, novelty seeking and positive urgency for positive motivations underlying impulsivity), the KM-only group scored high across these measures while the KM + ED group demonstrated a more impulsive nature with respect to positive and

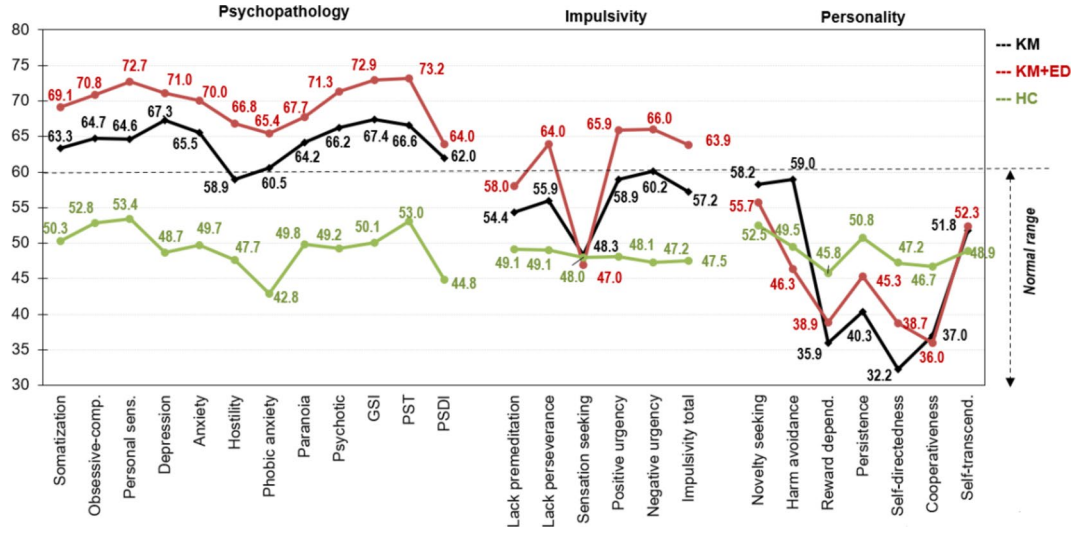

Fig. 1. Distribution of the mean T-scores. *KM* kleptomania, *KM + ED* kleptomania and eating disorder, *HC* healthy control. The conversion of the raw scores into standardized T-scores based on an external reference population-based sample.

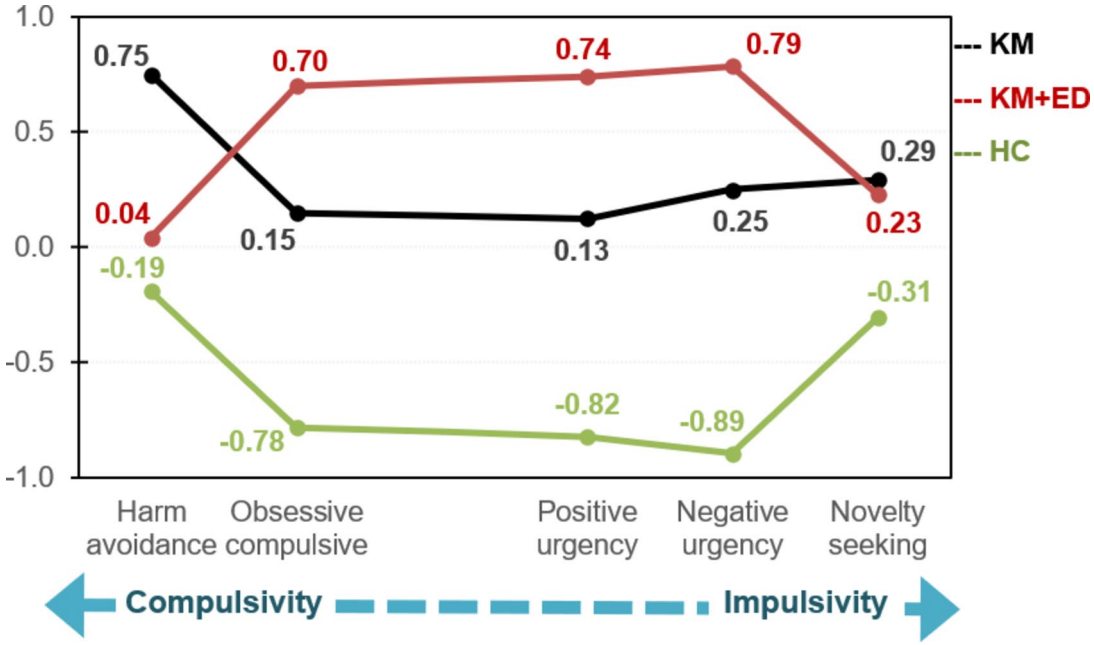

Fig. 2. Distribution of the groups within along a compulsivity-impulsivity spectrum (mean T-scores). *KM* kleptomania, *KM + ED* kleptomania and eating disorder, *HC* healthy control. The conversion of the raw scores into standardized T-scores based on an external reference population-based sample.

negative urgency, suggesting impulsive tendencies related to a broad range of emotional tendencies. Therefore, while both groups seems to present obsessive and impulsive tendencies, the KM-only presented high harm-avoidance features, while the KM + ED scored higher on other compulsive tendencies and emotion-related impulsive tendencies. This finding suggests a complex, multifaceted nature of compulsivity and impulsivity in KM, which may be exacerbating in the presence of a co-occurring ED.

In this regard, other aspects may be also considering. While impulsivity has been ascribed to speedy, reward-driven behaviors[59], stealing, without getting caught, in patients with KM often requires forethought and planning, perhaps not constituting a solely purely impulsive behavior[32]. This phenomenon resonates with findings observed in the present study, where statistically significant differences were found between clinical groups, particularly high emotion-related impulsivity in the KM + ED group and high harm avoidance in the KM group. Also, patients with KM often express a sense of relief when stealing, and compulsive behaviors in

	KM ($n=13$)		KM + ED ($n=46$)			
	n	Risk (%)	*n*	Risk (%)	*p*	C-V
Dropout	9	69.2	24	52.2	0.274	0.142
Poor outcome	11	84.6	31	67.4	0.226	0.158

Table 2. Treatment outcomes. *KM* kleptomania, *KM + ED* kleptomania and eating disorder, *HC* healthy control. Poor outcome: relapses during the treatment, non-remission at the end of the intervention or dropout.

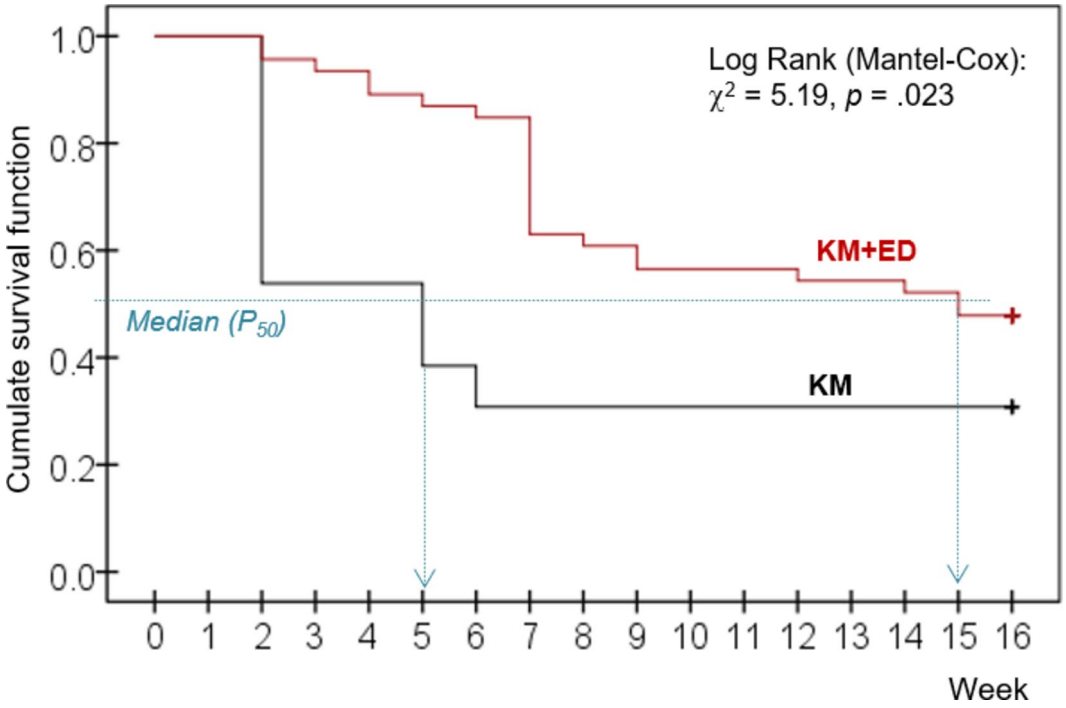

Fig. 3. Cumulative survival functions for the rates of dropout (Kaplan–Meier estimator). *KM* kleptomania, *KM + ED* kleptomania and eating disorder.

OCD have been associated with relief-driven actions[59–61], which may explain why novelty seeking was present in both clinical groups, but not has prominent feature as the emotion-related impulsive ones in the KM + ED and the harm avoidance in the KM-only group. In the KM + ED group, in which EDs were mostly represented by binge-spectrum concerns, the impulsive tendencies may reflect difficulties controlling behaviors despite negative consequences and harms when experiencing strong emotions. On the other hand, harm avoidance is characterized by avoiding potential risks and seeking security[62], as can be seen in the KM-only sample. As noted above, both positive and negative urgency were elevated in the KM groups, both in the clinical range[47], which may reflect using KM behavior as a way to cope with emotional states. Similarly, the KM + ED group demonstrated high frequencies of substance use, raising questions regarding how emotional states and impulsivity may relate to all present behaviors, food and substance ingestions, as well as KM. Taken together, the results may suggest the existence of different presentations of KM triggered by impulsivity or compulsivity traits, and even a jointly presence of them, when associated with other condition as EDs or substance use[14].

Therefore, a principal finding of this research may be supported by the hypothesis of interactions between impulsivity and compulsivity, considering in transdiagnostic models[20,22]. While KM is currently considered an ICD[1] and its compulsive nature has already been explored but potentially as a contrary feature to impulsiveness[14,15,63], the present results may help to demonstrate that impulsive and compulsive features may be found jointly in patients with KM, as in other conditions like gambling disorder[22]. Therefore, regarding our second aim, it may not be possible to frame KM on one sides of an impulsive-compulsive spectrum, but to consider KM a disorder of interest for an initial exploration of the multifaceted nature of the condition.

The aforementioned results have important implications regarding therapeutic approaches. Patients with KM often do not respond optimally to psychological treatments[13]. Patients often seek treatment due to external motivations, namely court requirements or family pressure[3,10]. Such considerations are consistent with our results, being that patients with KM showed frequent dropout and poor treatment outcomes. Therefore, the complexity of impulsive and obsessive features of KM may involve consideration in order to implement better

intervention options, exploring which tendencies (impulsive or compulsive) may predominate in individual cases[14].

To date, cognitive behavioral therapy (CBT) designed for ICDs is the most widely used psychological treatment for KM, targeting impulsive elements[15,64]. However, only a few studies investigating treatment response have been published, and most are case reports[64]. These approaches have incorporated the model used for ICDs and addictions, including aims for relapse prevention and abstinence by avoiding high-risk situations[65]. However, considering the present results, this impulsivity-directed intervention may not addressing the complexity of KM, and interventions for OCD[14], such as ritual or response prevention (EX/RP) treatments, warrant consideration. These treatments aim to help individuals to not react to compulsions to steal and resist urges of performing the behaviors while waiting until the anxiety subsides[66]. Also, training at a "distance" from their own thoughts and urges, in order to prevent engaging in the planning of stealing[67] could be beneficial. Finally, to combine the aforementioned strategies with inhibitory control and emotion regulation training may be helpful, particularly for KM patients with co-occurring EDs and substance use[68].

Regarding the KM + ED group, the presence of KM negatively impacted the treatment results in patients with ED, with over 50% presenting poor outcome and dropouts, percentages that are higher than those usually reported in patients with ED without KM[49,69]. Therefore, KM should be considered a disorder of interest, not only because of its complex nature, but because its presence could reflect a worst profile in co-occurring disorders, as suggested by the present study. Here, the comorbidity of KM + ED seemed characterized by more psychopathology, elevated impulsivity, and substance use, and these characteristics may relate to stealing and bingeing and purging behaviors[26]. Therefore, we propose that a transdiagnostic therapeutic approach targeting impulsivity and mood disturbances may be helpful in patients with ED and co-occurring KM[40], being that it has been reported that personalized treatment approaches in complex cases of EDs patients as shown positive results[70]. A promising complementary therapeutic strategy may be the use of serious games to improve emotional regulation skills; the combination use of CBT plus this type of innovative strategies has provided positive results in the treatment of ICDs with other co-occurring disorders[71].

Limitations, strengths of the study and future research lines

The present study includes several strengths, such as the inclusion of treatment outcomes in KM, the presence of a control group, and the use of a well-established and validated psychometric battery. Nonetheless, study limitations warrant mention. The presence of KM in patients with ED was self-reported; future studies should consider other structural assessments for diagnosis. Potential recall bias related to self-reported psychometric and clinical data should be highlighted. As well, the heterogeneity of the EDs sample may be also considering. The KM-only and KM + ED groups received different treatments, complicating direct comparisons. The study included only women seeking treatment in a hospital setting; future studies should include larger sample sizes and men, as possible sex differences have been suggested[72]. Likewise, further research is needed to deepen the analysis of individuals with co-occurring KM in other psychiatric disorders apart from EDs. Even if, as the literature stablish, KM has not been reported as a very prevalent disorder, which correspond to the low sample of KM only patients considered for this study, the results may be taken with caution, considering this low number of participants in the only KM group. Finally, is important to mention that the conclusions derived from the results of the study could be reinforced with the inclusion of a group with only EDs patients, in order to be able to distinguish which clinical traits obey directly to the ED or to the comorbidity, this comparison should be explored in further studies. Given that impulsive and compulsive constructs possess a complex multidimensionality, it could be of interest to explore other aspects, such as neurobiological and behavioral measures. Another interesting future research line could be to explore treatment results for those patients that receive treatment for both disorders, ED and KM, even if was in a different temporary line.

Conclusions

The findings of the present study suggest that KM can present both impulsive and compulsive features, considering obsessive-compulsive SCL-90 subscale and harm avoidance (in the compulsivity bound) and novelty seeking and positive and negative urgency (in the impulsivity bound). Therefore, is important to keep studying the disorder, not only as an ICD, but also from a multiple dimension into the impulsive-compulsive spectrum perspective.

Interestingly, the comorbid presence of other disorders, as EDs, could increase the severity of the clinical profile, for which the results lay the groundwork for further exploration of other ICDs and co-occurring disorders with KM.

Regarding treatment, in general, CBT is used, but other compulsive-related elements may be incorporated in cases that do not appear to respond to the traditional impulsive-directed treatments.

Data availability

Due to the participants of the study are clinical population, the research data is confidential.

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Author contributions

Conceptualization: LM, FFA, SJM; Methodology: RG; Formal analysis: RG; Investigation: LM, IBS, MFB, AGP, MR; Resources: FFA, SJM; Data curation: RG; Writing—original draft preparation: LM, IBS, MFB, AGP, RG, FFA, SJM; Writing—review and editing: LM, MR, FFA, MNP, AC, JTM, RMCG, AMTC, MEMA, MTTN, SJM; Supervision: LM, FFA, MNP, SJM; Funding acquisition: FFA, SJM. All authors have read and agreed to the published version of the manuscript.

Declarations

Competing interests

The authors have no conflicts of interest to report. Fernando Fernández-Aranda and Susana Jiménez-Murcia received consultancy honoraria from Novo Nordisk. Marc Potenza discloses that he has consulted for Opiant Therapeutics, Game Day Data, the Addiction Policy Forum, AXA and Idorsia Pharmaceuticals; has been involved in a patent application with Yale University and Novartis; has received research support from Mohegan Sun Casino, Children and Screens and the Connecticut Council on Problem Gambling; has participated in surveys, mailings or telephone consultations related to drug addiction, impulse-control disorders or other health topics; has consulted for and/or advised gambling and legal entities on issues related to impulse control, internet use and addictive disorders; has performed grant reviews for research-funding

agencies; has edited journals and journal sections; has given academic lectures in grand rounds, CME events and other clinical or scientific venues; and has generated books or book chapters for publishers of mental health texts. The other authors have no declarations to report.

Additional information

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