Journal of Psychosomatic Research 72 (2012) 65–72

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

Latent class analysis of eating and impulsive behavioral symptoms in Taiwanese women with bulimia nervosa☆

Mei-Chih Meg Tseng [a,b,*], Fu-Chang Hu [c,d]

[a] Department of Psychiatry, National Taiwan University Hospital and National Taiwan University College of Medicine, Taipei, Taiwan
[b] Institute of Occupational Medicine and Industrial Hygiene, College of Public Health, National Taiwan University, Taipei, Taiwan
[c] Graduate Institute of Clinical Medicine and School of Nursing, College of Medicine, National Taiwan University, Taipei, Taiwan
[d] International Harvard Statistical Consulting Company, Taipei, Taiwan

ARTICLE INFO

Article history:
Received 6 January 2011
Received in revised form 8 June 2011
Accepted 9 June 2011

Keywords:
Binge-eating
Bulimia nervosa
Eating disorders
Impulsive behavior
Latent class analysis
Purging

ABSTRACT

Objective: The implications of impulsivity in its relationship with binge-eating or purging behaviors remain unclear. This study examined the patterns of eating behaviors and co-morbid impulsive behaviors in individuals with bulimia nervosa n optimally homogeneous classes using latent class analysis (LCA).
Methods: All participants (n=180) were asked to complete a series of self-reported inventories of impulsive behaviors and other psychological measures. Information regarding the lifetime presence of symptoms of eating disorder was assessed by clinical interviews. LCA was conducted using eating disorder symptoms, impulsive behaviors, and the number of purging methods.
Results: Three latent classes of bulimic women were identified. These were women who exhibited relatively higher rates of purging, symptoms of impulsive behavior, and multiple purging methods (17.8%), women who used no more than one purging method with a low occurrence of impulsive behavior (41.7%), and women who showed higher rates of purging behaviors and the use of multiple purging methods with a low rate of impulsive behavior (41.7%). The impulsive sub-group had comparable severity of eating-related measures, frequency of binge-eating, and higher levels of general psychopathology than that of the other two sub-groups.
Conclusion: This study provides empirical support for the existence of an impulsive subgroup with distinctive features among a non-Western group of BN patients. This study also suggests that mechanisms other than impulse dysregulation may exist for the development of binge-eating and purging behaviors in bulimia nervosa patients, or the mechanisms contributing to binge-eating and impulsive behaviors may be different.

Introduction

In addition to their binge-eating and purging behaviors, women with bulimia nervosa (BN) often have various kinds and intensities of impulsive behavior [1]. The prevalence of impulsive behaviors or impulse control disorders is high in women with BN, with rates of 3 to 50% for substance use and/or dependence [2], 10 to 50% for alcohol use disorders [2,3], 15 to 30% for self-injurious behavior or suicide attempts [4], 20% for sexual promiscuity [5], 28 to 47% for shoplifting, and 18% for compulsive buying [6]. Patients with multi-impulsivity, as defined by Fichter et al. as the presence of at least three impulsive behaviors, have been postulated to be a distinct subgroup of BN patients [5,7]. Although correlation studies have demonstrated that measures of impulsivity are positively correlated with the severity of disordered eating [8–11], some studies have failed to show that patients with multi-impulsivity have more severe binge eating or other eating pathologies [5,12–15]. The relationships between impulsivity and binge-eating or purging behaviors remain unclear.

Bulimia nervosa has been classified as being of either the purging or non-purging type since the publication of the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) in 1994 [16]; however, the use of purging or non-purging as compensatory behaviors to distinguish between subtypes in terms of clinical relevance, severity, or co-morbidity was recently questioned [17]. The characteristics of individuals with different compensatory behaviors, such as exercise, vomiting, laxative use, and diet pill use, have been studied in eating disorder (ED) patients [18–22]. Notably, laxative abuse is most frequently associated with greater general psychopathology, self-injurious behavior, suicide attempts, history of depression and anxiety, borderline personality features, and greater eating symptomatology [22]. Patients with laxative abuse have a higher level of impulsivity than those with other disordered eating behaviors [14,23,24] with a few exceptions [5,25]. Some published studies have suggested that the number of different types of purging behaviors

☆ Presented in part in the poster section at the 2nd World Congress of Asian Psychiatry, Taipei, Taiwan, Nov 7–10, 2009.

* Corresponding author at: 7, Chun-Shan South Road, Zhongzheng District, Taipei, 10002, Taiwan. Tel.: +886 2 23123456x66788; fax: +886 2 23819873.
E-mail address: mctseng@ntu.edu.tw (M.-C.M. Tseng).

0022-3999/$ – see front matter © 2011 Elsevier Inc. All rights reserved.
doi:10.1016/j.jpsychores.2011.06.003

provides important information about the severity of ED, self-injurious behavior, or general psychopathology [26–28]. Moreover, one study indicated that the use of multiple purging methods instead of any specific purging method was associated with greater severity of disordered eating attitudes [29]. Both the type and the number of different purging methods should be considered in studying the relationships between ED symptoms and comorbid psychopathology.

Several studies have identified subgroups of individuals resembling those with BN that are characterized by binge-eating and purging symptoms in both clinical and community populations by using latent class analysis (LCA) [30–37] or latent profile analysis (LPA) [38–45]. Latent class analysis seeks to identify the smallest number of identifiable latent classes (i.e., categories of a latent factor) that account for the association between three or more observed dichotomous and polychotomous variables [46,47]. It is an empirical method for examining the inter-relationships among observed categorical variables and characterizing the underlying set of mutually exclusive latent classes that account for the associations among the observed categorical variables. Conditioning on the latent classes, probabilities of observed variables are assumed independent of each other. Similarly, LPA is used to determine latent classes from observed continuous variables. Of those studies conducted with participants with bulimic symptoms, four have identified coherent groupings of patients on the basis of bulimic and purging symptoms [33–35,42], one on the basis of six impulsive behaviors [48], and three on the basis of psychological and interview measures of co-morbid psychopathology [37,38,45]. Among them, only one study replicated the previous multi-impulsivity bulimic classification empirically [48]; nevertheless, the issue of how behavioral symptoms of eating and impulsivity co-exist within individuals was seldom addressed in these studies.

Bulimia nervosa has been found to have a prevalence in Taiwan as comparable to that in Western countries [49], but literature regarding empirical data about BN among non-Western populations is still scarce. Little is known about the clinical manifestations and co-occurring impulsive behaviors among patients with BN in non-Western countries. Only two studies have investigated the multi-impulsivity that was found among Japanese BN patients [13,25]. In this study, we sought to determine whether an impulsive subgroup of BN patients could be identified through the use of LCA, and to assess the patterns of eating behaviors co-aggregating with impulsive behaviors among a group of Taiwanese women with BN. In addition, latent classes were compared to determine whether empirically derived classes showed specific associations with psychological measures of eating pathology and comorbid psychopathology.

Methods

Participants and procedures

The study participants were 180 adult women who met the diagnostic criteria in DSM-IV-TR for BN. Participants were not excluded on the basis of any history of anorexia nervosa (AN). All were recruited consecutively from the outpatient clinics of the Department of Psychiatry of a university hospital, and 149 (82.8%) met the criteria for purging-type BN and 31 (17.2%) for nonpurging-type BN.

To ascertain the presence of disordered eating behaviors, ED symptoms were assessed using a semi-structured clinical interview conducted by a senior psychiatrist (MM Tseng). All participants were asked to complete self-administered questionnaires assessing eating-related psychopathology and general psychological functioning, as well as demographic details. Impulsive behaviors (suicide attempts, deliberate self-harm, stealing, sexual promiscuity, illicit drug or alcohol abuse, and excessive buying) were assessed by self-report. The hospital's Institutional Review Board approved the study and all participants provided written informed consent.

Measurements

Eating behavior assessments

The contents of the interview, adapted from those of the Eating Disorders Questionnaire [50], included weight history, menstruation history, and the presence of various disordered eating behaviors (dieting, exercise, binge-eating, self-induced vomiting, chewing and spitting, diet pill use, and laxative use). The presence of current (previous 4 weeks) and lifetime ED symptoms were determined with a "yes/no" question. If the participants responded "yes" to their lifetime presence, then further questions regarding the age of onset and the associated characteristics were asked.

Impulsive behavioral assessments

Lifetime presence of impulsive behaviors was assessed by self-reported questions with a binary response. Because compulsive and impulsive self-harm behaviors have been found to have no differential associations with suicide attempts and alcohol and illicit substance misuse in previous studies [51], self-harm acts in this study included cutting or burning, pulling out hair, picking the skin, and biting nails. The presence of stealing was ascertained by a history of at least one instance in the past. Stealing was defined as the taking without permission of any object, regardless of value, that did not belong to the taker [52]. Excessive buying was defined as "have ever been bothered by spending much more money than you can afford". Sexual promiscuity was defined as "have had five or more sexual partners in the past 2 years" [5]. Alcohol abuse was defined as a positive response to "have ever been drinking continuously for months". Illicit drug use was assessed by the question "Have you ever used illicit drugs repeatedly?"

Eating disorder inventory-1 (EDI-1)

The EDI-1 had 64 items scored on a 6-point Likert scale ranging from always to never. It was composed of eight subscales, with three subscales assessing attitudes and behaviors concerning eating, weight, and body shape. These include Drive for thinness, Bulimia, and Body dissatisfaction, as well as five subscales measuring psychological functioning: Perfectionism, Ineffectiveness, Interpersonal distrust, Interoceptive awareness, and Maturity fear [53]. Respondents must rate whether each item applies "always," "usually," "often," "sometimes," "rarely," or "never." Responses for each item are rated from 0 to 3, and scoring of the EDI-1 is as follows: 3 for the farthest in the "symptomatic" direction on each question, 2 for the immediately "adjacent" response, 1 for the next "adjacent" responses, and 0 for the three responses farthest in the "asymptomatic" direction [53]. Higher subscale scores indicate greater manifestations of the trait.

The Mandarin Chinese version of the EDI-1 was developed via a two-step procedure. The values of the α coefficients were >0.80 for Bulimia, Body dissatisfaction, Ineffectiveness, and Interoceptive awareness subscales and near or above 0.70 for the remaining subscales. With few exceptions, the original clinically-derived eight EDI subscales were clearly identified in exploratory factor analysis (EFA) and explained 50.8% of the variance in a clinical patient group (n=551) including 180 BN patients in this study. The model-fit indices of confirmatory factor analysis (CFA), including the comparative fit index (CFI=0.916), standardized root-mean-square residual value (SRMSR=0.914), and root-mean-square error of approximation (RMSEA=0.0713) indicated that the original 1st-order 8-factor structure was acceptable for Taiwanese ED patients [54].

Bulimic investigatory test Edinburgh (BITE)

This 36-item self-reported measure consists of two subscales: the Symptom Scale (30 items) and the Severity Scale (6 items) [55]. The former is rated with a binary response, while the latter is rated with the number corresponding to the frequency of binge-eating or purging behaviors. The Chinese version of the BITE had good internal consistency (Cronbach α=0.95 and 0.77, respectively) and test–re-