



Influence of eating behaviors on short-term weight loss by orlistat and anorectic agent[☆]



Kyoung Kon Kim¹, Heuy Sun Suh¹, In Cheol Hwang^{*}, Ki Dong Ko

Department of Family Medicine, Gachon University Gil Medical Center, Incheon, Republic of Korea

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ABSTRACT

Little data exists concerning whether eating behaviors determine the response to orlistat treatment, especially with added anorectic agents. This study was a sub-investigation of a 12-week randomized controlled trial for the additive effect of orlistat on sibutramine treatment. The analysis presented here was restricted to 98 women who had fulfilled the protocol. The Dutch eating behavior questionnaire and three-factor eating questionnaire were used to assess eating behaviors. Scores of emotional eating, external eating, disinhibition and hunger are significantly interrelated. Using multiple logistic analysis with adjustment for potential confounders, such as age, initial BMI and the other 2 eating behavior scores, traits of emotional eating (OR 0.30, 95% CI 0.13–0.74) and disinhibition (OR 0.61, 95% CI 0.40–0.82) have a significant influence on prediction for additional 5% weight loss in the treatment with orlistat and sibutramine. Subjects with less vulnerability to emotional cues had significantly more weight loss with orlistat treatment and anorectic agents.

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1. Introduction

Weight gain seems to be inescapable in western ‘obesogenic’ environment. As a result of the interaction with this environment, individuals develop their own eating behaviors that appear to represent an adaptive way to respond to a plentiful and energy-dense food supply (Kuijjer, de Ridder, Ouwehand, Houx, & van den Bos, 2008). Since eating behaviors may influence dietary intake again, it is important for obesity management strategies to examine the relationships between eating behaviors and response to weight loss intervention.

Although diet and exercise regimens are still considered the cornerstones of obesity management, these approaches are of limited success in a considerable number of patients. In patients for whom lifestyle changes are ineffective, drug therapy may be indicated. In addition, some investigators have suggested that greater weight loss might be achieved by combining anti-obesity drugs that have different mechanisms of action (Bray & Greenway, 1999).

Orlistat is a gastric and pancreatic lipase inhibitor that reduces dietary fat absorption by around 30% (Hauptman, Jeunet, & Hartmann, 1992) and it is the only currently available drug for the long-term treatment of obesity. Recent withdrawal of sibutramine, an anorectic agent, from the market due to excessive cardiovascular events (James et al., 2010) marks the importance of orlistat use, as obesity is a chronic disease that needs long-term or even lifelong treatment.

Antiobesity drugs can produce weight loss with considerable variance in treatment response. Better matching of treatments to participant's measured characteristics would optimize the intervention's efficacy for each individual or groups with similar profiles (Wadden, Brownell, & Foster, 2002). Also screening some candidates out of treatment has justified the assessment of characteristics, if their likelihood of success is estimated as very low (Ogden, 2000).

However, to the best of our knowledge, no evidence exists so far concerning eating behaviors determining the response to orlistat, especially with added anorectic agents. We therefore evaluated eating behavioral correlates associated with successful weight loss with orlistat and sibutramine through a 12-week structured intervention trial.

2. Method

2.1. Subjects and study design

This study was a sub-investigation of a 12-week prospective, double-blind, placebo-controlled trial for the additive effect of orlistat on sibutramine treatment. The study design and recruitment procedures have been previously described elsewhere (Suh, Hwang, Lee, & Kim, 2013). Inclusion criteria were age over 18 and under 50 years, being naïve to both antiobesity drugs, and a BMI of ≥ 27 kg/m². The analysis presented here was restricted to 98 women who had fulfilled the protocol. The study was approved by the medical center institutional review board.

Eligible participants were assigned to sibutramine alone group or sibutramine–orlistat combination group in a 1:1 randomized, parallel group design. To standardize for potential differences in the behavioral

[☆] This work was conducted at the Department of Family Medicine, Gachon University Gil Medical Center, 1198 Guwol-dong, Namdong-gu, Incheon 705-460, Korea.

^{*} Corresponding author. Tel.: +82 32 460 2735; fax: +82 32 460 3354.

E-mail address: spfe0211@gmail.com (I.C. Hwang).

¹ These authors contributed equally to this work.

aspects of weight reduction therapy, all participants were given a standard behavioral weight management text, the “LEARN” Manual (Brownell, 2004). The main outcome of this study was the percentage of weight loss (% weight loss), not the absolute value, because previous reviews have generally indicated that a higher initial weight is strongly related to higher absolute losses during treatment (“Summary: weighing the options—criteria for evaluating weight-management programs. Committee to Develop Criteria for Evaluating the Outcomes of Approaches to Prevent and Treat Obesity Food and Nutrition Board, Institute of Medicine, National Academy of Sciences,” 1995).

2.2. Assessment of eating behavior

A validated Korean version of the Dutch eating behavior questionnaire (DEBQ) was used to assess eating behaviors (Kim, Lee, & Kim, 1996). The DEBQ is a 33-item, self-assessment scale for assessing three eating behavior domains: the restrained subscale (10 items), the emotional eating subscale (13 items), and the external eating subscale (10 items). Respondents were required to rate each item on a 5-point Likert scale ranging from 1 (seldom) to 5 (very often). Item scores for each subscale were added to obtain an overall subscale score; the overall subscale score was then divided by the number of subscale items to calculate score per subscale. Higher scores indicate a greater tendency to exhibit the subscale behavior. For the present sample, the internal reliability coefficients (Cronbach's α) were 0.90 for restrained eating, 0.97 for emotional eating, and 0.75 for external eating.

The Three-Factor Eating Questionnaire (TFEQ) is another tool used to assess eating behaviors in this study. It is a principle psychometric instrument for the assessment of three constructs relevant to the study of human eating behavior (Stunkard & Messick, 1985). Restraint describes the tendency to consciously control food intake in order to prevent weight gain or to achieve weight loss. Disinhibition refers to the breakdown of this cognitive control. Hunger describes the susceptibility to feelings of food lack and its behavioral consequences. The Cronbach's α in this sample were 0.83, 0.79, and 0.79, respectively.

2.3. Statistical analysis

The correlation between body mass index and each domain score was determined using a Spearman correlation coefficient. Multiple logistic regression analyses were applied in order to evaluate the explanatory ability of baseline eating behavior in relation to the investigated outcome, %weight loss. The restraint and disinhibition concepts have their origins in laboratory experiments showing that individuals with continual weight concern (restrainer) tend to overeat when critical events or disinhibitors disrupt their self-control: this phenomenon has been termed ‘counter-regulation’ (Ouwens, van Strien, & van der Staak, 2003). This is why we adjusted for the other two domain scores. All analyses were carried out by the statistical program STATA SE 9 (STATA Corporation, Texas). The criterion for significance was set at a p value of less than 0.05 for all tests.

3. Results

In both questionnaires, only restraint score is significantly different between the two groups: subjects with higher BMI have lower restraint scores ($p = .03$ for DEBQ and $p < .01$ for TFEQ) (Supplemental Table 1). Table 1 shows the correlation coefficients among body mass index and domain scores of the two questionnaires. Scores of emotional eating, external eating, disinhibition and hunger are significantly interrelated. Correlation between disinhibition scores in TFEQ and emotional eating scores in DEBQ is the highest ($r = 0.65$).

Using multiple logistic analysis with adjustment for potential confounders, such as age, initial BMI and the other 2 eating behavior scores, we confirm that traits of emotional eating (OR 0.30, 95% CI 0.13–0.74) and disinhibition (OR 0.61, 95% CI 0.40–0.82) have a significant influence on prediction for additional 5% weight loss in treatment with orlistat and sibutramine (Table 2).

4. Discussion

This study demonstrated significant relationship between emotional eating and weight loss by orlistat and an appetite suppressant in obese females. In the present study, we found that subjects with less vulnerability to emotional cues had significantly more weight loss.

There have been very few studies concerning predictors for outcomes of orlistat treatment, especially in terms of psychological aspects. As generally expected, initial weight loss and control of fat intake predict more weight reduction with orlistat treatment (Rissanen, Lean, Rossner, Segal, & Sjostrom, 2003; Toplak et al., 2005; Ullrich, Erdmann, Margraf, & Schusdzjarra, 2003). Recently, Elfhag et al. investigated psychological correlates for success of orlistat treatment in subjects with a BMI of at least 30 kg/m² and no associations to eating behavior were revealed in their study (Elfhag, Finer, & Rossner, 2008). This might be explained by the flexibility or changeability of eating behaviors. For their study, they selected from the information after weight loss treatments, not from those before treatments. Normalization of eating behaviors is likely to be induced by addressing emotional triggers to eating or improving cognitive control over external situations (Foster et al., 1998): subjects with the worst initial values will improve and post-treatment scores may therefore not have a significant relationship to outcomes. However, the relationships between changes in eating behavior subscales and weight change are still unclear, as population-based prospective studies examining these changes are scarce (Drapeau et al., 2003; Song, Lee, Sung, & Yang, 2013).

Instead, they found specific personality traits, which would be unchangeable, were related to weight reduction by orlistat treatment: greater weight loss was associated with the personality facets ‘order’ and ‘deliberation’ which belong to the ‘conscientiousness’ factor in the Revised NEO Personality Inventory (NEO PI-R) (Elfhag et al., 2008). This finding seems to be due to the demanding nature of orlistat treatment, both in its thrice-daily regimen and the need for self-imposed dietary fat restriction. Heaven et al. once investigated the association

Table 1
Correlation^a between BMI and eating behaviors.

		DEBQ			TFEQ			
		BMI	Restrained	Emotional	External	Restraint	Disinhibition	Hunger
DEBQ	BMI	1						
	Restrained	−0.22*	1					
	Emotional	0.02	0.05	1				
TFEQ	External	−0.10	−0.05	0.34*	1			
	Restraint	−0.32*	0.65*	0.02	−0.03	1		
	Disinhibition	0.08	−0.01	0.66*	0.38*	−0.12	1	
	Hunger	−0.04	−0.16	0.39*	0.47*	−0.12	0.52*	1

Note: DEBQ = Dutch eating behavior questionnaire. TFEQ = three factor eating questionnaire.

^a Spearman's rank correlation coefficients.

* $p < .05$.

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