Appetite 65 (2013) 8–13

Contents lists available at SciVerse ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Research report

Misuse of prescription stimulants for weight loss, psychosocial variables, and eating disordered behaviors

Amy Jeffers [a,*], Eric G. Benotsch [a], Stephen Koester [b]

[a] Virginia Commonwealth University, Department of Psychology, P.O. Box 842018, Richmond, VA 23284, United States
[b] University of Colorado Denver, Departments of Anthropology and Health and Behavioral Sciences, CB 103, P.O. Box 173364, Denver, CO 80217, United States

ARTICLE INFO

Article history:
Received 6 July 2012
Received in revised form 21 January 2013
Accepted 22 January 2013
Available online 29 January 2013

Keywords:
Weight loss
Dieting
Prescription stimulants
Adderall
Ritalin
Eating disorder
Prescription misuse
Appearance motivations
Stress-eating
Appetite suppression

ABSTRACT

In recent years there has been a dramatic increase in the non-medical use of prescription drugs among young adults including an increase in the use of prescription stimulants normally used to treat ADHD. Reported motivations for the non-medical use of prescription stimulants (NPS) include enhancing academic performance and to get high. Although a common side effect of these medications is appetite suppression, research examining weight loss as a motivation for NPS among young adults is sparse. In the present study, undergraduate students ($n = 705$) completed an online survey assessing weight loss behaviors, motivations for weight loss, and eating behaviors. Nearly 12% of respondents reported using prescription stimulants to lose weight. Participants who reported using prescription stimulants for weight loss had greater appearance-related motivations for weight loss, greater emotion and stress-related eating, a more compromised appraisal of their ability to cope, lower self-esteem, and were more likely to report engaging in other unhealthy weight loss and eating disordered behaviors. Results suggest some young adults are misusing prescription stimulants for weight loss and that this behavior is associated with other problematic weight loss strategies. Interventions designed to reduce problematic eating behaviors in young adults may wish to assess the misuse of prescription stimulants.

Introduction

In recent years, there has been a dramatic increase in the intentional misuse of prescription drugs among young adults in the United States (National Institute on Drug Abuse [NIDA], 2010; Rozenbroek & Rothstein, 2011). One notable concern is the rise in the non-medical use (i.e., without a doctor's prescription) of prescription stimulants (NPS) (Arria & DuPont, 2010; McCabe & Teter, 2007; Rabiner et al., 2009). Lifetime prevalence rates of NPS are estimated between 6.9% and 18.6% (Arria et al., 2011) in college students. Common motivations for the misuse of prescription stimulants include to help with concentration, to increase alertness, to get high, and for the sake of experimenting (Teter, McCabe, LaGrange, Cranford, & Boyd, 2006).

Prescription stimulant medications used to treat Attention Deficit Hyperactivity Disorder (ADHD), for example, Adderall and Ritalin, have shown promise for improving the main symptoms of ADHD and increasing academic performance among those with ADHD (Zachor, Roberts, Hodgens, Isaacs, & Merrick, 2006). However, a common side effect of these medications is appetite suppression (Zachor et al., 2006) and subsequent weight loss (Kent, Blader, Koplewicz, Abikoff, & Foley, 1995). Because of this widely known side effect of ADHD medications, some individuals may be motivated to misuse such drugs for the purpose of losing weight. Misusing prescription ADHD medication for the purpose of weight loss has been discussed in the popular press, but has been examined only minimally in the research literature. In one study, the non-medical use of specific prescription stimulants was examined along with the motives for such use (Teter et al., 2006). About 9.7% of the lifetime users reported using stimulants not prescribed to them for the purpose of weight loss. However, this motivation was the sixth highest reason given after motives such as improving concentration, as a study aid, and increasing alertness. The use of prescription stimulants for weight loss was minimally examined in this study. Rabiner et al. (2009) examined the misuse of ADHD medication among individuals who reported having a current prescription for these medications. Motivations for misusing prescription stimulants were discussed, including for the purpose of losing weight. However, this was not a focal point of the research as this behavior was minimally endorsed within the sample. The issue of misusing prescription stimulants for weight loss is a timely phenomenon to examine due to the increasing prevalence of NPS and high prevalence rate of individuals trying to lose weight (McGuire, Wing, & Hill, 1999; Serdula et al., 1999).

* Corresponding author.
E-mail address: jeffersaj@vcu.edu (A. Jeffers).

0195-6663/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.appet.2013.01.008

People can attempt to lose weight by utilizing healthy strategies (e.g., increasing fruit or vegetable consumption, reducing consumption of sweets) or unhealthy strategies (e.g., skipping meals, vomiting/using laxatives) (French & Jeffery, 1994). The specific strategy a person employs for weight loss may depend on the type of motivation he or she has, such as wanting to lose weight for appearance reasons (i.e., to feel more attractive) or health reasons (i.e., to have more energy and feel better). Wanting to lose weight for appearance reasons has been associated with the use of more unhealthy weight loss strategies (Putterman & Linden, 2004).

There are other important psychosocial variables to examine when studying weight loss. For example, overweight individuals tend to use eating as a coping mechanism in response to a stressor (Ozier et al., 2007). It is important to examine stress-eating in individuals who are trying to lose weight as this can be associated with negative outcomes. Self-esteem is another relevant construct to consider when examining health behaviors. Low self-esteem has been associated with a variety of problematic health behaviors including alcohol use, sexual risk taking, and eating disordered behaviors (Gullette & Lyons, 2006; Kensinger, Murtaugh, Reichmann, & Tangney, 1998). Additionally, examining eating disordered behaviors is important when studying weight loss. In one study, adolescents engaging in unhealthy weight loss practices, such as vomiting and fasting, were more likely to abuse substances and to perceive themselves as being overweight and depressed (Haley, Hedberg, & Leman, 2010).

Because the misuse of prescription stimulants and weight loss attempts are both prevalent, it is important to examine if they are associated. The aim of the present study was to assess the prevalence of prescription stimulant use for weight loss in a sample of college students and to examine if this behavior is related to other health-jeopardizing behaviors. We hypothesized that individuals who reported the misuse of prescription stimulants for weight loss would also utilize other unhealthy weight loss approaches and have more problematic ways of thinking, such as more appearance-oriented motivations for weight loss.

Method

A brief online survey was administered to undergraduate students ($N = 705$) enrolled in psychology classes at a large eastern university. All surveys were completed anonymously online via a password-protected, secure survey system. Participants received course credit for participation. The system was set up to award credit automatically while masking participant identities from the researchers. Participants were told the surveys would assess weight loss behaviors, motivations for weight loss, and other health behaviors. Consent procedures were conducted anonymously online by having participants mark a checkbox indicating they either did or did not wish to participate in this study. Participants were known only by an identification number. All study procedures and measures were approved by the Institutional Review Board of Virginia Commonwealth University. Data were collected in April–October 2011.

Measures

The survey assessed demographic information, weight loss behaviors, motivations for weight loss, stress-related eating, self-esteem, and eating disorder symptoms.

Demographics

Participants were asked their gender, race/ethnicity, age, if they had ever dieted in their lifetime, if they had dieted within the last year, and if they were currently dieting. They were also asked to report their height and weight. These data were used to calculate participants' Body Mass Index (BMI).

Weight loss behaviors

Participants reported the frequency that they had ever utilized various healthy and unhealthy weight loss behaviors on a scale from "Never (1)" to "Always (5)." This measure was adapted from a list of weight loss behaviors compiled by French and Jeffery (1994). We added additional items, including one item that asked participants if they had ever utilized a prescription stimulant normally used to treat ADHD in an effort to lose weight. Both Ritalin and Adderall were given as examples for such medications. Other unhealthy behaviors that were assessed included vomiting/use of laxatives and skipping meals. Examples of healthy behaviors included increasing physical activity/exercise, reducing sweet intake, and stopping or decreasing the frequency of eating fast-food. During data analysis, answers were either totaled for a single dimensional score, or dichotomized based on whether the participants indicated they had never engaged in the behavior or had engaged in the behavior at least once. In addition, participants were compared on various measures, such as stress-eating and self-esteem, based on whether they had never engaged in using a prescription stimulant for weight loss or had engaged in the behavior at least once. This measure showed adequate internal consistency for both healthy ($\alpha = 0.87$) and unhealthy ($\alpha = 0.74$) behaviors.

Motivations for weight loss: health versus appearance

Participants were asked questions concerning their motivations for weight loss. This measure assessed three types of weight loss motivations: health, appearance in relation to others, and appearance in relation to oneself (Meyer, Weissen-Schelling, Munsch, & Margraf, 2010). For example, individuals who want to lose weight for health reasons may want to decrease their health risks and live longer. Individuals who are motivated to lose weight due to their appearance in relation to others may desire to improve their appearance so that they are more accepted by society and to be better liked. Lastly, individuals who may be motivated to lose weight due to their appearance in relation to oneself may want to feel more self-confident and/or to like to look at themselves in the mirror again. Motivations were assessed on a scale from "Absolutely Not (1)" to "Strongly (4)." The internal consistencies for the three subscales were acceptable, with alphas ranging from 0.90 to 0.92.

Eating and appraisal due to emotions and stress

Participants were asked questions concerning stress-eating and appraisal of stressors. This scale assessed three factors: emotion and stress-related eating; appraisal of ability and resources to cope with emotions and stress; and appraisal of outside stressors/influences on a scale from "Strongly Disagree (1)" to "Strongly Agree (5)" (Ozier et al., 2007). The emotion and stress-related eating factor identifies eating as a coping mechanism that occurs in response to a particular emotion or stressor. Two example items are: "I use food to cope with my emotions" and "I overeat when I am stressed." The second factor, appraisal of ability and resources to cope with emotions and stress, examines the perception of a person's ability to change a situation, control emotional reactions, and cope effectively. Two example items are: "I am capable of dealing with stressful situations" and "I have control over my emotions." Lastly, the third factor, appraisal of outside stressors/influences, examines individuals' perceptions of other people, which can influence how they perceive various stressors and

how they deal with them. Two example items are: "I worry about what people think of me" and "Other people influence how I handle problems." This list was shortened from 49 items to 26. Internal consistencies for this measure were acceptable, with alphas ranging from 0.63 (appraisal of outside stressors/influences) to 0.90 (emotion and stress-related eating).

Self-esteem

Participants were asked questions concerning their self-esteem. This self-esteem scale (Rosenberg, 1965) has been a widely used measure that assesses self-worth, respect, and satisfaction with oneself among other feelings. Participants were asked to rate various statements on a scale from "Strongly Disagree (0)" to "Strongly Agree (3)". This scale showed acceptable internal consistency within the present sample ($\alpha = 0.89$).

Eating disorder screen

Participants reported on eating disorder behaviors. This eating disorder screen was adapted from Stice, Fisher, and Martinez (2004) and assessed symptoms of anorexia and bulimia nervosa. Example items included: "Have you had a definite fear that you might gain weight or become fat?"; "Has your shape influenced how you think about (judge) yourself as a person?"; and "How many times per week on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating?".

Data quality assurances and statistical analyses

All data were examined for inconsistencies and invalid responses. Missing data were omitted from analyses, resulting in slightly different *n*s for various statistical tests. Mean-item substitution was used for some missing data (0.66%). Two-tailed significance levels were used for all tests.

Results

Among the participants, the mean age was 19.92 years (SD = 3.03). The sample consisted largely of female participants (61.3%). The majority of the sample was White (51.6%), followed by African American (19.0%), Asian American (15.7%), other/mixed racial or ethnic background (7.6%), Hispanic/Latino (5.6%), and Native American (0.6%). The majority of the sample reported that they had dieted at some point in their lifetime (65.8%), about half of the sample reported that they had dieted within the last year (50.5%), and 26.2% reported that they were currently dieting.

Prescription stimulants for weight loss and demographics

In this sample of young adults, 11.7% reported ever having used a prescription stimulant for weight loss. Use was comparable across genders, with 13.1% of females reporting use and 9.7% of males reporting such use, $\chi^2(1) = 1.92$, $p = .166$. Age did not differ significantly between participants who used prescription stimulants for weight loss ($M = 20.30$, SD = 3.27) and those who had not ($M = 19.88$, SD = 2.99), $t(694) = -1.17$, $p = .242$. There were also no significant differences in BMI between participants who utilized prescription stimulants for the purpose of losing weight ($M = 24.20$, SD = 3.85) and non-users ($M = 24.07$, SD = 4.75), $t(637) = -.22$, $p = .828$. White participants (14.6%) were significantly more likely to report the use of prescription stimulants for weight loss than non-white participants (8.9%), $\chi^2(1) = 5.34$, $p < .05$.

Use of prescription medications for weight loss and dieting

Individuals who reported using prescription stimulants for weight loss were more likely to report dieting in their lifetime (85.4%) than individuals who did not report this behavior (63.2%), $\chi^2(1, N = 699) = 17.89$, $p < .001$. Participants who reported using prescription stimulants for weight loss were also more likely to report dieting in the past year (75.3%) than participants who did not report using prescription stimulants for weight loss (47.1%), $\chi^2(1, N = 688) = 23.71$, $p < .001$. Finally, individuals who reported using prescription stimulants for weight loss were more likely to report that they were currently dieting (51.2%) than individuals who did not report using prescription stimulants for weight loss (23.0%), $\chi^2(1, N = 696) = 26.61$, $p < .001$.

Use of prescription stimulants for weight loss and motivations

As seen in Table 1, individuals who used prescription stimulants for weight loss also showed differences in weight loss motivations. They reported a greater desire to lose weight due to reasons concerning their appearance in relation to others than participants who did not use prescription stimulants for the purpose of losing weight. They were also more likely to report motivations concerning appearance in relation to oneself than non-users. The groups did not significantly differ in regards to health motivations (i.e., to feel healthier and have more energy).

Use of prescription stimulants for weight loss and stress

As shown in Table 1, individuals reporting the use of prescription stimulants for weight loss also scored lower on the three subscales of the eating and appraisal due to emotions and stress (EADES) questionnaire. With this measurement, lower scores suggest greater difficulty in coping with stressors.

Use of prescription stimulants for weight loss and self-esteem

Individuals who used prescription stimulants for weight loss also reported lower self-esteem than those who did not endorse the behavior (see Table 1 for means).

Use of prescription stimulants for weight loss and other unhealthy weight loss behaviors

Some individuals using prescription stimulants for weight loss also reported engaging in other unhealthy weight loss behaviors. Prescription drug users were significantly more likely to engage in all of the assessed unhealthy weight loss behaviors than were non-users, including using other diet pills and smoking cigarettes. Furthermore, individuals who reported using prescription stimulants for weight loss were significantly more likely to report eating disordered behaviors, including vomiting, using laxatives, and skipping meals (see Table 2).

A hierarchical logistic regression was conducted in order to assess the independent relationship between the use of prescription stimulants for weight loss and the use of other unhealthy weight loss behaviors, after controlling for demographic factors and self-esteem. Because the unhealthy weight loss behavior variable, excluding prescription stimulant use, was not normally distributed and could not be transformed to normality, we dichotomized the variable by performing a median split. The logistic regression analysis predicted membership in one of two groups: those who scored at or above the median in engaging in unhealthy weight loss behaviors other than using prescription stimulants ($n = 336$) and those who scored below the median ($n = 291$). Demographic variables were entered on the first step, and significantly predicted

Table 1
Prescription stimulants for weight loss and psychosocial variables.

	Individuals reporting prescription stimulants for weight loss (n = 82) Mean (SD)	Individuals NOT reporting prescription stimulants for weight loss (n = 617) Mean (SD)	t
Psychosocial variable: motivations			
Appearance in relation to others	23.45 (SD = 7.80)	17.09 (SD = 7.30)	−7.35**
Appearance in relation to oneself	17.72 (SD = 4.55)	14.39 (SD = 5.88)	−5.99**
Health	20.08 (SD = 4.48)	18.96 (SD = 6.17)	−1.59
Psychosocial variable: coping and stress-eating			
EADES: emotion and stress-related eating	37.95 (SD = 9.52)	42.22 (SD = 10.27)	3.55***
EADES: appraisal of ability and resources to cope with emotions and stress	29.39 (SD = 5.33)	33.28 (SD = 5.95)	5.63***
EADES: appraisal of outside stressors/influences	12.80 (SD = 3.16)	14.31 (SD = 3.34)	3.85***
Psychosocial variable: self-esteem			
Self-esteem	7.71 (SD = 3.32)	9.65 (SD = 3.37)	4.91**

N = 699.
Note. The t-value represents the difference between the mean scores of two groups, while taking variation into account.
With the EADES measurement, lower scores suggest greater difficulty in coping with stressors.
** $p < .01$.
*** $p < .001$.

Table 2
Prescription stimulants for weight loss and other unhealthy weight loss behaviors.

	Individuals reporting prescription stimulants for weight loss (n = 82) % Reporting	Individuals NOT reporting prescription stimulants for weight loss (n = 619) % Reporting	χ^2
Unhealthy weight loss behavior			
Utilizing a fad diet	63.4	23.8	55.71***
Using diet pills	57.3	14.5	84.27***
Smoking cigarettes	50.0	9.7	95.39***
Eating disordered behavior			
Vomiting	22.1	3.2	43.35***
Using laxatives or diuretics	23.5	3.2	48.87***
Fasting (skip at least two meals in a row)	66.7	22.8	56.82***
Compensatory exercise	57.4	35.9	11.78**

N = 699.
Note. χ^2 = Goodness-of-fit test used to compare observed data with expected data based on a specific hypothesis.
** $p < .01$.
*** $p < .001$.

unhealthy weight loss behaviors, compared to a constant only model, $\chi^2(4, N = 627) = 88.48$, $p < .001$. Female, older, white, and higher BMI participants were more likely to report unhealthy weight loss behaviors. Self-esteem was entered on the second step, and significantly added to the model, $\chi^2(1, N = 627) = 43.38$, $p < .001$. Higher self-esteem was a protective factor for engaging in unhealthy weight loss behaviors. The use of prescription stimulants for weight loss variable was entered on the final step, and significantly contributed to the predictive utility of the model, $\chi^2(1, N = 627) = 31.46$, $p < .001$, indicating that the use of prescription stimulants for weight loss was associated with engaging in other unhealthy weight loss behaviors, after controlling for demographic factors and self-esteem (see Table 3).

Table 3
Hierarchical logistic regression analysis predicting unhealthy weight loss behaviors other than prescription stimulant use.

Variable and step	OR	CI	B	S.E.	p
1. Gender	0.39	(0.27, 0.56)	−.944	.182	<.001
Age	1.08	(1.01, 1.16)	.079	.036	<.05
Ethnicity	0.68	(0.48, 0.95)	−.391	.174	<.05
BMI	1.17	(1.12, 1.23)	.160	.024	<.001
2. Self-esteem	0.90	(0.86, 0.93)	−.111	.018	<.001
3. Prescription Stimulant Use	8.41	(3.42, 20.65)	2.13	.459	<.001

N = 627.
Note. OR = Odds-ratio: probability of engaging in unhealthy weight loss behaviors divided by the probability of not engaging in such behaviors (e.g., Prescription stimulant users were eight times more likely to engage in other unhealthy weight loss behaviors).
Note. CI = Confidence-interval: measures the probability that a population parameter will lie between these two values (e.g., We are 95% confident that the odds of prescription stimulant users to also engage in other unhealthy weight loss behaviors will lie between 3.42 and 20.65 times in the reference group).

Validity check

A limitation of this study is that we did not specifically assess if a participant had been prescribed an ADHD medication for the purpose of weight loss. Although not a primary medication strategy for treating obesity, in some cases ADHD medications are prescribed off-label for weight loss if a physician feels it is medically appropriate (Weight-control Information Network [WIN], 2010). When treating a young adult patient who is overweight or obese, however, most clinicians would first recommend lifestyle changes including changes in diet and physical activity (Kushner, 2003; WIN, 2010). If these changes were not effective and the patient was at an increased medical risk due to their weight, the physician might then prescribe a weight loss medication in addition to a program combined with healthy eating and physical activity (Kushner, 2003; WIN, 2010). According to guidelines from the American

College of Physicians, pharmacological therapy should only be recommended to patients who have been unsuccessful in achieving their weight loss goals through such lifestyle changes (Snow, Barry, Fitterman, Qaseem, & Weiss, 2005). Furthermore, if a physician chose to treat such a patient with medication, the most likely Food and Drug Administration-approved weight loss medications during the time of this study would include Phentermine, Diethylpropion, Phendimetrazine, and Orlistat, which are all non-ADHD drugs (Snow et al., 2005; WIN, 2010). However, in some cases, a physician might choose to use a prescription ADHD drug off label (Cohen, 2007), but most use older generic stimulants (Beck, 2012). Medications can be prescribed for weight loss if an individual has a BMI of 30 or greater (i.e., obese) or has a BMI of 27 or greater with comorbid conditions, such as diabetes or high blood pressure (Bray & Wilson, 2008; WIN, 2010). Twelve of the 82 participants (14.6%) in the study who reported using prescription stimulants for weight loss had a BMI of 27 or higher. Analyses were re-run after excluding these individuals. Removing these individuals did not affect the interpretation of our results – all significant findings reported in Tables 1–3 remained significant in the same direction once these individuals were removed from the analyses.

Discussion

The current study adds to the scant body of literature on using prescription stimulants for the purpose of weight loss. We specifically examined the use of prescription stimulants, defined as a medication normally used to treat ADHD (e.g., Adderall, Ritalin) for the purpose of losing weight. In the present sample, 11.7% reported ever having misused a prescription stimulant for weight loss. Individuals who engaged in taking prescription stimulants for weight loss were more likely to report dieting, had greater appearance-related motivations for weight loss, greater emotion and stress-related eating, a more compromised appraisal of their ability and resources to cope, a more compromised appraisal of outside stressors and influences, lower self-esteem, and were more likely to report engaging in all of the assessed unhealthy weight loss and eating disordered behaviors. Even after controlling for demographic factors and self-esteem, using prescription stimulants for weight loss was significantly associated with engaging in other unhealthy weight loss behaviors.

Results suggest that the misuse of prescription stimulants for weight loss is relatively common and is associated with problematic weight-related motivations and behaviors. Prescription stimulant use may be especially harmful for those who do not actually have a prescription. When not under proper medical supervision, an individual may experience common side-effects of stimulant abuse, such as anxiety, paranoia, and cardiac irregularities (Higher Education Center, 2012). Mixing prescription stimulants with other drugs and alcohol can also exacerbate these side-effects (Higher Education Center, 2012). Due to a decrease in appetite, individuals misusing these stimulants may also become malnourished. Interventions designed to reduce eating disorders in young adults should consider assessing the use of prescription stimulants for weight loss and emphasize the harmful effects related to the misuse of prescription stimulants. Physicians may also wish to express these concerns when prescribing such medications, and the possible negative health consequences of sharing prescriptions with others. Additionally, clinicians may want to include this behavior when assessing unhealthy weight loss and disordered eating behaviors. Assessing for the misuse of prescription stimulants for weight loss may be especially important for clinicians working in a college or university setting because unhealthy weight loss practices, disordered eating, and misusing prescription stimulants are typically more prevalent in this setting compared to a non-college setting (Harring, Montgomery, & Hardin, 2011; Kelly-Weeder, 2011).

Limitations of this study should be considered when interpreting the findings. First, the sample may limit the generalizability of the results as this survey was conducted at only one college campus and was a non-random sample of students enrolled in psychology courses who were given course credit to participate. We also did not assess whether participants were prescribed a stimulant medication for weight loss as prescription ADHD medications are sometimes given to overweight and obese individuals who struggle with weight. However, this did not appear to affect our results as we reran the analyses excluding those participants who may have potentially had a valid prescription to use an ADHD medication for weight loss. All significant findings reported in Tables 1–3 remained significant after these individuals were excluded. Further, there were no overall differences in BMI between those individuals who did and did not use a prescription stimulant for weight loss. In addition, we did not examine whether the prescription stimulants were prescribed to the individual or if the individual received the medication from somebody else. We also did not inquire about specific stimulant medications used but had only a broad question with two ADHD medication examples. Previous research has demonstrated that Adderall is the most common illicitly-used stimulant drug among college students (Teter et al., 2006). It would be important to know which particular stimulants people were using, and if our study may have resulted in lower estimates of prevalence due to the absence of both brand and generic names for a variety of medications (Teter et al., 2006).

Future studies should assess a more generalizable sample, such as a wider variety of college students from several universities, and how the use of prescription stimulants for weight loss compares to the use among non-college peers. Studies should also examine whether individuals have prescriptions for stimulant weight loss medications, which individuals are misusing their own stimulant medication (not prescribed for weight loss) or others' medication, which specific stimulants are being used for weight loss, and the perceived effectiveness of the medications. It would also be important to examine the use of non-prescription stimulants (e.g., cocaine) and the non-medical use of other prescription drugs (e.g., benzodiazepines) for the purpose of losing weight. Furthermore, studies should examine other substance use (e.g., alcohol) that may be associated with taking prescription stimulants for weight loss. Previous research has demonstrated that individuals who misuse prescription stimulants are more likely to report polydrug use and drug use related problems, including experiencing blackouts and engaging in illegal activities to obtain drugs compared to other drug users (Benotsch, Koester, Luckman, Martin, & Cejka, 2011; McCabe & Teter, 2007; McCabe, Teter, & Boyd, 2006). Associations with various psychopathologies, such as depression, anxiety, ADHD, and actual eating disorder diagnoses would also be important to examine. Body image measures should be incorporated to better understand these individuals who use prescription stimulants for weight loss, including the assessment of internalization of media influences and athleticism.

Despite the limitations, the present study is one of the first to examine the non-medical use of prescription stimulant medication used to treat ADHD for the purpose of weight loss. Findings suggest that this is a fairly common behavior associated with maladaptive cognitions, other unhealthy weight loss behaviors, and disordered eating. Results demonstrate the need for including the misuse of prescription stimulants when assessing for unhealthy weight loss behaviors, especially among college students. Prospective research is needed to examine which stimulants are being used, both prescription and non-prescription; the prevalence of using other prescription drugs for weight loss; their perceived effectiveness; and

how this use is related to eating disorder diagnoses and body image concerns.

References

Arria, A. M., & DuPont, R. L. (2010). Nonmedical prescription stimulant use among college students. Why we need to do something and what we need to do. *Journal of Addictive Diseases, 29*, 417–426. http://dx.doi.org/10.1080/10550887.2010.509273.

Arria, A. M., Garnier-Dykstra, L. M., Caldeira, K. M., Vincent, K. B., O'Grady, K. E., & Wish, E. D. (2011). Persistent nonmedical use of prescription stimulants among college students. Possible association with ADHD symptoms. *Journal of Attention Disorders, 15*(5), 347–356. http://dx.doi.org/10.1177/1087054710367621.

Beck, M. (2012, July 30). *New diet pills offer option to off-label obesity drugs*. http://online.wsj.com/article/SB10000872396390443931404577553413824697168.html.

Benotsch, E. G., Koester, S., Luckman, D., Martin, A., & Cejka, A. (2011). Non-medical use of prescription drugs and sexual risk behavior in young adults. *Addictive Behaviors, 36*, 152–155.

Bray, G.A., & Wilson, J.F. (2008). In the clinic. Obesity. *Annals of Internal Medicine, 149*(7), ITC4-1-15.

Cohen, E. (2007, March 22). *ADHD drug use for youth obesity raises ethical questions*. http://www.cnn.com/2007/HEALTH/03/21/vs.adderall/.

French, S. A., & Jeffery, R. W. (1994). Consequences of dieting to lose weight. Effects on physical and mental health. *Health Psychology, 13*(3), 195–212.

Gullette, D. L., & Lyons, M. A. (2006). Sensation seeking, self-esteem, and unprotected sex in college students. *Journal of the Association of Nurses in Aids Care, 17*(5), 23–31. http://dx.doi.org/10.1016/j.jana.2006.07.001.

Haley, C. C., Hedberg, K., & Leman, R. F. (2010). Disordered eating and unhealthy weight loss practices. Which adolescents are at highest risk? *Journal of Adolescent Health, 47*, 102–105. http://dx.doi.org/10.1016/j.jadohealth.2009.12.023.

Harring, H. A., Montgomery, K., & Hardin, J. (2011). Perceptions of body weight, weight management strategies, and depressive symptoms among US college students. *Journal of American College Health, 59*(1), 43–50. http://dx.doi.org/10.1080/07448481.2010.483705.

Higher Education Center (2012). *Prescription stimulants*. Ritalin, Adderall, Concerta, Dexedrine. http://www.higheredcenter.org/high-risk/drugs/ritalin.

Kelly-Weeder, S. (2011). Binge drinking and disordered eating in college students. *Journal of the American Academy of Nurse Practitioners, 23*(1), 33–41. http://dx.doi.org/10.1111/j.1745-7599.2010.00568.x.

Kensinger, G. J., Murtaugh, M. A., Reichmann, S. K., & Tangney, C. C. (1998). Psychological symptoms are greater among weight cycling women with severe binge eating behavior. *Journal of the American Dietetic Association, 98*(8), 863–868.

Kent, J. D., Blader, J. C., Koplewicz, H. S., Abikoff, H., & Foley, C. A. (1995). Effects of late-afternoon methylphenidate administration on behavior and sleep in attention-deficit hyperactivity disorder. *Pediatrics, 96*(2), 320–325.

Kushner, R. F. (2003). *Roadmaps for clinical practice. Case studies in disease prevention and health promotion. Assessment and management of adult obesity. A primer for physicians*. Chicago, IL: American Medical Association.

McCabe, S. E., & Teter, C. J. (2007). Drug use related problems among nonmedical users of prescription stimulants. A web-based survey of college students from a Midwestern university. *Drug and Alcohol Dependence, 91*, 69–76. doi: 0.1016/j.drugalcdep.2007.05.010.

McCabe, S. E., Teter, C. J., & Boyd, C. J. (2006). Medical use, illicit use and diversion of prescription stimulant medication. *Journal of Psychoactive Drugs, 38*(1), 43–56. http://dx.doi.org/10.1080/02791072.2006.10399827.

McGuire, M. T., Wing, R. R., & Hill, J. O. (1999). The prevalence of weight loss maintenance among American adults. *International Journal of Obesity, 23*, 1314–1319.

Meyer, A. H., Weissen-Schelling, S., Munsch, S., & Margraf, J. (2010). Initial development and reliability of a motivation for weight loss scale. *Obesity Facts, 3*(3), 205–211. http://dx.doi.org/10.1159/000315048.

National Institute on Drug Abuse. (2010, December). *Drug abuse at highest level in nearly a decade*. http://www.drugabuse.gov/news-events/nida-notes/2010/12/drug-abuse-highest-level-in-nearly-decade.

Ozier, A. D., Kendrick, O. W., Knol, L. L., Leeper, J. D., Perko, M., & Burnham, J. (2007). The eating and appraisal due to emotions and stress (EADES) questionnaire. Development and validation. *Journal of the American Dietetic Association, 107*, 619–628.

Putterman, E., & Linden, W. (2004). Appearance versus health. Does the reason for dieting affect dieting behavior? *Journal of Behavioral Medicine, 27*, 185–204.

Rabiner, D. L., Anastopoulos, A. D., Costello, E. J., Hoyle, R. H., McCabe, S. E., & Swartzwelder, H. S. (2009). The misuse and diversion of prescribed ADHD medications by college students. *Journal of Attention Disorders, 13*(2), 144–153. http://dx.doi.org/10.1177/1087054708320414.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Rozenbroek, M. A., & Rothstein, W. G. (2011). Medical and nonmedical users of prescription drugs among college students. *Journal of American College Health, 59*(5), 358–363.

Serdula, M. K., Mokdad, A. H., Williamson, D. F., Galuska, D. A., Mendlein, J. M., & Heath, G. W. (1999). Prevalence of attempting weight loss and strategies for controlling weight. *Journal of the American Medical Association, 282*(14), 1353–1358.

Snow, V., Barry, P., Fitterman, N., Qaseem, A., & Weiss, K. (2005). Pharmacologic and surgical management of obesity in primary care. A clinical practice guideline from the American College of Physicians. *American College of Physicians, 142*, 525–531.

Stice, E., Fisher, M., & Martinez, E. (2004). Eating disorder diagnostic scale. Additional evidence of reliability and validity. *Psychological Assessment, 16*(1), 60–71. http://dx.doi.org/10.1037/1040-3590.16.1.60.

Teter, C. J., McCabe, S. E., LaGrange, K., Cranford, J. A., & Boyd, C. J. (2006). Illicit use of specific prescription stimulants among college students. *Pharmacotherapy, 26*(10), 1501–1510.

Weight-control Information Network, (2010, December). *Prescription medications for the treatment of obesity*. http://win.niddk.nih.gov/publications/prescription.htm.

Zachor, D. A., Roberts, A. W., Hodgens, J. B., Isaacs, J. S., & Merrick, J. (2006). Effects of long-term psychostimulant medication on growth of children with ADHD. *Research in Developmental Disabilities, 27*, 162–174. http://dx.doi.org/10.1016/j.ridd.2004.12.004.