MacDONALD CENTER FOR OBESITY PREVENTION AND EDUCATION
COLLEGE OF NURSING VILLANOVA UNIVERSITY

Welcome to the COPE Webinar Series for Health Professionals!

May 28th 2014 webinar:
Night Eating Syndrome: Diagnosis and Treatment Options

Time: 12 – 1 PM EST
Moderator: Rebecca Shenkman, MPH, RDN, LDN
Program Manager
MacDonald Center for Obesity Prevention & Education

Handouts of the slides are posted at: **www.villanova.edu/COPE**

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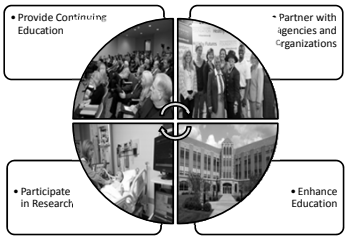
MacDonald Center for Obesity Prevention and Education (COPE) Goals



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05/28/14 Webinar: Night Eating Syndrome: Diagnosis and Treatment Options

Kelly C. Allison, PhD
Assistant Professor of Psychology, Department of Psychiatry
Center for Weight and Eating Disorders
Perelman School of Medicine at the University of Pennsylvania

Objectives: Learner will be able to:
1. Recognize the diagnostic criteria for NES
2. Describe the relationship of NES to other disorders
3. Identify treatment options for NES

Credits: This webinar is approved for 1 contact award awarded by ANCC and 1 CPEU awarded by CDR. Suggested CDR Learning Need Code: 5370,5200,6000,6020; Level 2.

Notice: The webinar planners do not have any conflicts of interest to disclose for this presentation. The webinar presenter does disclose that she was a Pfizer consultant in the past.
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NIGHT EATING SYNDROME: DIAGNOSIS AND TREATMENT OPTIONS

Kelly C. Allison, Ph.D.
Assistant Professor of Psychology
Department of Psychiatry
Director of Education
Center for Weight and Eating Disorders
Perelman School of Medicine at the University of Pennsylvania

May 28, 2014

Disclosures

- I, Kelly Allison, Ph.D., have served as a consultant to Pfizer Pharmaceuticals. I also receive royalties from the New Harbinger Publications and Guilford Publications.

Non-normative Eating vs. Eating Disorder

What are the roles of:
- Environmental cues?
- Social & cultural cues?
- Internal cues?

- Distress present?
- Impairment in functioning?
- Adverse health effects/disability?
  - Mental
  - Physical

Tanofsky-Kraff & Yanovski, Obes Res, 2004

Insomnia cookies

Baked Right
Late Night

Delivery: 8:00 PM - 2:30 AM

Background

- NES – described 50 years ago (Stunkard et al., 1955), but definitions have varied
  - Morning anorexia
  - Evening hyperphagia
  - Insomnia

- With inclusion under "Otherwise Specified Feeding and Eating Disorders" in DSM 5, it calls for more standardized definition
- How clinically meaningful is NES?

Proposed Diagnostic Criteria for NES

A. The daily pattern of eating demonstrates a greatly increased intake in the evening and/or night time, as manifested by one or both of the following:
   1. At least 25% of daily food intake is consumed after the evening meal
   2. At least 2 eating episodes per week occur upon awakening during the night

B. Awareness and recall of evening and nocturnal eating episodes are present.

C. The clinical picture is characterized by at least three of the following features:
   1. Lack of desire to eat in the morning and/or breakfast is omitted on ≥ 4 mornings per week
   2. Presence of a strong urge to eat between dinner and bedtime and/or during the night
   3. Sleep onset and/or sleep maintenance insomnia are present ≥ 4 nights per week
   4. Presence of a belief that one must eat in order to get to sleep
   5. Mood is frequently depressed and/or mood worsens in the evening

D. The disorder is associated with significant distress and/or impairment in functioning.

E. The disordered pattern of eating has been maintained for a minimum of 3 months.

F. The disorder is not secondary to substance abuse or dependence, a general medical disorder, medication, or another psychiatric disorder.

Allison et al., Int J Eat Disord, *2010*

Prevalence of NES

- 1.5% in general population
  (Rand et al, *Int J Eat Disord*, 1997)
- 9-14% in obesity clinics
  (Gluck et al., Obes Res, 2001; Stunkard et al., Int J Obes, 1996)
- 3.8% in type 2 diabetic population
  (Allison, Crow, Stunkard et al., Obesity, 2007)
- 12% in psychiatric clinic patients
  (Lundgren, Allison, Crow et al., *Amer J Psychiat, 2006*)
  - Obese patients 5.2 times more likely to have NES than normal weight patients
- 8 - 42% in prospective bariatric surgery candidates
  (Allison et al., 2006; Hsu et al., 1996)

Diabetes and Night Eating

- N = 216 Type 2 diabetic patients – Patients with NE showed higher HbA1c values, higher scores on the disinhibition and the perceived hunger scale, lower scores on the quality of life scale and higher depression scores vs. patients without NE. (de Zwaan et al., Psychother Psychosom Med Psychol, 2012)
- N = 714 type 1 and type 2 diabetic patients - evening hyperphagia significantly predicted an HbA1c>7, obesity, and having two or more diabetes complications (Morse et al., Diabetes Care, 2006)
- N = 845 Type 2 diabetic participants – no relation with HbA1c or other physical measures, except BMI (Allison et al., Obesity, 2007)

Participant Reflections

- "My husband sleeps on a cot in our kitchen to help remind me to not eat when I wake up. . .sad situation, but it helps my mood during waking hours which makes for a better marriage overall."
- "Now I lock the refrigerator and pantry most nights before I go to bed. This keeps me from eating and is the only thing that has worked for me."
- "Easier to give up and just eat....feel more hopeless about control."
- "My husband locks a gate at the top of the stairs so I can't get to the kitchen"
- "I think I have learned to live with it. I have no choice."

Major themes

- Cravings (often named a specific food)
- Anxious/Agitated
- Need to eat to fall (back) asleep
- Physically hungry/Compelled to eat

Cravings

3 am: "I bolted out of bed with a radar (that's what it feels like – I remembered where there was chocolate without having to travel far). This is gross. I knew I threw out a box of chocolate truffles because I don't like them. I rifled through the trash… found the box and ate two."

⇩

2 chocolate truffle candies

⇩

"I feel ridiculous – I just want to stop doing this."

Cravings, Anxious/Agitated, & Hunger

1:56 am: "Can't sleep – feeling pretty hungry. Maybe if I eat something I can go to sleep and feel a little more relaxed."

⇩

2 Fried oysters, 6 oz. cup of Italian ice

⇩

2:15 am: "Still feel restless and hungry."

⇩

Cravings, Anxious/Agitated, & Hunger

3:09 am: "Still feeling hungry and restless. I want a chocolate bar."

⇩

1 Mr. Goodbar 1.75 oz.

⇩

3:30 am: "Feeling a bit more relaxed. I will try to sleep now."

Eat to Sleep & Cravings

1:00 am: "It's now 1 am. I have no snacks with me upstairs. I have the munchies. What should I do? If only I could go back to sleep without eating… but I can't. I'll go downstairs and get some ice cream.

⇩

1 cup strawberry ice cream

⇩

"I feel content after eating the ice cream. Now I can go back to sleep, I hope."

Nighttime Eating Assessment

1. **Physical hunger**—feeling physical signs of hunger
2. **Craving food**—desiring specific foods
3. **Compelled to eat**—having a drive to eat, to put something in your stomach, not necessarily for a specific food
4. **Anxious**—having anxiety-provoking thoughts, ruminations, racing thoughts, etc.
5. **Agitated**—having the physical feeling of not being able to sit still or remain in bed, often linked to anxiety
6. **Sad**—feeling depressed or wanting to eat to help improve depressed mood

not at all extremely

7. **Bored**—looking for an activity to pass the time
8. **Tired**—feeling fatigued and just wanting to get to sleep

not at all X----------X extremely

Timing of Sleep Onset and Offset (Night 2)

The timing of sleep onset and sleep offset were not different between NES and Control subjects in the laboratory (PSG night 2; Rogers et al., 2006) or at home (diary and actigraphy), and the laboratory PSG data were consistent with the home data (O'Readon et al., 2004).

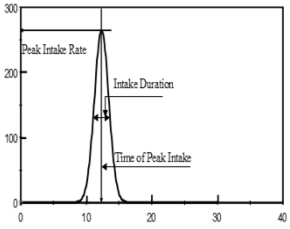
	NES subjects	Control subjects
Sleep onset time (PSG)	23:38 ± 1:59	22:52 ± 1:04
Sleep onset time (home)	23:57 ± 1:33	23:32 ± 1:06
Sleep offset time (PSG)	7:04 ± 0:48	7:06 ± 0:41
Sleep offset time (home)	7:35 ± 1:11	6:59 ± 1:12

Results from Polysomnography (Night 2)

	NES subjects	Control subjects	
Sleep onset latency	26	16	
TST (hour:min)	5:54	7:01	P = 0.049
Sleep efficiency	72%	85%	P = 0.03
Latency to 1st awaken (min)	71	50	
Awakenings (number)	4.5	3.2	(P = 0.069)
WASO (min)	59	39	
REM onset latency	72	85	
Stage 1 (min)	39	37	
Stage 2 (min)	165	235	P = 0.012
Stage 3 (min)	29	38	P = 0.023
Stage 4 (min)	24	26	
SWS (min)	54	64	
REM sleep (min)	95	86	

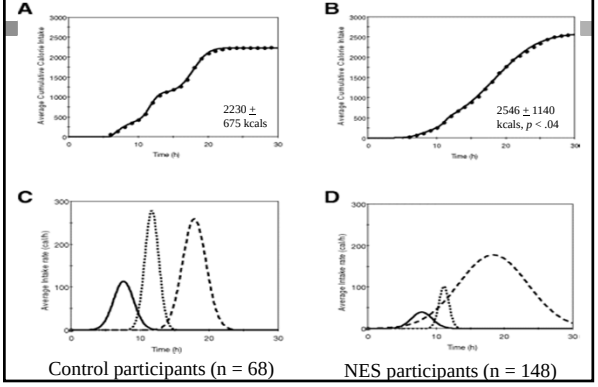
Rogers et al., Sleep, 2006

Mathematical Model of Food Intake



- Top panel will be the sum of three Gaussian curves to describe the average cumulative caloric intake of Control and NES participants. The bottom panel will depict the individual Gaussian curves that describe the average rate of eating during each of three separate meals.

Intake Models of NES (Boston et al., J Clin Nutr, 2008)



Control participants (n = 68) NES participants (n = 148)

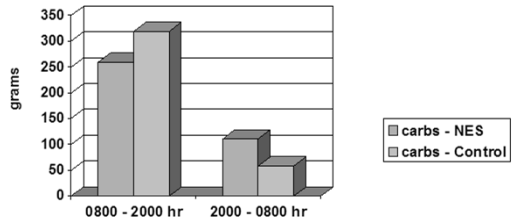
NES Characteristics by Group

Variable	NES	Controls	P-value
Total Daily Calories	2546	2230	.03
% calories after dinner	37.5%	10.9%	< .001
# awakenings/ week	9.8	2.9	< .001
# nocturnal ingestions/wk	7.6	0.1	<.001

NES Characteristics by Group

Variable	NES	Controls	P-value
Beck Depression Inv.	16.7	3.9	< .001
EDE Global	1.95	0.71	< .001
Pittsburgh Sleep Global	9.5	3.5	< .001
Axis I diagnoses (Lifetime – any)	72%	33%	<.001

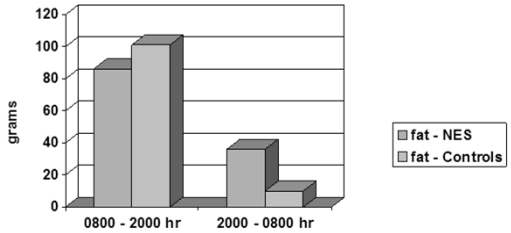
Carbohydrate Consumption



$p < 0.07$
NES – 59%
Con – 60%

$p < 0.03$
NES – 68%
Con – 76%

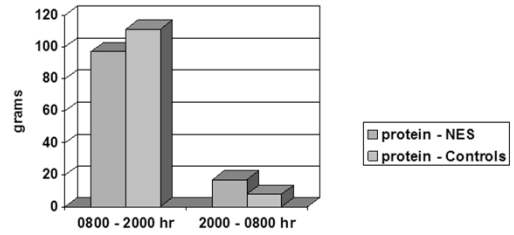
Fat Consumption



n.s.
NES – 19%
Con – 19%

$p < 0.001$
NES – 22%
Con – 13%

Protein Consumption



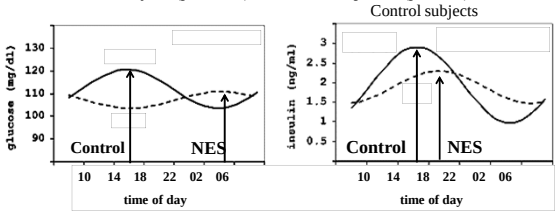
n.s.
NES – 22%
Con – 21%

$p < 0.05$
NES – 10%
Con – 11%

Circadian analysis of neuroendocrine data (nonlinear mixed harmonic regression)

GLUCOSE showed an inverted phase (delayed in NES by 11.6 hours) relative to Control subjects (p=0.0001)

INSULIN was phase delayed in NES by 2.8 hours (p=0.004), and was half the amplitude (p<0.001) relative to Control subjects

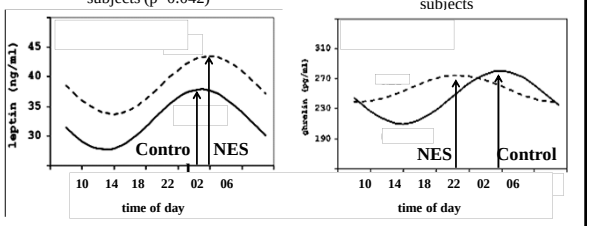


Goel et al., J Biol Rhythms, 2009

Circadian analysis of neuroendocrine data (nonlinear mixed harmonic regression)

LEPTIN was phase delayed in NES by 1.0 hour relative to Control subjects (p=0.042)

GHRELIN was phase advanced in NES by 5.2 hours (p<0.001), and was half the amplitude (p=0.021) relative to Control subjects



Leptin is an adipocyte-derived hormone that suppresses appetite

Ghrelin is predominantly a stomach-derived peptide that stimulates appetite

Treatment

Treatment Background

First attempt at therapy by Stunkard psychodynamic

- Later case reports (behavioral treatment; 1986 &1989) with mixed results
- Case reports of phototherapy (2002 & 2006) successful, but 2002 case relapsed when therapy ended

Pharmacotherapy trials

- Case reports
  - D-fenfluramine helpful (Spaggiari, 1994; O'Reardon et al., 2004)
- SSRIs – paroxetine - Successful in four cases
  - fluvoxamine - Successful in one case (Miyaoka et al., 2003)
- Open label trial of sertraline
  - O'Reardon, Stunkard, & Allison, 2004

Outcome Measures

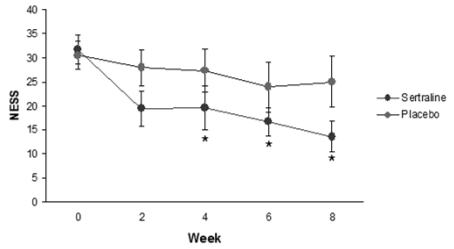
- Night Eating Symptom Scale
- % Intake after Evening Meal
- # of Nocturnal Ingestions in Past Week
- # Awakenings
- Weight change
- Quality of Life (Quality of Life, Enjoyment, and Satisfaction Questionnaire)
- Mood (Beck Depression Inventory – II)

Randomized controlled trial of sertraline

- Patients randomized to sertraline or placebo for 8-week active phase
- 17 on sertraline, 17 on placebo
- 1 participant from each group was un-blinded early at their request due to no response
- 11 females, 3 normal weight, 12 Caucasian

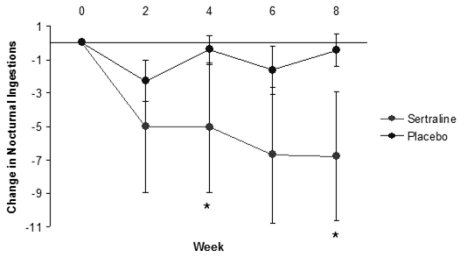
O'Reardon et al., Am J Psychiatry 2006;163:893-8

Randomized controlled trial of sertraline



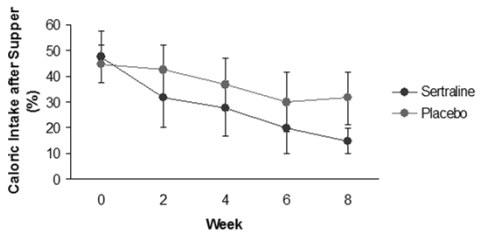
O'Reardon et al., Am J Psychiat 2006;163:893-8

Randomized controlled trial of sertraline



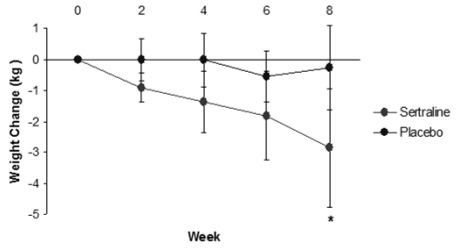
O'Reardon et al., Am J Psychiat 2006;163:893-8

Randomized controlled trial of sertraline



O'Reardon et al., Am J Psychiat 2006;163:893-8

Randomized controlled trial of sertraline



O'Reardon et al., Am J Psychiat 2006;163:893-8

Randomized controlled trial of sertraline

- 71% in sertraline group vs. 18% in placebo group – "responders"
- 41% of sertraline group – "remitters"

O'Reardon et al., Am J Psychiat 2006;163:893-8

Open label treatment with escitalopram

- 342 screened → 75 attended screening →
- 31 participants (18 completers)
  - 68% female
  - 45% Caucasian, 39% African American
  - Mean age: 45.4 $\pm$ 11.6 yrs.
  - Mean BMI: 31.8 $\pm$ 6.4 kg/m^2
- Baseline screening:
  - NEQ, NESHI, EDE, SCID, BDI, Food/Sleep logs

Allison et al., Eating Behaviors, 2013

Participant characteristics

Baseline characteristics	Mean (SD)
% calories after dinner until morning awakening	34.9 (12.3)
% calories evening meal to bedtime	21.8 (14.8)
% calories after bedtime to morning awakening	13.1 (10.7)
No. awakenings/week	8.7 (6.2)
No. nocturnal ingestions/week	5.7 (5.0)
Baseline total caloric intake	2743.3 (1051.6)
Night Eating Questionnaire	31.7 (6.9)
Beck Depression Inventory	14.3 (11.0)

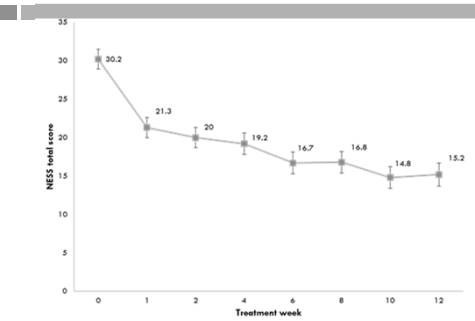
Allison et al., Eating Behaviors, 2013

Participants - SCID diagnoses

Co-morbid psychopathology	N (Percentage)
Any lifetime Axis I SCID diagnosis	20 (65%)
Binge eating disorder (all current)	7 (23%)
Any lifetime mood disorder	7 (23%)
Any lifetime anxiety disorder	7 (23%)
Any lifetime substance/alcohol abuse or dependence	5 (16%)

Allison et al., Eating Behaviors, 2013

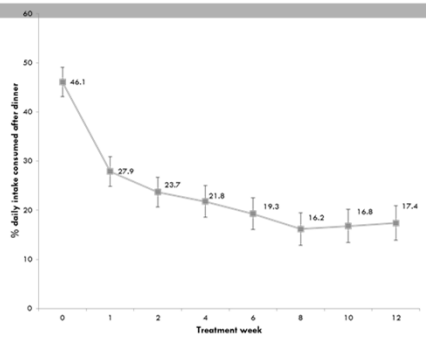
Change in NESS



NESS – Night Eating Symptom Scale, decreased by 49%, $p < 0.001$

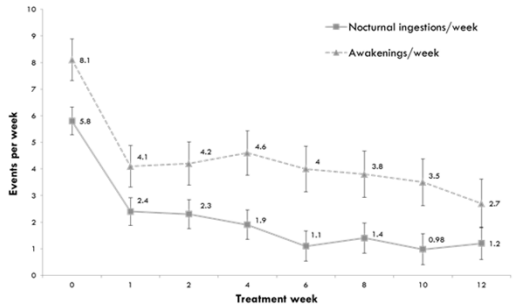
Allison et al., Eating Behaviors, 2013

Change in Evening Hyperphagia



Decreased by 62%, $p < 0.001$

Change in Awakenings & Nocturnal Ingestions



80% decrease in NIs; 67% decrease in Awakenings, p's < 0.001

Allison et al., Eating Behaviors, 2013

Cognitive Behavioral Therapy (CBT)

- Cognitive behavioral therapy has been validated for treatment of AN, BN, BED, insomnia, and depression.
- Started by collecting data on thoughts related to night eating episodes
- Main goal:
  - Shift the delayed eating schedule back to the day by promoting a regular daytime eating schedule and eliminating nocturnal ingestions.

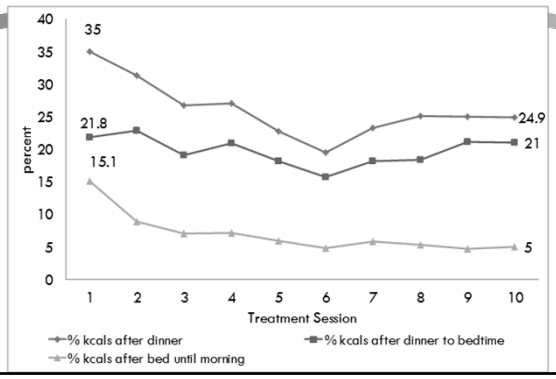
CBT for NES
Patient characteristics

- Pilot study (Allison et al., 2010, Am J Psychotherapy)
  - 25 enrolled (14 completers)*
  - 6 males (3 completers)
  - 17 Caucasians, 6 African Amer., 1 Hispanic, 1 Other
  - 8 normal weight
    7 overweight
    10 obese
  - Mean age: 46.8 ± 13.4 yrs.
  - Mean BMI: 29.5 ± 7.5 kg/m^2

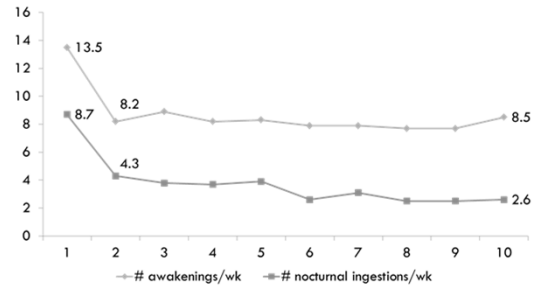
* drop-outs had more awakenings & nocturnal ingestions at baseline

Allison et al., Am J Psychotherapy, 2010

Change in % kCals after Dinner

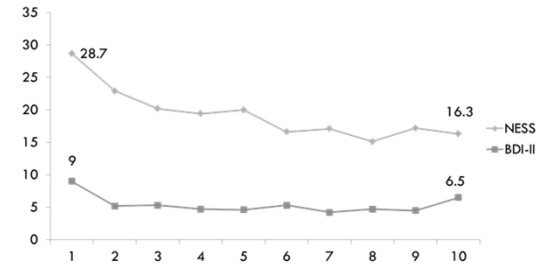


Change in awakenings and ingestions



Allison et al., Am J Psychotherapy, 2010

Change in NESS & depressed mood



NESS – Night Eating Symptom Scale, BDI – Beck Depression Inventory. Quality of Life Scale did not change significantly

Allison et al., Am J Psychotherapy, 2010

CBT – Calories and Weight

	Baseline	Final	p-value
Total daily caloric intake	2365	1759	0.01
Weight loss (kg)		-3.1 (0.4)	.013

Allison et al., Am J Psychotherapy, 2010

Conclusions for total sample

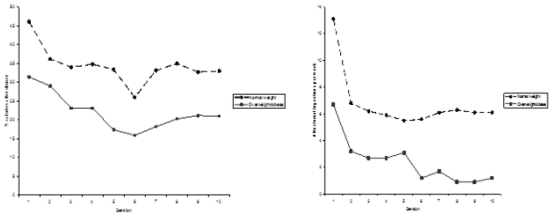
- CBT was effective in reducing nocturnal ingestions and percentage of caloric intake after dinner, mainly due to decrease in calories after initial sleep onset.
- There were overall improvements, as measured on NESS and BDI.
- Weight decreased significantly overall by 3.1 kg (6.8 lbs).

Normal Wt. vs. Ovwt/Obese

Treatment Baseline	Normal Wt.	Ovwt/Obese	p-value
BMI (kg/m^2)	22.6	32.9	< .001
Quality of Life	56.4	43.2	.01
% Calories after dinner	46.1	31.3	.015
# Nocturnal ingestions/wk	13.1	6.7	.21
Baseline total caloric intake	2010.9	2531.0	.32

NESS, BDI, age did not differ. All normal weight patients were white, females.

Treatment Outcomes by Weight



% Calories after dinner # Nocturnal ingestions

All changes significant at p < .05 or smaller. NW (n = 8), Ovwt/OB (n = 17)

Allison et al., Am J Psychotherapy, 2010

Implications for Treatment

- With **overweight and obese** patients, focus is on regulating circadian pattern of eating (decreasing evening overeating and nocturnal ingestions) and reducing overall caloric intake
- With **normal weight** patients, focus is on regulating circadian pattern of eating and reducing compensation (restriction and excessive exercise).

Worth mentioning…

- Bright light therapy has been effective in 3 published cases of NES (Friedman et al., 2006; Friedman et al., 2002).
- Given the circadian shift, it seems worth pursuing!
- Topirmate – three case series, 1 RCT underway

Summary

- NES will likely be gaining more attention with its mention in DSM 5
- NES is related to circadian shifts (delays) in neuroendocrine patterns and sleep disruption
- Psychological and nutrition component
- Treatment so far – SSRIs and CBT

Conclusion…

- Those with NES are distressed, experiencing increasing BMI and may be at risk for increased metabolic disorder = CLINICALLY MEANINGFUL!
- Therefore, it is important to assess for night eating – it's just a question – you may be surprised by what you hear…

Acknowledgements

- Thank you to my collaborators:
  - Albert Stunkard
  - John O'Reardon
  - Jennifer Lundgren
  - Renee Moore
  - Namni Goel
  - David Dinges
  - Rexford Ahima
- Funding sources
  - NIH/NIDDK - DK 056735
  - Pfizer Pharmaceuticals
  - Forest Laboratories

Correspondence

Kelly C. Allison, Ph.D.

University of Pennsylvania School of Medicine
Department of Psychiatry
Center for Weight and Eating Disorders
3535 Market St. Suite 3027
Philadelphia, PA 19104
kca@mail.med.upenn.edu

Thank you!

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- The email will be sent to the email address that you used to register for the webinar.
- Please complete the evaluation soon after you receive the email. The evaluation does expire after 3 weeks. Once expired, you cannot obtain a certificate.
- Once the evaluation is completed, the CE certificate will be emailed separately within 2 business days.

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COPE's June Professional Webinar (it's free!)

Marsha Hudnall, MS, RDN, CD
President and Co-Owner
Green Mountain at Fox Run

Title:	***Weight Management in the Treatment of Binge Eating Disorder***
Date:	**Tuesday June 17th**
Time:	**12:00PM - 1:00PM EDT**
CE Credit:	**1.0 contact hour, 1.0 CPE**

To register, go to **villanova.edu/cope**

MacDONALD CENTER FOR OBESITY PREVENTION AND EDUCATION
COLLEGE OF NURSING
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Questions and Answers!

Moderator: Rebecca Shenkman, MPH, RDN, LDN
Email: cope@villanova.edu
Web site: villanova.edu/COPE

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