

A Personalized Nutrition Message Centered on Energy Balance Influences' Self-Efficacy for Weight Control in Obese Adults

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ABSTRACT

Background: The self-efficacy (SE) theory appears to be the best predictive theory for health behavior adoption. Interventions that increase individual SE typically have a medium to large (d= .40-.60) effect on behavior adoption. Moreover, research indicates SE explains 20% of the variance for individual weight loss. Therefore, the purpose of this observational study was to evaluate the short-term effect on weight SE and individual weight loss following a brief counseling session centered on energy balance. **Methods:** Thirty (16 women and 14 men) obese (BMI= 31-54 kg/m²) adults (Age= 30-79 years) voluntarily participated in the 30 day study. Participants received an RMR measurement using the MedGem[®] indirect calorimeter to determine daily energy needs and were counseled by a medical provider on energy balance for weight control. Also, participants received a computer generated educational report about energy balance, individual metabolism, and their detailed nutrition plan. Participants returned 30-days later for post-evaluation and counseling on their respective medical condition. SE was assessed using the Weight Efficacy Lifestyle Questionnaire (WEL). Paired sample t-test was used to determine the level of difference between baseline and follow-up WEL scores. Alpha was set to .05. **Results:** Sixteen individuals had a diagnosis of hypertension and fourteen had a diagnosis of hypercholesterolemia. Intent-to-treat indicated a strong trend for increased WEL scores (108.8 ± 32.1 vs. 119.5 ± 29.8; p=.06). A significant increase was noted in subset WEL scores (food availability and positive activities) between baseline and 30-day follow-up (ps.05). No significant change was noted for variables related to emotional eating. Of those returning (n=21) for the follow-up appointment seven participants lost 3 or more pounds, seven lost 0-2 pounds, and seven gained weight. **Conclusions:** A personalized energy balance message developed from measured RMR may have a positive influence on weight SE in obese adults. In addition, the energy balance message does significantly increase specific SE for situations when food is readily available and positive activities (i.e. celebrations) involving food. Most follow-up participants (66%) were able to maintain bodyweight or achieve weight loss.

BACKGROUND

The percentage of US adults that are overweight exceeds 65% and it is expected to increase over the next 10 years. By 2015, 75% of individuals are expected to be overweight. Moreover, obesity is expected to climb to 41% by the same time ¹.

There is no debating the effectiveness of a comprehensive weight reduction program. However, most overweight and obese (90-95%) individuals forgo these programs for self-help solutions ². Unfortunately, many of these self-help programs are not effective for the majority of the population. It is well documented that physician advice increases weight loss behaviors ³. However, advice to lose weight is not effective for long-term weight loss ⁴. Moreover, patients prefer an individualized plan from their physician rather than generic messages to lose weight⁵. Based on these data; alternative strategies that are evidence-based and meet patient demands are needed for overweight individuals that promote weight management.

Self-efficacy (SE) is the best predictor of short and long term weight change. SE explains 20-25% of the variance in weight loss in overweight and obese adults ⁶⁻¹⁰. SE is defined as "the belief in one's abilities to organize and execute the course of action required to manage prospective situations" and is dependant upon verbal persuasion that is source credible, task mastery experience, vicarious experience, and the emotional state of the person ^{11,12}. From an individual perspective, effective communication that is credible, provides a plan to manage dietary anxiety, and enables an individual to accomplish dietary tasks should improve individual SE for weight change.

The purpose of this observational study was to evaluate the short-term affect on SE and individual weight change from a brief individualized nutrition counseling session, centered on energy balance, delivered by medical provider.

METHODS

Obese adults were recruited from a cardiology practice near Orlando, FL. Patients were identified from a Body Mass Index (BMI) screen by a medical assistant at a standard office visit. The MA informed the provider of the patient's BMI. The provider informed the patient how their bodyweight may be contributing to the patient's medical condition and encouraged the patient to begin weight management. Thirty patients (N=30) indicated interest and readiness to lose weight and returned to the medical clinic for an indirect calorimetry (IC) assessment (Figure 1) (MedGem[®]; Microlife Medical Home Solutions, Inc.; Golden, CO) and brief nutrition counseling session on energy balance. Patients were provided a three-page educational report from MedGem[®] Analyzer (Figure 2) (Microlife Medical Home Solutions, Inc.; Golden, CO). Patients were provided an individual choice for weight management. Patients returned to the clinic 30 days later for routine follow-up.

Patients completed a SE questionnaire¹³ at baseline and at 30 day follow-up. Weight was assessed over the same time period. Repeat measure ANOVA using completer data and Intent-to-treat on SE scores assessed the level of difference over time. Repeat measure ANOVA using completer data assessed weight change over time. Alpha was set to .05.

RESULTS

Thirty obese adults participated in the observation study. Participant demographics are presented in Table 1. Sixteen individuals (n=16) had a primary diagnosis of hypertension and fourteen (n=14) had a primary diagnosis of hypercholesterolemia. Twenty-three individuals returned to the medical clinic at the 30 day follow-up resulting in 24% attrition.

Completer SE scores improved significantly from baseline to 30 day follow-up (Table 2). Interestingly, subset SE scores also were significantly influenced from the RMR counseling session. Specifically, the RMR appointment had a significant influence on SE in situations where food was readily available, social pressures to eat, and positive activities with food (ps.05). When applying the ITT statistical method, the increase in SE scores were no longer significant, yet clinically meaningful, between baseline and 30 day follow-up (109 ± 32 vs. 120 ± 30; ps.06) . However, subset SE scores for food availability (17 ± 8 vs. 20 ± 7; p=.01) and positive activities (24 ± 6 vs. 26 ± 7; p=.04) were still significant.

Of the individuals (N=23) returning to the medical clinic at 30 day follow-up, 38% (N=9) lost weight (i.e. greater than 0.5 lb/week) and 28% (N= 6) maintained bodyweight. Therefore 66% of individuals were able to maintain or experience short-term weight loss. Thirty three percent (N=8) experienced weight gain.

Table 1. Descriptive Statistics of Study Participants (Female=16 and Male=14).

	Mean	SD	Range
Age (yrs)	61.4	9.4	34 - 79
Weight (kg)	109.6	23.8	80 – 200
BMI (m/kg2)	37.3	5.5	31 - 54
Sys BP (mmHg)	126	16	104 - 170
Dia BP (mmHg)	79	10	58 - 103

Figure 1. IC procedure with MedGem[®] and MedGem[®] Analyzer Software.



Table 2. Completer Analysis (N=23) of SE scores.

	Day 1	Day 30	P value
SE	107 ± 32	122 ± 29	.02
Food Av.	16 ± 8	21 ± 6	.00
Social Pres.	20 ± 8	24 ± 6	.02
Positive Act.	24 ± 8	26 ± 7	.03
Neg. Emot.	22 ± 9	24 ± 9	.08
Physical Dis.	26 ± 8	27 ± 6	.33

Figure 2. First page of MedGem[®] Analyzer Report.



CONCLUSIONS

With the rise in obesity, there is a need for effective alternatives to control bodyweight. Recently, the American Dietetic Association issued clinical guidelines, from their evidence-based library, for adult and pediatric weight management ¹⁴. In these guidelines, it is recommended that clinicians use IC when assessing RMR for the development of a nutritional plan. Moreover, dietary counseling is effective in helping overweight and obese adults manage bodyweight ¹⁵. From this observational study, it appears the use of IC for developing an individualized nutrition program improves short-term SE in obese adults. Specifically, SE related to food availability, social pressure to eat, and positive activities (i.e. celebrations) with food are significantly improved. SE appears to increase from two important constructs; source credible information and task experience. The study participants appeared to believe the information was credible and were comfortable with managing food consumption in various situations. Therefore, the energy-balance message from measured RMR may have provided an effective foundation to calorie awareness and daily energy needs. However, additional treatment is needed to address negative emotions and physical discomfort that may foster emotional eating.

The energy balance message with measured RMR also appears to affect the individual responsive to weight change. Thirty eight percent (38%) of completers were able to reduce bodyweight and 28% were able to maintain bodyweight over the 30 day period. Therefore, an energy balance message from measured RMR along with a patient choice of "if you can not lose, don't gain" appears to be effective for 66% of the obese adults in this study.

Not only does this assessment and counseling method appear to be effective, but the RMR assessment was reimbursed by government and private payers. The diagnostic procedure (CPT 94690) was allowed by payers for all participants. Average reimbursement for the procedure was \$67.00. Therefore, the use of IC technology in a medical practice provides an individualized plan that appears to be a cost-effective solution that may resolve the insurance barrier many physicians indicate as a deterrent to treating overweight and obese patients ¹⁶⁻¹⁸.

In conclusion, the use of IC technology for developing a personalized nutrition program, combined with an energy balance message, may provide clinicians a cost-effective solution to patient self-management for overweight and obesity.

REFERENCES

- Wang Y, Beydoun MA. The Obesity Epidemic in the United States—Gender, Age, Socioeconomic, Racial/Ethnic, and Geographic Characteristics: A Systematic Review and Meta-Regression Analysis. *Epidemiol Rev*. 2007;29(1):6-28.
- Kruger J, Galuska DA, Serdula MK, Jones DA. Attempting to lose weight: specific practices among U.S. adults. *Am J Prev Med*. Jun 2004;28(5):402-406.
- Sciamanna CN, Tate DF, Lang W, Wing RR. Who Reports Receiving Advice to Lose Weight?: Results From a Multistate Survey. *Arch Intern Med*. August 14, 2000;160(15):2334-2339.
- Franz MJ, Varwornier JJ, Cimin AL, et al. Weight-loss outcomes: a systematic review and meta-analysis of weight-loss clinical trials with a minimum 1-year follow-up. *J Am Diet Assoc*. Oct 2007;107(10):1755-1767.
- Beran MS, Fowles JB, Kind EA, Craft CE. State of the Art Reviews: Patient and Physician Communication About Weight Management: Can We Close the Gap? *Am J of Life Med*. February 1, 2008;20(2):175-83.
- Palmira AL, Teixeira PJ, Branco TL, et al. Predicting short-term weight loss using four leading health behavior change theories. *Int J of Behav Nutr and Phys Act*. 2007;4:14.
- Linde JA, Rothman AJ, Baldwin AS, Jeffrey RW. The impact of self-efficacy on behavior change and weight change among overweight participants in a weight loss trial. *Health Psychol*. May 2006;25(3):282-291.
- Wamstaker EW, Geisner R, Isstria J, Larsen JK, Zeisler PK, van Sluven WA. Obesity-related beliefs predict weight loss after an 8-week low-calorie diet. *J Am Diet Assoc*. Mar 2005;105(3):441-444.
- Teixeira PJ, Going SB, Sardinha LB, Lohman TG. A review of psychosocial pre-treatment predictors of weight control. *Obes Rev*. Feb 2005;6(1):43-65.
- Rosch JB, Yadrick MK, Johnson JT, Boudreaux LJ, Forsythe WA, 3rd, Billon W. Using self-efficacy to predict weight loss among young adults. *J Am Diet Assoc*. Oct 2003;103(10):1357-1369.
- Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. Mar 1977;84(2):191-215.
- Srecher VJ, DeVellis BM, Becker MH, Rosenstock ML. The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*. Spring 1986;13(1):73-82.
- Clark MM, Abrams DB, Niaura RS, Eaton CA, Rossi JS. Self-efficacy in weight management. *J Consult Clin Psychol*. Oct 1991;59(5):739-744.
- ADA. Adult Weight Management Evidence-Based Nutrition Practice Guideline. Accessed 12/08/2007 from [http://www.adaonlinelibrary.com/topic/doi:10.2337/7788libaryEBAGAmericanDnsingerML_TatsioniA_WongJB_ChungM_BalkEM_Meta-analysis:_The_Effect_of_Dietary_Counseling_for_Weight_Loss_AnnInternMed_2007;147\(1\):41-50](http://www.adaonlinelibrary.com/topic/doi:10.2337/7788libaryEBAGAmericanDnsingerML_TatsioniA_WongJB_ChungM_BalkEM_Meta-analysis:_The_Effect_of_Dietary_Counseling_for_Weight_Loss_AnnInternMed_2007;147(1):41-50)
- Frank A. Conflicts in the care of overweight patients: inconsistent rules and insufficient money. *Obes Res*. May 1997;5(3):268-270.
- Kushner RF. Barriers to providing nutrition counseling by physicians: a survey of primary care practitioners. *Prev Med*. Nov 1995;24(6):546-552.
- Tost AG, Asch DA, Wadden TA. Insurance coverage for obesity treatment. *J Am Diet Assoc*. 2006;106(10):1651-1655.

DISCLOSURE

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