



Factors Associated with Success in the Child Weight Management Program Bright Bodies

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Childhood Obesity

- Incidence of childhood obesity has more than doubled for children aged 2-5 and 12-19, and has tripled in children aged 6-11 over the past 30 years (Hood, 2005).
- Nearly 20% of children in the U.S. are either overweight or obese (Tao, 2005).
- American life expectancy could drop 2-5 years if today's children cannot bring their weight into normal range (Goldsmith, 2005).



Yale Bright Bodies Child Weight Management Program

- Family based intensive lifestyle intervention
- Children 8-16 attend a 50 minute exercise class twice a week
- Participants attend nutrition or behavior modification classes once a week
- Participants weighed weekly and analyzed for body fat percentage (BIA) and body mass index (BMI) at baseline, 6 months, and 12 months of intervention



Why Body Mass Index and Body Fat Percentage is an Indicator of Success

- Body Mass Index:

- Height vs. weight chart
- Initially indicator of starvation in Africa
- Doesn't account for body composition
- Childhood overweight/obesity at >95th percentile for BMI based on age and gender.

- Body Fat Percentage:

- Measured with bioelectrical impedance
- Measure examines body composition
- Different standards for gender.



Aim of Current Study

- The main aim of this study is to examine if there are any significant differences in BMI and BIA change scores between age, gender, and race/ethnicity of Bright Bodies (BB) participants over time :
 - Baseline to six months
 - Baseline to twelve months
 - Six months to twelve months



Child Weight Management Literature Review - Gender

- Effects of a multidisciplinary weight loss intervention on body composition in obese adolescents. (Dao et al., 2004).
- Which factors are associated with a successful outcome in a weight management programme for obese children? (Sabin et al, 2007).
 - Do boys fare better than girls in a family based intensive child weight management program?



Child Weight Management Literature Review - Age

- Which factors are associated with a successful outcome in a weight management programme for obese children? (Sabin et al., 2007).
- Treatment of adolescent overweight and obesity (Tsiros et al., 2008).
 - The current study examines pre-adolescents as a group, adolescents as a group, and examines differences between them.

Child Weight Management Literature Review - Race/Ethnicity

- Racial divergence in adiposity during adolescence: The NHLBI growth and health study. (Kimm et al., 2001).
- Obesity and the development of insulin resistance and impaired fasting glucose in black and white adolescent girls. (Klein et al., 2004),
 - Would these inequities affect the success of participants in a child weight management program in BMI and body fat percentage?



Methods

- Data obtained by researcher was a secondary Excel data file collected by the BB program.
 - Method approved by the SCSU IRB and the Yale HIC.
- Same BB data was analyzed in an article published in the June 2007 issue of The Journal of the American Medical Association (JAMA).

Methods for Initial Data Collection

- Effects of a weight management program on body composition and metabolic parameters in overweight children: A randomized control trial (Savoie et al., 2007).
 - BB collected data between May 2002 and September 2005.
 - Participants randomized 2:1 either to the BB child weight management intervention (105) or the control group (69).
 - Participants were included if they were aged 8-16, above the 95th percentile of weight based upon the CDC growth chart, English speaking, and with a guardian willing to take part in the program (Savoie et al., 2007).



Results of Initial Study

- Significant differences between the intervention and control groups at six and twelve months in weight, BMI, body fat percentage, estimated body fat mass, total cholesterol, fasting insulin, and HOMA-IR (Savoie et al., 2007).
- The present study conducts an additional analysis to examine differences in outcomes based on demographic factors.
- Utilizes the same data, but examines it in a different way.

Data Collection for Current Study

- Upon receipt of BB Excel file:
 - Only used BB intervention group members with complete files (N=72)
 - BMI and body fat percentage change scores calculated over time (baseline - 6 mo., baseline - 12 mo., 6mo. - 12mo.)
 - Race/ethnicity was split into 3 categories (White, Latino, and Black)
 - Age was split into two categories (pre-adolescent 8-11 and adolescent 12-16)
 - All demographic variables given categorical values for regression analysis

Demographics of the Sample

Characteristics (n=72)	Frequency (%)
Gender	
Female	41 (56.9%)
Male	31 (43.1%)
Race/Ethnicity	
White	27 (37.5%)
Latino	21 (29.2%)
African American	24 (33.3%)
Age	
Pre-adolescent (8-11years)	41 (56.9%)
Adolescent (12 – 16 years)	31 (43.1%)



Data Analysis

- Univariate tests

- Run on each demographic group for each time period to determine whether there were significant differences in BMI or BIA change score based on age, gender or race/ethnicity.

- Regression tests

- Run with every variable included in the model at each time period to determine the strength of interaction and significant interactions with BMI or body fat percentage change scores in the model.

Demographic Comparison of BMI Change Scores for Three Time Periods

Demographic Characteristics	Body Mass Index Change Score Mean (std. dev.)		
	Baseline to 6 months	Baseline to 12 months	6 months to 12 months
Gender	<i>p</i> = .825	<i>p</i> = .296	<i>p</i> = .144
Male	1.974 (2.499)	2.047 (3.314)	0.073 (1.418)
Female	1.864 (1.344)	1.329 (2.477)	-0.535 (1.930)
Race/Ethnicity	<i>p</i> = .154	<i>p</i> = .116	<i>p</i> = .374
White/non-Latino	2.460 (2.422)	2.453 (3.380)	-0.007 (1.570)
White/Latino	1.720 (1.311)	1.562 (2.521)	-0.158 (2.084)
African American	1.462 (1.603)	0.788 (2.326)	-0.674 (1.602)
Age	<i>p</i> = .134	<i>p</i> = .006	<i>p</i> = .005
Pre-adolescent (8-11 years)	1.617 (1.652)	0.849 (2.472)	-0.769 (1.801)
Adolescent (12-16 years)	2.300 (2.178)	2.682 (3.056)	0.381 (1.442)

Demographic Comparison of BIA Change Scores for Three Time Periods

Demographic Characteristics	Body Fat Percentage Change Score Mean (std. dev.)		
	Baseline to 6 months	Baseline to 12 months	6 months to 12 months
Gender	<i>p</i> = .037	<i>p</i> = .011	<i>p</i> = .080
Male	5.068 (7.380)	7.339 (9.215)	2.271 (4.409)
Female	1.983 (3.482)	2.493 (4.951)	0.510 (3.807)
Race/Ethnicity	<i>p</i> = .756	<i>p</i> = .793	<i>p</i> = .980
White/non-Latino	3.696 (7.061)	5.056 (8.830)	1.359 (4.203)
White/Latino	3.633 (4.845)	4.943 (7.130)	1.310 (4.230)
African American	2.600 (4.680)	3.725 (6.169)	1.129 (4.171)
Age	<i>p</i> = .692	<i>p</i> = .450	<i>p</i> = .054
Pre-adolescent (8-11 years)	3.544 (4.985)	3.998 (5.793)	0.454 (3.767)
Adolescent (12-16 years)	3.003 (6.552)	5.348 (9.252)	2.345 (4.422)

Body Mass Index Regression Analysis

Time	Adjusted R ² Score	Significant Variable(s)	Level of Significance	Beta Score
Baseline and Six Months	.050 (5%)	African American	.037	-.282
Baseline and Twelve Months	.165 (16.5%)	Age African American	.002 .011	.359 -.324
Six and Twelve Months	.147 (14.7%)	Age	.002	.361

Body Fat Percentage Regression Analysis

Time	Adjusted R ² Score	Significant Variable(s)	Level of Significance	Beta Score
Baseline and Six Months	.034 (3.4%)	Gender	.027	-.273
Baseline and Twelve Months	.081 (8.1%)	Gender	.005	-.345
Six and Twelve Months	.059 (5.9%)	Gender Age	.043 .031	-.246 .260



Gender Discussion

- Literature: One study found boys lost more fat mass; another found boys lost more BMI than girls.
- Body Mass Index: No significant difference at any time.
- Body Fat Percentage: Males decreased BIA more than females at all times for the regression model and most times for the univariate analysis (close at 6mo.-12mo.)
- Implications: Physiological difference in results of exercise; BIA again may be stronger measure of success; different/additional approach to weight management needs to be included w/females?

Age Discussion

- Literature: Previous studies found more younger achievers but wanted more adolescent research.
- Body Mass Index: In the univariate and regression analyses, adolescents decreased BMI significantly more from baseline to 12 months and 6 to 12 months than pre-adolescents.
- Body Fat Percentage: In the regression analysis, but not the univariate analysis, adolescents decreased body fat percentage significantly more than pre-adolescents from 6-12 months.
- Implications: Adolescents decreasing BMI but not BIA significantly more than pre-adolescents could be a testament to the strength of measuring body composition instead of height vs. weight.

Race/Ethnicity Discussion

- Literature: Black girls BMI increases faster than white girls; key divergence age 12
- Body Mass Index: No significant difference in univariate analysis, but not being African American significant at baseline-6mo. and baseline-12 mo. Baseline-12 mo. also has being an adolescent a significant predictor to success.
- Body Fat Percentage: No significant difference at any time.
- Implications: Race in weight management complicated issue. Only demographic factor where univariate and regression analysis didn't match. More study needed to understand role.



Limitations of the Study

- Secondary data analysis
- Couldn't look at all desired factors that may influence success (SES, exercise attendance, family history, access to healthcare, etc.)
- Specific intervention and geography - children from a largely urban area who have participated in a program with nutrition, behavior modification, and exercise classes.



Conclusion

- Raises questions about how childhood overweight should be measured (BMI or body fat percentage).
- This study demonstrates a need to examine demographic and other factors in a comprehensive manner to understand factors that influence success in a child weight management program.

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