

5-2-1–Almost None: Parents’ Perceptions of Changing Health-Related Behaviors in Their Obese Child

Michael Campbell, PhD, LCSW

Jane M Benton, MD

Lloyd N Werk, MD, MPH

Abstract

Objective: Recent clinical pediatric practice guidelines reiterate the importance of key messages to prevent childhood overweight and obesity, including the consumption of at least five servings of fruits or vegetables each day, a limit to screen time (time spent watching TV, using a computer, and playing video games) of two hours or less per day, engagement in at least one hour of physical activity per day, and the consumption of no sugary beverages each day. The perceptions of primary caregivers of obese children of these key messages are less clear. We explored parents’ (or caregivers’) awareness of and confidence in adopting a variation of the expert committee’s recommended (5-2-1–Almost None [AN]) behaviors.

Materials and Methods: Before the initiation of treatment, parents of obese children completed a survey designed to explore their awareness of and confidence in adopting 5-2-1–AN behaviors. Qualitative and quantitative analyses were conducted to assess how aware these families are of 5-2-1–AN behaviors and how confident they would be of their ability to guide adoption of these specific behaviors.

Results: Parents from 193 families indicated that weight management depends substantially on physical activity (63%). However, parents rated as less important consuming fruits and vegetables (17%), controlling portions (13%), eliminating sugary drinks (4%), reducing screen time (3%), eating breakfast each morning (1%), and having family dinners (1%). Almost universally, respondents reported significantly reduced confidence in helping their child adopt nonspecific lifestyle changes in eating and physical activity versus the targeted behaviors identified in 5-2-1–AN.

Conclusion: Parents surveyed for this clinical study readily accept certain aspects of the 5-2-1–AN message as factors in healthy living. Despite low levels of reported awareness of the message, the consumption of almost no sugary drinks was the only actionable behavior in the 5-2-1–AN message that parents felt significantly more confident they could achieve than the nonspecific goal of improved eating. These perceptions can be used to help guide the adoption of 5-2-1–AN strategies as well as help clinicians target messages for specific healthy behavior adoption.

Introduction

One of the most daunting issues facing parents today is the deleterious effect of excess body weight on their children. According to the Centers for Disease Control and Prevention (CDC), between 14% and 19% of children and adolescents in the US are overweight.¹ A similar trend was noted in younger children, with 10% of children between the ages of 2 and 5 years and 15% of children between the ages of 6 and 11 years being obese (body mass index \geq 95th percentile).² Florida is no stranger to this problem, with state

percentages of obese children equal to or greater than national averages.³ Consistent with the rest of Florida, Orlando’s youth are seriously affected by the childhood epidemic of obesity. Further, more than one-quarter of Florida’s children are at risk to become or are already clinically overweight. Early intervention is vital because overweight and obese children are at an increased risk for adult obesity, heart disease, hypertension, diabetes, gallbladder disease, and some cancers.^{4,7}

Recently, an expert committee convened by the American Medical Association, in collaboration with the

Michael Campbell, PhD, LCSW, is a Clinical Social Worker in the Division of Behavioral Pediatrics, Nemours Children’s Clinic, Orlando, FL. E-mail: micampbe@nemours.org.

Jane M Benton, MD, is the Co-Director of the Healthy Choices Clinic in the Division of Consultative Pediatrics, Nemours Children’s Clinic, Orlando, FL. E-mail: jrbenton@pol.net.

Lloyd N Werk, MD, MPH, is the Co-Director of the Healthy Choices Clinic and Chief of the Division of Consultative Pediatrics, Nemours Children’s Clinic, Orlando, FL. E-mail: LWerk@nemours.org.

Department of Health and Human Services' Health Resources and Service Administration and the CDC, produced a series of recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity. The committee found consistent evidence to support targeted behaviors that contribute to a healthy lifestyle.^{8,9} Four specific target behaviors are readily actionable and contribute to better management of the energy equation (caloric energy intake versus energy expended).⁹ These key target behaviors consist of consuming at least five servings of fruits or vegetables each day,^{10,11} limiting screen time (TV, computer, and video games) to two hours or less per day,^{12,13} engaging in at least one hour of physical activity per day,^{14,15} and consuming no sugary beverages each day.^{16,17} The 5-2-1-0 messaging has been adopted widely in regional initiatives, either directly or in a slightly modified form (eg, 5-2-1-Almost None [5-2-1-AN]; www.growuphealthy.com). A survey conducted within a pediatric obesity interest group found that 5-2-1-0 messages or a slight variant are being used in 40% of US regional social marketing campaigns.¹⁸

Through the efforts of Nemours Health and Prevention Services, these targeted behaviors are packaged into the 5-2-1-AN message that Nemours' clinicians and child advocates use to drive policy advocacy initiatives as well as contribute to pediatric weight management in practice. Weight management, as with other healthy lifestyle behaviors, has presented a considerable challenge to traditional medical intervention strategies.^{8,19} The 5-2-1-AN message is tailored to help children and their parents and caregivers better understand concrete ways to live a healthy life. Parents play a key role in facilitating weight control through role modeling, limit setting, and supportive encouragement.^{2,20-22} It is hypothesized that by using 5-2-1-AN as a guide for healthy living, parents have clear direction for actionable behaviors and thus are better positioned to partner with their child and the health care team to negotiate strategies for weight control.^{23,24}

Clinical Setting

Children seen in the Nemours Healthy Choices Clinic (HCC) receive care from a multidisciplinary team of pediatric specialists and allied health professionals who provide evidence-based care and are child and family focused. The comprehensive medical, nutritional, and psychosocial evaluation and treatment of these children requires a team approach²⁵ that promotes the 5-2-1-AN message. Interdisciplinary collaboration

among health care professionals allows each member to contribute to the care of specific patients.²⁶ A key element in this collaboration is coordination of care among clinicians, resulting in greater efficiency and better clinical outcomes.²⁷

Anchored by the 5-2-1-AN message, the HCC model of shared care involves a core health care team working in partnership with the patient and the patient's family to identify opportunities for healthy weight management and to navigate needs and barriers to adopting new behaviors. The shared-care model allows enhanced information exchange beyond routing of notes, adoption of systematic evaluation and treatment, improved patient service, and reduced or eliminated multiple appointments at different sites to improve patient outcomes and satisfaction, as indicated in prior research.^{27,28}

Parents play a key role in facilitating weight control through role modeling, limit setting, and supportive encouragement.^{2,20-22}

Research Design and Methods

We surveyed primary caregivers of obese children regarding their awareness of and confidence in adopting a variation of the expert committee's recommended (5-2-1-AN) behaviors. A convenience sample was chosen of parents from a cohort of racially and ethnically diverse families who came to the HCC between August 2006 and December 2007. Parents completed the survey, adapted from Miller and Rollnick's model²² (which explores respondents' views regarding the importance of adopting healthy lifestyle behaviors, their confidence in their ability to adopt them, and their readiness to do so), and then returned them before the initiation of treatment.

The survey involved both qualitative and quantitative data items. The qualitative survey data was analyzed by categorically ranking healthy lifestyle themes to assess the frequency with which parents identified 5-2-1-AN variables as a component of healthy living. A coding sheet was developed identifying 5-2-1-AN constructs as well as three other weight-control themes that are featured prominently in the literature (controlling portions,²⁹⁻³¹ eating breakfast,^{32,33} and eating family meals^{34,35}). The surveys were coded by two independent reviewers and kappa (K) statistic analyses were run to assess their interrater reliability.³⁶

Quantitative survey data were examined using SPSS (version 14.0, SPSS Inc, Chicago, IL, USA) cross-tabulation analysis to assess respondents' confidence in their ability to make changes with nonspecific goals of healthier eating and engaging in healthier physical

activity and their confidence in their ability to adopt specific 5-2-1-AN behaviors. Scales were created comparing the “top box,” or highest, responses (5) with the combined scores of all others (4 to 1), with scores recoded to allow for comparison. As indicated by market research, the likelihood of engaging in a behavior (buying and brand loyalty) is closely influenced by a reported top box score.^{37,38} Associations between global goal change and 5-2-1-AN variables was assessed using χ^2 analysis.

Results

A total of 193 parents fully completed surveys. Nine surveys met exclusion criteria based on lack of completeness (more than 10% of items unanswered); the excluded families were found to have similar baseline characteristics to those enrolled in the study sample. Of their children, 51% were girls. This ethnically and economically diverse group of children had a mean age of 11.3 ± 3.1 years and mean body mass index that put them in the 99th percentile ($\pm 1.03\%$) for their age (Table 1 and 1A). Medical records reviews and physical examinations showed that all of the respondents' children had some identified comorbidity involving insulin resistance, cardiovascular conditions, underlying respiratory conditions, or sleep disturbance (Table 2).

Characteristic	Value
Female [no. (%)]	108 (51)
Age [mean (SD)] (in years)	11.3 (3.1)
Initial body mass index percentile [mean (SD)]	99 (1.03)
Insurance at first visit [no. (%)]	212 (100)
Race/ethnicity [no. (%)]	212 (100)

Insurance at first visit	no. (%)
Commercial	105 (50)
Medicaid	101 (47)
Self-pay	4 (2)
Tricare (military insurance plan)	2 (1)
Race/ethnicity	no. (%)
American Indian	1 (>1)
Pacific Islander	1 (>1)
Non-Hispanic	111 (52)
Black	36 (17)
White	75 (35)
Hispanic	73 (34)
Black	7 (3)
White	66 (31)
Other	26 (13)

Comorbidity	Percentage
Insulin resistance (acanthosis nigricans and/or hyperinsulinemia)	78.4
Cardiovascular conditions (elevated blood pressure and/or hyperlipidemia)	58.4
Underlying respiratory conditions (asthma and/or exercise intolerance)	57.8
Sleep disturbance	42.7

From the 193 surveys, 375 valid cases of qualitative data yielded strong interrater reliability ($K = 0.98$; $p < 0.001$). Through the use of categorically ranked healthy lifestyle themes, the parents indicated overwhelmingly that they believed engaging in physical activity (63%) to be the most important factor in managing weight, followed by consuming fruits and vegetables (17%), controlling portions (13%), reduced consumption of sugary drinks (4%), reducing screen time (3%), and eating breakfast and family dinners (both <1%).

On a scale of 1 to 5, with 5 indicating the highest level of importance and concern, parents ranked their child's changing of eating habits (mean score, 4.7 ± 0.7) and changing of physical activity habits (mean score, 4.7 ± 0.8) as being highly important and causing a high level of concern (Table 3). Parents reported vastly different levels of confidence that they would be able to adopt specific 5-2-1-AN behaviors. Under the “healthy eating” domain, parents indicated high levels of confidence (mean score, 4.3 ± 1.0) in their ability to remove sugary drinks from diets but lower levels of confidence in their ability to promote eating five servings of fruits or vegetables daily (mean score, 3.9 ± 1.2). In the “physical activity” domain, parents reported higher levels of confidence (mean score, 4.0 ± 1.2) in their ability to promote reduction of screen time but lower levels of confidence (mean score, 3.9 ± 1.2) in their ability to promote engagement in vigorous activity.

Overall confidence in ability to change eating habits and change to specific 5-2-1-AN behaviors (eating at least five servings of fruits and vegetables and consuming almost no sugar-sweetened beverages) was assessed. The percentage of respondents who were confident in their ability to promote change in their child's eating habits was 53.9%. However, only 43.5% felt confident in their ability to get their child to eat more fruits and vegetables daily (5, $p < 0.001$). However, respondents had greater confidence (60.1%) in their ability to promote reduced consumption of sugar-sweetened beverages (AN) ($p < 0.001$).

Overall confidence in ability to change physical

activity habits and to change to specific 5-2-1-AN behaviors (reducing screen time to ≤ 2 hours daily and increasing physical activity to ≥ 1 hour per day) was also determined. The percentage of respondents who were confident in their ability to promote change in their child's overall physical activity habits was 57%. However, only 51.3% of respondents reported that they were confident that they could encourage their children to reduce screen time (2, $p < 0.001$). Finally, only 46.1% of respondents were confident of their ability to promote their child's adoption of at least one hour of physical activity (1, $p < 0.001$).

Discussion

Families face numerous and often overwhelming obstacles in managing their obese child's weight. Though no simple solution exists for weight control, a simplified "road map" for attaining a healthier lifestyle, such as 5-2-1-AN, can focus initial efforts and frame further attempts at adopting behavioral change.

However, among parents of obese children, fewer than half felt confident that they could help their children to achieve an increase in fruit and vegetable consumption and to participate in at least one hour of moderate to vigorous exercise each day. This lack of confidence is particularly concerning because respondents indicated that these two behaviors were the most important factors for achieving weight control. This apparent discrepancy highlights the disconnection between well-intentioned desires to be healthy and the adoption of specific, targeted, and actionable behaviors.

Despite the reported low levels of confidence in ability to promote adoption of certain actionable behaviors, the consumption of almost no sugary drinks was the only actionable behavior in the 5-2-1-AN message for which parents felt significantly more confident in their ability to promote. Targeted behavior negotiation for reducing sugary drink consumption is "low-hanging fruit"—it might provide an attainable starting point for goal setting for adopting a healthier lifestyle. This finding supports the need for negotiated lifestyle behavior changes that are targeted, small, measurable, and attainable. Nonspecific confidence in ability to promote adoption of changes in eating behaviors or physical activity level may represent the respondents' ambition, but actionable change is specific and likely contributed to the decline in confidence. It is by partnering with the family³⁹ in these negotiated tasks that clinicians can help families increase their sense of self-efficacy and thus their confidence in adopting targeted behaviors such as 5-2-1-AN.

Families often arrive for HCC appointments armed with some awareness about these "5" (eating five servings of fruits or vegetables daily) and "1" (engaging in at least one hour of physical activity daily) behaviors but may lack the readiness or confidence to change their habits.²³ This presents an opportunity for the clinician to partner with families in setting realistic and achievable ways to include 5 and 1 behaviors in their lifestyle. Other target behaviors not included in the 5-2-1-AN message (portion control, eating breakfast daily, and encouraging family meals) also appear in varying degrees to be part of the respondents' awareness regarding weight control and should be considered as other targets in promoting healthy weight management.

As with other nonrandomized cohort studies, the use of a convenience sample of patients and families diminishes the applicability of our findings. The survey tool was adapted from a set script used in evaluation of patients with substance abuse, and therefore, the reliability and validity of these survey items in paper form has not been evaluated. In addition to testing survey validity, future research could examine the cultural competence of the instrument to ensure its applicability in different languages and with different cultural groups. Finally, without longitudinal outcomes ideally linked to discrete patient outcomes, the practical and clinical significance of these 5-2-1-AN outcomes are suggestive but not completely clear.

... among parents of obese children, fewer than half felt confident that they could help their children to achieve an increase in fruit and vegetable consumption and to participate in at least one hour of moderate to vigorous exercise each day.

Table 3. Ranking by survey respondents (n = 193) of importance of changing and confidence in ability to change health-related behaviors

Survey topics	Mean score on scale of 1 to 5 (SD)	Percentage of scores of 5
Eating habits		
Importance of changing	4.7 (0.7)	78.0
Confidence in ability to promote change overall	4.1 (1.1)	50.7
Confidence in ability to remove sugary drinks from diet	4.3 (1.0)	56.6
Confidence in ability to promote eating five daily servings of fruits or vegetables	3.9 (1.2)	41.0
Physical activity habits		
Importance of changing	4.7 (0.8)	76.6
Confidence in ability to promote change overall	4.3 (1.0)	53.7
Confidence in ability to promote reduction of screen time (time spent watching TV, using a computer, and playing video games)	4.0 (1.2)	48.3
Confidence in ability to promote engagement in vigorous activity	3.9 (1.2)	43.4

SD = standard deviation

This study contributes to the policy and practice efforts in pediatric weight management and in combating childhood obesity by offering relevant information and identifying factors that affect the application of 5-2-1—AN messaging. Given the expanding use of the 5-2-1—0 interventions, evaluation research such as this study explores the effect of a simple evidence-based message regarding a healthy lifestyle. Continued effort and research is needed to assess the effect 5-2-1—AN messaging has on patient-level outcomes. ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

Acknowledgments

We gratefully acknowledge the invaluable assistance of Sharon Corp, RN, in coordination and survey collection; Teresa Nodal, MD, in data abstraction; and Brenda Marin, MSW, and intern Jason Serrano, BSW, in data coding.

Katharine O'Moore-Klopf, ELS, of KOK Edit provided editorial assistance.

References

1. National Center for Health Statistics Health E-Stats. Prevalence of Overweight Among Children and Adolescents: United States, 2003–2004 [monograph on the Internet]. Hyattsville, MD: US Department of Health and Human Services: Centers for Disease Control and Prevention; 2006 Apr [cited 2009 Jun 22]. Available from: www.cdc.gov/nchs/products/pubs/pubd/hestats/overweight/overwght_child_03.htm.
2. Rhee KE, De Lago CW, Arscott-Mills T, Mehta SD, Davis RK. Factors associated with parental readiness to make changes for overweight children. *Pediatrics* 2005 Jul;116(1):e94–101.
3. Professional Research Consultants. 2006 PRC child and adolescent health assessment: east central Florida [monograph on the Internet]. Oviedo, FL: Health Council of East Central Florida; 2006 [cited 2009 Jun 22]. Available from: www.hcecf.org/HCdocs/2006%20East%20Central%20Florida%20Child%20&%20Adolescent%20Health%20Assessment.pdf.
4. Whitlock EP, Williams SB, Gold R, Smith PR, Shipman SA. Screening and interventions for childhood overweight: a summary of evidence for the US Preventive Services Task Force. *Pediatrics* 2005 Jul;116(1):e125–44.
5. Reilly JJ, Methven E, McDowell ZC, et al. Health consequences of obesity. *Arch Dis Child* 2003 Sep;88(9):748–52.
6. Demerath EW, Schubert CM, Maynard LM, et al. Do changes in body mass index percentile reflect changes in body composition in children? Data from the Fels Longitudinal Study. *Pediatrics* 2006 Mar;117(3):e487–95.
7. Kirk S, Scott BJ, Daniels SR. Pediatric obesity epidemic: treatment options. *J Am Diet Assoc* 2005 May;105(5 Suppl 1):S44–51.
8. Barlow SE; Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics* 2007 Dec;120 Suppl 4:S164–92.
9. Davis MM, Gance-Cleveland B, Hassink S, Johnson R, Paradis G, Resnicow K. Recommendations for prevention of childhood obesity. *Pediatrics* 2007 Dec;120 Suppl 4:S229–53.
10. Childhood Overweight Evidence Analysis Project; updated 2006 [Web page on the Internet]. Chicago, IL: American Dietetic Association; ©2009 [cited 2009 Jun 24]. Available from: www.adaevidencelibrary.com/topic.cfm?cat=1046.
11. Baranowski T, Smith M, Hearn MD, et al. Patterns in children's fruit and vegetable consumption by meal and day of the week. *J Am Coll Nutr* 1997 Jun;16(3):216–23.
12. Biddle SJ, Gorely T, Stensel DJ. Health-enhancing physical activity and sedentary behaviour in children and adolescents. *J Sports Sci* 2004 Aug;22(8):679–701.
13. Marshall SJ, Gorely T, Biddle SJ. A descriptive epidemiology of screen-based media use in youth: a review and critique. *J Adolesc* 2006 Jun;29(3):333–49.
14. Salmon J, Timperio A, Cleland V, Venn A. Trends in children's physical activity and weight status in high and low socioeconomic status areas of Melbourne, Victoria, 1985–2001. *Aust N Z J Public Health* 2005 Aug;29(4):337–42.
15. Harris KM, Gordon-Larsen P, Chantala K, Udry JR. Longitudinal trends in race/ethnic disparities in leading health indicators from adolescence to young adulthood. *Arch Pediatr Adolesc Med* 2006 Jan;160(1):74–81.
16. Welsh JA, Cogswell ME, Rogers S, Rockett H, Mei Z, Grummer-Strawn LM. Overweight among low-income preschool children associated with the consumption of sweet drinks: Missouri, 1999–2002. *Pediatrics* 2005 Feb;115(2):e223–9.
17. Newby PK, Peterson KE, Berkey CS, Leppert J, Willett WC, Colditz GA. Beverage consumption is not associated with changes in weight and body mass index among low-income preschool children in North Dakota. *J Am Diet Assoc* 2004 Jul;104(7):1086–94.
18. NICHQ. National Initiative for Children's Healthcare Quality Childhood Obesity Action Network [Web page on the Internet]. Boston, MA; 2008 [cited 2009 Mar 31]. Available from: www.nichq.org/register_coan.html?returnpage=online_communities/coan/member_resources.html.
19. Wilson GT, Schlam TR. The transtheoretical model and motivational interviewing in the treatment of eating and weight disorders. *Clin Psychol Rev* 2004 Jul;24(3):361–78.
20. Golan M, Crow S. Parents are key players in the prevention and treatment of weight-related problems. *Nutr Rev* 2004 Jan;62(1):39–50.
21. Lindsay AC, Sussner KM, Kim J, Gortmaker S. The role of parents in preventing childhood obesity. *Future Child* 2006 Spring;16(1):169–86.
22. Miller WR, Rollnick S. Motivational interviewing: preparing people for change. 2nd ed. New York: Guilford Press; 2002.
23. Resnicow K, Davis R, Rollnick S. Motivational interviewing for pediatric obesity: Conceptual issues and evidence review. *J Am Diet Assoc* 2006 Dec;106(12):2024–33.
24. Rollnick S, Mason P, Butler C. Health behavior change: a guide for practitioners. London, UK: Churchill Livingstone; 1999.
25. Nowicka P. Dietitians and exercise professionals in a childhood obesity treatment team. *Acta Paediatr Suppl* 2005 Jun;94(448):23–9.
26. Bronstein LR. A model for interdisciplinary collaboration.

- Soc Work 2003 Jul;48(3):297–306.
27. Institute of Medicine, Committee on Quality of Health Care in America. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academy Press; 2001. p 38.
 28. Mitchell G, Del Mar C, Francis D. Does primary medical practitioner involvement with a specialist team improve patient outcomes? A systematic review. *Br J Gen Pract* 2002 Nov;52(484):934–9.
 29. Orlet Fisher J, Rolls BJ, Birch LL. Children's bite size and intake of an entrée are greater with large portions than with age-appropriate or self-selected portions. *Am J Clin Nutr* 2003 May;77(5):1164–70.
 30. McConahy KL, Smiciklas-Wright H, Birch LL, Mitchell DC, Picciano MF. Food portions are positively related to energy intake and body weight in early childhood. *J Pediatr* 2002 Mar;140(3):340–7.
 31. Mrdjenovic G, Levitsky DA. Children eat what they are served: the imprecise regulation of energy intake. *Appetite* 2005 Jun;44(3):273–82.
 32. Lin BH, Huang CL, French SA. Factors associated with women's and children's body mass indices by income status. *Int J Obes Relat Metab Disord* 2004 Apr;28(4):536–42.
 33. Siega-Riz AM, Carson T, Popkin B. Three squares or mostly snacks—what do teens really eat? A sociodemographic study of meal patterns. *J Adolesc Health* 1998 Jan;22(1):29–36.
 34. Gillman MW, Rifas-Shiman SL, Frazier AL, et al. Family dinner and diet quality among older children and adolescents. *Arch Fam Med* 2000 Mar;9(3):235–40.
 35. Videon TM, Manning CK. Influences on adolescent eating patterns: the importance of family meals. *J Adolesc Health* 2003 May;32(5):365–73.
 36. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977 Mar;33(1):159–74.
 37. Menzes MAJ, Serbin J. Xerox Corporation: the customer satisfaction program, case no. 591-055. Boston: Harvard Business School Publishing Division; 1991.
 38. Reichheld FF. The one number you need to grow. *Harv Bus Review* 2003 Dec;81(12):46–54, 124.
 39. Golan M. Parents as agents of change in childhood obesity—from research to practice. *Int J Pediatr Obes* 2006;1(2):66–76.

Overeating

Diseases caused by overeating are cured by fasting;
those caused by starvation are cured by feeding up.

Diseases caused by exertion are cured by rest;
those caused by indolence are cured by exertion.

To put it briefly: the physician should treat disease
by the principle of opposition to the cause of
the disease according to the form.

— Hippocratic Writings, *Hippocrates*, c 460 BC – c 370 BC,
ancient Greek physician in the Age of Pericles