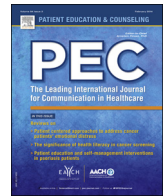




Contents lists available at ScienceDirect

Patient Education and Counseling

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



Adolescents with at-risk eating and lifestyle behaviors are affected by after school schedules across the clinical weight spectrum

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ARTICLE INFO

Article history:

Received 2 May 2016

Received in revised form 14 February 2017

Accepted 3 March 2017

Keywords:

Adolescent

Obesity

Dietary intake

Health behavior

Health promotion programs

ABSTRACT

Objective: Evaluate adolescent lifestyle patterns to develop more effective health promotion programs. **Methods:** An interview approach was employed to gain in-depth understanding of eating and activity behaviors. Adolescents aged 13–18 years (n=43) from clinically normal and obese weight categories were enrolled. Nutrient intake and food group servings were obtained from a food frequency questionnaire.

Results: Four participant subgroups were identified and labeled: "Idle, Engaged, Balanced and Working." "Idle" adolescents were sedentary, sometimes napped, and often snacked after dinner. "Engaged" adolescents participated in extra-curricular activities for the majority of their after school hours. "Balanced" adolescents participated in a single after-school activity followed by sedentary time; they consumed meals consistently and often snacked after dinner. "Working" adolescents were the least sedentary with limited sleep duration and inconsistent meals; they often substituted a meal with a snack. Weight status did not differentiate subgroups effectively.

Conclusions: Each group demonstrated at-risk behaviors for obesity. Future programs should consider after-school schedules and use activity and meal pattern assessments, not simply weight status, for program tailoring.

Practice implications: Pediatric health care providers could identify at-risk behaviors through routine assessment of diet and activity patterns in combination with weight monitoring.

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1. Introduction

Pediatric obesity remains a significant public health issue and contributes to the development of chronic disease [1–3]. Behavioral health promotion programs (HPPs) have been implemented among obese adolescents, but few have been reproducibly successful [4]. The American Academy of Pediatrics recommends targeting physical inactivity, sleep duration, sedentary/screen time, and dietary patterns for pediatric obesity prevention, consistent with cohort studies [5–11]. Pediatric nutrition HPPs frequently promote substituting high fat or sugary snacks for healthier alternatives, limiting sugar-sweetened beverage intake, and reducing consumption of fast food to prevent or treat obesity [9,12–15].

Adolescent behavior change interventions often focus on school-based programs. However, prior HPPs achieved limited success with small or non-significant changes in body mass index (BMI). [16–19] School-based HPPs face issues of sustainability given increased pressure on schools to concentrate on standardized testing [16,20]. After school HPPs, in an individual or group format, are feasible as part of the school environment or as separate community efforts. These HPPs primarily focus on increasing physical activity (PA) and improving eating habits, since school programs have facilities for PA and can offer designated snack times where healthy snacks could be provided [16].

Given the challenges faced by school-based programs, the after school period could be an opportune time to offer HPPs to adolescents. However, adolescents' after school schedules could influence whether they participate in these programs, if HPPs compete with extra-curricular activities and sporting practice or events. A comprehensive understanding of diet and PA patterns is needed to identify windows of opportunity to intervene and better tailor HPPs, for both treatment and prevention purposes, to participant needs [21]. Recent studies found effective HPPs begin

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with a knowledgeable foundation of behavioral patterns and environmental influences [21,22]. Individual interviews can provide rich, descriptive data about behavioral patterns, preferences, and challenges as a component of the formative intervention development process. Therefore, the purpose of this study was to assess adolescents' eating and activity behaviors to develop and better tailor lifestyle HPPs for obesity prevention and treatment.

2. Methods

Participants were recruited at an urban children's hospital outpatient pediatric clinics, using on-site recruitment methods for patients and electronic advertisements sent to hospital employees for their children. Inclusion criteria included adolescents aged 13–18 years who were clinically normal weight or obese. In pediatric populations, the 95th to 99th BMI percentile is considered "clinically obese," and the 5th to 85th percentile is considered

"clinically normal/healthy weight." [9] In this study, purposive sampling was used to recruit both normal weight and obese adolescents to better ensure variation in lifestyle and eating patterns would be captured. Those diagnosed with diabetes (type 1 or 2), prescribed steroid medications for >2 weeks, pregnant or postpartum, or non-English speaking were excluded. Individuals enrolled in college also were excluded, since it was expected that their lifestyles would be different from those of school-age.

Interested individuals were screened through an in-person or telephone interview to determine eligibility. Once eligibility was established, an interview was scheduled. Interviews conducted at pediatric clinics required documentation of BMI using a digital stadiometer and scale. Interviews conducted at non-clinic locations (e.g., public library) required guardians to bring their child's height and weight from their most recent clinic visit to record BMI. Adolescents were interviewed alone while guardians completed a questionnaire about household demographic

Table 1
Demographic characteristics of participant subgroups from a sample of normal weight and obese adolescents (n=43).

	Idle (n = 13)	Engaged (n = 12)	Balanced (n = 13)	Working (n = 5)	P-value ^a
Demographic Characteristics					
Age (years)	15 (14, 18)	14 (13, 18)	15 (13, 18)	18 (16, 18)	0.006
Body Mass Index (BMI; kg/m ²)	24.4 (19.5, 34.6)	21.3 (17.8, 33.0)	23.1 (16.6, 44.5)	39.8 (21.9, 40.9)	0.09
BMI percentile	70.0 (40.0, 98.0)	63.5 (22.0, 99.0)	80.0 (3.00, 100.0)	100.0 (63.0, 100.0)	0.15
			n (%)		P-value ^b
Gender					0.92
Female	6 (46.2%)	5 (41.7%)	7 (53.8%)	3 (60.0%)	
Male	7 (53.8%)	7 (58.3%)	6 (46.2%)	2 (40.0%)	
Race					0.16
African American	6 (46.2%)	6 (50%)	4 (30.8%)	5 (100%)	
Caucasian	7 (53.8%)	4 (33.3%)	7 (53.8%)	0 (0.0%)	
Hispanic	0 (0.0%)	2 (16.7%)	1 (7.7%)	0 (0.0%)	
Asian American	0 (0.0%)	0 (0.0%)	1 (7.7%)	0 (0.0%)	
BMI category					0.38
Obese	6 (46.2%)	4 (33.3%)	6 (46.2%)	4 (80.0%)	
Clinically normal/healthy weight	7 (53.8%)	8 (66.7%)	7 (53.8%)	1 (20.0%)	
Adolescent lives with parent	13 (100%)	10 (83.3%)	12 (92.3%)	5 (100.0%)	0.34
Guardian education level ^c					0.21
Less than 12th grade/HS diploma or GED	2 (18.2%)	3 (27.3%)	0 (0.0%)	2 (50%)	
Vocational/trade school/some college	5 (45.5%)	2 (18.2%)	6 (46.2%)	1 (25%)	
Bachelor's degree/advanced degree	4 (36.4%)	6 (54.5%)	7 (53.8%)	1 (25%)	
Guardian employment ^c					0.08
Employed full time	8 (72.7%)	7 (63.6%)	10 (76.9%)	1 (25.0%)	
Employed part-time	2 (18.2%)	3 (27.3%)	3 (23.1%)	0 (0.0%)	
Full-time homemaker	1 (9.1%)	0 (0.0%)	0 (0.0%)	1 (15.0%)	
Disabled/unable to work	0 (0.0%)	1 (9.1%)	0 (0.0%)	2 (50.0%)	
Guardian is primary income provider of household ^c	7 (63.6%)	9 (81.8%)	7 (58.3%)	4 (100.0%)	0.41
Guardian marital status ^c					0.71
Never married	2 (18.2%)	4 (36.4%)	2 (15.4%)	2 (50.0%)	
Married	5 (45.5%)	5 (45.5%)	8 (61.5%)	1 (25.0%)	
Separated/divorced	4 (36.4%)	2 (18.25%)	3 (23.1%)	1 (25.0%)	
Number of children in household ^c					0.49
≤1 child	3 (27.3%)	3 (27.3%)	5 (38.5%)	1 (25%)	
2 children	4 (36.4%)	3 (27.3%)	4 (30.8%)	3 (75%)	
3 children	1 (9.1%)	2 (18.2%)	4 (30.8%)	0 (0.0%)	
≥4 children	3 (27.3%)	3 (27.3%)	0 (0.0%)	0 (0.0%)	
Guardian household income ^c					0.48
≤\$10,000–\$29,999	4 (36.4%)	4 (40.0%)	4 (30.8%)	3 (75.0%)	
\$30,000–\$69,999	2 (18.2%)	1 (10.0%)	1 (7.7%)	1 (25.0%)	
≥\$70,000	5 (45.5%)	5 (50.0%)	8 (61.5%)	0 (0.0%)	
Guardian race					0.04
White	6 (50.0%)	4 (36.4%)	10 (76.9%)	0 (0.0%)	
African American	6 (50.0%)	6 (54.5%)	3 (23.1%)	5 (100.0%)	

^a P < 0.05 used for statistical significance; due to non-normality, p values are based on the Wilcoxon test.
^b P < 0.05 used for statistical significance based on Chi-Square test or Fisher's exact test for small cell counts.
^c Some cell counts do not equal the subgroup sample size due to missing data for the guardian demographic questionnaire.

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