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A lifestyle assessment and intervention tool for pediatric weight management: the HABITS questionnaire

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Abstract

Background—Lifestyle assessment and intervention tools are useful in promoting pediatric weight management. The present study aimed to establish convergent validity and reliability for a quick simple measure of food intake and physical activity/sedentary behaviour. The HABITS questionnaire can be used to identify and monitor behavioural intervention targets.

Methods—Thirty-five youths (ages 7–16 years) were recruited from the waiting area of the Jacobi Medical Center Child and Teen Health Services. To establish convergent validity for the HABITS questionnaire, study participants completed the HABITS questionnaire, a 24-h recall and a modified version of the Modifiable Activity Questionnaire for Adolescents (MAQ). Participants completed a second HABITS questionnaire within 1 month to assess test–retest reliability. Internal consistency for dietary and physical activity/sedentary behaviour subscales was assessed using Cronbach’s alpha, and test–retest reliability was assessed using Cohen’s Kappa coefficient. Spearman’s rank correlation coefficients were calculated for individual items using the 24-h recall and the MAQ as reference standards.

Results—The HABITS questionnaire subscales showed moderate internal consistency (Cronbach’s alpha of 0.61 and 0.59 for the dietary and physical activity/sedentary behaviour subscale, respectively). The test–retest reliability was 0.94 for the dietary subscale and 0.87 for the physical activity/sedentary behaviour subscale. Several items on the HABITS questionnaire were moderately correlated with information reported in the MAQ and the 24-h recall ($r = 0.38$ – 0.59 , $P < 0.05$).

Conclusions—The HABITS questionnaire can reliably be used in a paediatric setting to quickly assess key dietary and physical activity/sedentary behaviours and to promote behaviour change for weight management.

Keywords

assessment tool; children; dietary behaviours; physical activity; primary care

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Conflict of interests, source of funding and authorship

The authors have participated fully in the conception and design of the work, as well as writing of the manuscript, and take public responsibility for it. We consider that the manuscript represents valid work, have reviewed the final version of the submitted manuscript, and approve it for publication. Neither this manuscript nor one with substantially similar content under our authorship has been published or is being considered for publication elsewhere. We certify that, before its commencement, the Institution Review Board (IRB) approved this study. There are no affiliations with or involvement in any organisation or entity with a direct financial interest in the subject matter or materials discussed in this manuscript (e.g. employment, consultancies, stock ownership, honoraria, expert testimony, retainers).

Introduction

Assessment and intervention at the primary care level are greatly needed to combat the increasing rates of childhood and adolescent obesity (Ogden *et al.*, 2008). Parents and children must be made aware of the health risks associated with a poor diet and inactivity and educated on how to effectively modify these behaviours. Existing assessment tools for quantifying energy intake and expenditure among youth can be time consuming, require special resources and may not easily translate into intervention strategies (Rockett & Colditz, 1997; Rockett *et al.*, 2003). In a paediatric clinical setting, these tools have limited feasibility as a means to promote healthy lifestyle habits.

The HABITS questionnaire was developed by the Family Weight Management Program at Jacobi Medical Center in the Bronx (NY, USA). It was designed for use in a clinical setting as a way to identify, track and monitor key modifiable weight-related behaviours (i.e. diet, physical activity and sedentary behaviours) and to serve as a springboard to negotiate a patient's willingness to change these behaviours. Goal setting theory suggests that setting specific behavioural goals (e.g. limit sugary beverage consumption), in contrast to general goals (e.g. lose weight), increases self-efficacy and leads to the sustained adoption of healthy behaviours (Strecher *et al.*, 1995; Bodenheimer & Handley, 2009). Working collaboratively with patients and families to set realistic and achievable goals is important for the prevention and treatment of obesity.

The present study aimed to establish convergent validity and reliability for the HABITS questionnaire. A validated instrument, such as this one, could be of great value for primary care and other clinical settings that provide services to overweight children.

Materials and methods

The 19-item HABITS questionnaire (see Appendix) assesses a variety of weight-related behaviours: eating regular meals, frequency of fruit and vegetable consumption, the consumption of high calorie beverages, type and quantity of milk, water, 'junk' food and fast food, time spent playing outside, watching television, playing video games, eating with the television on, as well as, measuring out food portions. These targeted behaviours were based on the 1998 Obesity Expert Committee recommendations (Barlow & Dietz, 1998). For the purpose of the present study, the HABITS questionnaire was divided into two subscales: one for dietary behaviours and one for physical activity/sedentary behaviour. Each item was coded and summary scores were computed so that higher scores indicated healthier behaviour.

Thirty-five youths were recruited from the waiting area of the Jacobi Medical Center Child and Teen Health Services. Parents and children gave their written consent and assent. To establish convergent validity for the HABITS questionnaire, participants (ages 7–16 years) completed the HABITS questionnaire, a 24-h food recall and the Modifiable Activity Questionnaire (MAQ) for Adolescents (Aaron *et al.*, 1995). A literature review by Serdula *et al.* (2001) suggests that 24-h food recalls can approximate energy intake within 10% of observed energy intake. The MAQ has a 1 month test–retest reliability of $r = 0.79$ and has been significantly correlated with 7-day physical activity records ($r = 0.55–0.83$). Both measures have been used to validate other food assessment/physical activity questionnaires in children and adolescents (Rockett *et al.*, 1997). To evaluate test–retest reliability, the same group of youth completed a second HABITS questionnaire 1–4 weeks later. Height and weight were obtained and recorded for each patient using standard of care techniques.

The internal consistency of the subscales was calculated with the Cronbach's alpha coefficient. Spearman's rank correlation coefficient was calculated for each behaviour using the 24-h recall and the MAQ as reference standards. The test-retest reliability of each behaviour in the HABITS questionnaire was assessed using Cohen's Kappa coefficient (κ) (Cohen, 1960). Data were analysed using SPSS, version 13.0 (SPSS Inc., Chicago, IL, USA). The protocol was approved by the Committee of Clinical Investigations of the Albert Einstein School of Medicine and the Jacobi Medical Center.

Results

Participants had a mean (SD) age of 11.8 (2.3) years; 43% had a body mass index $\geq$ 85th percentile for age and sex (Kuczmarski *et al.*, 2002), 63% were male, 54% percent were Hispanic and 34% were black. Scores on the dietary and physical activity/sedentary behaviour subscales did not vary by age, sex, or race. Body mass index was negatively correlated with the physical activity subscale ($r = -0.39$, $P = 0.03$) but was not significantly correlated with the dietary subscale.

Eating fruit, eating fast food, drinking soda (a sugary beverage) and drinking water were all significantly correlated with information reported in the 24-h recall ($r = 0.44$ – 0.55 ; $P < 0.01$). Drinking milk and milk type were also significantly correlated with the 24-h recall ($r = 0.38$, 0.50 ; $P < 0.05$). Watching television and playing video games on weekdays and weekends were both significantly correlated with the questions on the MAQ that asked about television watching ($r = 0.56$ and 0.59 , $P < 0.01$).

The individual items of the dietary subscale had fair to substantial test-retest reliability ($\kappa = 0.27$ – 0.78), whereas the individual items of the physical activity/sedentary behaviour subscale had fair to moderate test-retest reliability ($\kappa = 0.29$ – 0.48) (Landis & Koch, 1977). Examined as a whole, the dietary subscale and the physical activity/sedentary behaviour subscale had high test-retest reliability, $r = 0.94$ and 0.87 , respectively. Furthermore, these subscales showed moderate internal consistency, $\alpha = 0.61$ for the dietary subscale and $\alpha = 0.59$ for the physical activity/sedentary behaviour subscale.

Discussion

This psychometric evaluation of the HABITS questionnaire lends support for its continued use as a brief screening tool. The dietary and physical activity/sedentary behaviour scales had moderate internal consistency and high test-retest reliability, consistent with other similar self-report measures (Downes, 2008; Li & Levy-Milne, 2008; West & Sanders, 2009). Individual dietary and physical activity/sedentary behaviour items had fair to substantial kappas. As shown in other studies, individual food and physical activity items may have lower rates of reproducibility (Snyder *et al.*, 2004; Matthys *et al.*, 2007). Several items on the HABITS questionnaire were moderately correlated with information reported in the MAQ and the 24-h recall.

There are limitations to the present study. Self-report of dietary intake is often underestimated (Schoeller, 1995), whereas self-report of physical activity is often overestimated (Adams *et al.*, 2005). Information reported in the HABITS questionnaire may reflect such bias. In addition, obtaining multiple 24-h dietary recalls, instead of just one, may have provided a more accurate representation of dietary intake. Some of the items on the HABITS questionnaire were not significantly correlated with the reference standard. Likewise, the use of an objective measure of physical activity (e.g. accelerometer) in combination with the MAQ would have been preferable for validating physical activity/sedentary behaviour items on the HABITS questionnaire. Furthermore, the small sample

size and the age range of the sample limits the generalisability of this study. However, children included in this validation study were similar to the population the tool was designed for, a low-income, inner-city population.

Establishing healthy lifestyle habits should be the goal of any obesity prevention and treatment programme, regardless of weight change, because of the long-term health benefits of these behaviours (Barlow, 2007). The HABITS questionnaire has been successfully used for several years in the Jacobi Weight Management Program as an easy and fast way to assess lifestyle behaviours, promote behaviour change and monitor individual progress. As a brief, office-based tool for assessment and intervention, the HABITS questionnaire can be used to provide weight-management services to a large number of patients, helping primary care providers and families establish a dialogue about weight-related lifestyle behaviours. The psychometric evaluation of the HABITS questionnaire provides further support for its continued use in a paediatric clinical setting.

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Appendix. HABITS questionnaire

In this section, we are interested in knowing about your personal habits. Please tell me what answer best describes your situation.

1. In the past month, how often did you:

	Never	Sometimes	Every day
A. Eat three meals per day?	0	1	2
B. Eat fruit?	0	1	2
C. Eat vegetables?	0	1	2

2. Do you sometimes eat an extra meal, a snack, a bowl of cereal, or ‘seconds’:

1. Yes
0. No

3. In the past month, how often did you drink?

	Never/less than once a week	Several times a week	Once a day	Twice or more a day
A. Juice at home? (like apple or orange)	0	1	2	3
B. Other drinks at home? (like ice tea, lemonade, fruit punch, Kool-Aid, Capri Sun, Sunny Delight, Snapple, Gatorade, Vitamin Water)	0	1	2	3
C. Soda?	0	1	2	3
What kind?	Diet	Regular	Both	None
D. Milk or other milk products?	0	1	2	3
What kind?	Whole	Low fat (1%)	Low fat (2%)	Skim

	Never/less than once a week	Several times a week	Once a day	Twice or more a day
E. Water?	0	1	2	3

4. In the past month, how many times did you:

	Never	Once	Twice or More a Week	
A. Eat a fast food meal? (pizza, Chinese, hamburgers, fried chicken)	0	1		2
	Never/less than once a week	Several times a week	Once a day	Twice or more a day
B. Eat 'Junk food'? (candy bars, potato chips cookies)	0	1	2	3
C. Go outside to play? (ride a bike, do karate, jump rope, play basketball)	0	1	2	3

5. In the past month, how much time did you?

	<1 h	1 h	2 h	3 h or more a day
A. Watch television on a weekday?	0	1	2	3
B. Watch television on a weekend?	0	1	2	3
	Every day	Sometimes	Never	
C. Eat with the television on?	2	1	0	