

Primary Care Providers' Self-Efficacy and Outcome Expectations for Childhood Obesity Counseling

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Abstract

Background: Primary care providers have a role in the prevention and management of childhood obesity. We explored the relationship of providers' self-efficacy, outcome expectations, and practice level support with childhood obesity counseling frequency.

Methods: Providers ($n=123$) completed a survey that assessed their self-efficacy, outcome expectations, and reported obesity counseling frequency. A practice level assessment tool was used to characterize the practices. We analyzed data using frequencies and proportional odds modeling.

Results: Providers were confident or very confident (78.5–93.5%) in their ability to counsel about healthy eating, physical activity, and weight and agreed or strongly agreed (64.2–86.2%) that their counseling would result in actual changes. Providers with higher outcome expectations were more likely [odds ratio (OR)=3.4] to report providing obesity counseling. Female providers were more likely to report counseling about obesity (OR=2.3) than males. Providers in practices with resources for healthy eating and physical activity reported higher levels of self-efficacy and counseling frequency.

Conclusions: In our study, providers were confident in their ability to provide obesity counseling and expected changes from their efforts, suggesting that future studies should build on the high level of outcome expectations as well as self-efficacy. The gender difference found regarding obesity counseling may need further exploration.

Introduction

Obesity in children is a significant public health issue, with one-third of children considered either overweight (defined as a BMI 85% to <95%) or obese (BMI ≥95%).¹ Obesity in childhood tracks into adulthood, and as a consequence leads to an increased risk of cardiovascular disease and some cancers.^{2,3} Given the significant health risks associated with childhood obesity, providers have started placing more emphasis on addressing this “epidemic” on a national level.^{4,5}

Because of their important relationship with children and parents, providers can play an active role in the prevention, assessment, and treatment of this chronic disease in accordance with the American Academy of Pediatrics

guidelines.⁶ Ideally, obesity can be discussed during routine and nonurgent clinical visits and may be well accepted by parents and younger adolescents, who often seek advice about healthy eating, physical activity, and obesity prevention from their primary care providers.^{7,8} In addition, several clinic-based interventions have shown positive effects, such as modest weight loss, improved diet quality, and increased physical activity.^{9–13}

Social cognitive theory suggests that ones' self-efficacy (confidence in one's ability to do a given behavior), outcome expectations (a person's expectation that performing an action will lead to a specific result), and perceived environmental barriers and facilitators can influence behavior.¹⁴ Previous studies exploring providers' attitudes and beliefs have been descriptive in nature and have shown that

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providers believe that childhood obesity needs treatment, affects chronic disease risk, and deserves their attention.^{15,16} In several studies, providers reported that they do not feel confident in their ability to counsel obese children and believe that obesity counseling is ineffective.^{16,17} Competing priorities in a busy clinical practice in addition to perceived barriers, such as lack of time, practice, and community level resources, and reimbursement may make it less likely for providers to spend time discussing obesity.^{5,18,19} Previous studies have explored practice characteristics (number of staff, location, and access to educational material and community resources) and preventive service delivery, not including obesity.^{20,21} Practice characteristics vary greatly, but these characteristics may impact the provider's ability to provide preventive services, such as obesity-related counseling. Because these studies were descriptive in nature, we cannot draw any conclusions regarding the relationship of providers' attitudes and beliefs or practice characteristics with counseling frequency.

Therefore, we conducted a study using cross-sectional survey data from providers in North Carolina to explore the relationship of providers' self-efficacy, outcome expectations, and practice characteristics with reported counseling frequency. A secondary aim addressed whether the frequency of obesity preventive counseling differed relative to other preventive topics.

Methods

Study Participants

Providers at pediatric practices completed a survey regarding their attitudes, beliefs, and practices regarding childhood obesity prevention and management. The providers were sampled from practices that had agreed to participate in a randomized intervention trial. The aim for the larger intervention trial was to improve provider assessment and counseling for childhood obesity, for children between the ages of 3–8 years, with and without the support of Expanded Food and Nutrition Education Program (EFNEP) practitioners. Multiple strategies were used to recruit practices, including a network of public and private health care providers, lists, and personal contacts. After practices enrolled, they were randomized to one of three interventions: (1) Provider only; (2) provider, case manager and EFNEP; and (3) delayed intervention. Although practices were given a minor incentive, individual providers were not given any additional incentive for participating in the larger intervention. This study was approved by the University of North Carolina at Chapel Hill review board, and providers gave written consent.

Provider Survey

We modified a previously used survey and tested the face validity with a group of providers ($n=5$) not enrolled in this study.^{22–24} Researchers administered the survey

before the provider training and intervention activities during the years 2007–2008.

The primary outcome for this substudy was providers' self-reported counseling frequency, and the independent variables included providers' self-efficacy and outcome expectations. Counseling frequency regarding healthy eating, physical activity (PA), weight, general behavior problems, school problems, and age-specific injury risk prevention was assessed on a 4-point Likert scale (1 = never to 4 = all of the time) by asking the providers "When you see children ages 3–8 for well child checks, how often do you discuss the following topics...." Providers' self-efficacy was assessed by having them rate their level of confidence on a 4-point Likert scale (1 = not at all confident to 4 = very confident) in their ability to effectively counsel families about increasing fruit and vegetable (FV) consumption, decreasing sugar-sweetened beverage (SSB) consumption, decreasing juice consumption, switching to a lower-fat milk, decreasing "junk food" consumption, reducing screen time, and increasing outdoor activity. To assess outcome expectations, providers were asked to rate their level of agreement on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree) with the following statement for the same behaviors as above: "I believe that my counseling families will result in actual change regarding...."

In addition to the independent variables of interest, providers were asked for demographic information, including gender, age, years in practice, patient volume, provider type (provider, nurse practitioner/physician assistant), and perceived weight status. Providers were also asked if they had received any additional training in obesity or motivational interviewing.

We developed composite scores for reported counseling regarding healthy eating, physical activity, and obesity prevention by summing the providers' responses within each topic area for both self-efficacy and outcome expectations and then dividing by 4. The obesity prevention subscale included items regarding healthy eating, physical activity, and weight. The standardized Cronbach alpha values suggested that internal consistency was good to high for healthy eating (self-efficacy, outcome expectations: 0.95, 0.91), physical activity (0.79, 0.87), and obesity prevention (0.93, 0.94). We also developed a summary score for obesity prevention counseling frequency by summing the responses and dividing by 4 regarding counseling frequency for healthy eating, PA, and weight, which achieved a similarly high level of internal consistency (0.83).

Practice Level Assessment Tool

The study team developed a tool to aid the implementation of intervention tools in the larger study. The assessment tool was completed by observation and surveying practice staff to assess whether practices had electronic medical record (yes, no), had identified a non-provider to calculate and plot BMI (yes, no), or had

resources (educational handouts and posters, access to community or clinical programs) for the promotion of healthy eating and/or PA (yes, no).

Data Analysis

STATA 9.2 (College Station, Texas) was used for all analysis. We used descriptive statistics to describe provider demographics, attitudes, and beliefs. We used single test of proportions (*Z*-test) to determine whether there were differences between reported counseling frequencies for obesity-related and non-obesity-related topics. We chose the proportional odds model to explore the relationship of providers' self-efficacy and outcome expectations with counseling frequency because it has more power than logistic regression and it does not force an artificial cut point.^{25–27} A random effects term was used to account for clustering of providers within practices, and estimations were based upon bootstrapped samples. Model assumptions were tested using the Brant test for parallel regression and the approximate likelihood-ratio test of proportionality of odds across response categories.²⁸

For models with independent categorical variables, we explored two different models—a model with dummy variables and a model with a binary predictor variable.²⁹ Due to small *n* values in the lowest categories, self-efficacy and outcome expectation response categories were combined. Those rating as 2 or lower for self-efficacy or outcome expectations were defined as having low self-efficacy or low outcome expectations, respectively. For the dependent variables with zero observations in the lowest response category, we combined the two lowest categories, resulting in a 3-point Likert scale. For the subscales of self-efficacy and outcome expectations for healthy eating, PA, and obesity prevention counseling, the variables were dichotomized ($0 \leq 2$, and $1 \geq 3$) for analyses.

Results

A total of 123 providers from 23 practices completed the baseline provider survey, including physicians, nurse practitioners (NPs), and physician assistants (PAs). The 23 practices had an average of 4.7 ± 2.9 full-time (FT) physicians, 1.4 ± 1.6 part-time (PT) physicians, 1.7 ± 1.9 FT PAs or NPs, 0.5 ± 0.8 PT PAs or NPs, 5.2 ± 6.8 FT nurses, 0.5 ± 0.8 PT nurses, 6.0 ± 4.5 FT front desk staff, and 0.9 ± 1.4 PT front desk staff. Although the majority were pediatric practices ($n=18$), some were community health centers ($n=4$) and a family medicine practice ($n=1$). The practices came from both rural ($n=8$) and suburban ($n=15$) areas.

On average, participants were 44.6 ± 9.7 years old and had been practicing on average 12.8 ± 9.3 years. As seen in Table 1, 68.3% of respondents were female and most were physicians (74.0%) versus NPs or PAs (26.0%). Slightly more than 50% of the providers reported seeing 11–19 patients per half day (53.7%). The majority (70.7%) also reported that they were personally at a healthy weight.

Table 1. Characteristics of the Study Sample (N = 123)

	Frequency <i>n</i> (%)
Gender	
Female	84 (68.3)
Provider type	
Provider (MD/DO)	91 (74.0)
NP/PA	32 (26.0)
Perceived weight status	
Underweight	1 (0.8)
Healthy weight	87 (70.7)
Overweight	35 (28.5)
Received additional training in obesity	53 (43.1)
Received additional training in motivational interviewing	40 (32.5)
Number of patients seen per half day	
≤ 10 patients per half day	33 (26.8)
11–19 patients per half day	66 (53.7)
≥ 20 patients per half day	22 (17.9)

MD, medical doctor; DO, doctor of osteopathic medicine; NP, nurse practitioner; PA, physician assistant.

Majority of the providers rated their confidence as a 3 or 4 on a 4-point scale (73.1–93.5%) to effectively counsel children about age appropriate topics and obesity-related behaviors. They also agreed that their counseling efforts could make a positive impact; 64.2–86.2% reported that they somewhat or strongly agreed that their counseling could result in change (Table 2). Using the single test of proportion (*Z*-test), a greater proportion of providers reported that they counseled “most of the time” or “all of the time” about healthy eating (95.1%) and PA (91.9%) compared to general behavior problems (76.4%), school problems (77.2%), and age-specific injury risk prevention (84.6%) at a *p* value < 0.05. However, there was not a significant difference between the proportion of providers who frequently discussed weight (81.3%) than general behavior problems (*p* = 0.16), school problems (*p* = 0.24), or age-specific injury risk prevention (*p* = 0.35).

Female providers were more likely to report higher levels of self-efficacy for increasing FV consumption [odds ratio (OR) = 2.2; 95% confidence interval (CI) = 1.0, 4.9], decreasing SSB consumption (OR = 2.2; 95% CI = 1.2, 4.2), decreasing “junk food” intake (OR = 3.0; 95% CI = 1.1, 7.8), healthy eating (OR = 2.1; 95% CI = 1.0, 4.4), reducing screen time (OR = 2.5; 95% CI = 1.1, 5.7), PA (OR = 3.0; 95% CI = 1.3, 7.0), and preventive counseling (OR = 2.3; 95% CI = 1.1, 4.7). Female providers

Table 2. Providers' Reported Self-Efficacy, Outcome Expectations, and Counseling Frequency

	Response categories n (%)			
	1	2	3	4
Self-efficacy^a				
Discuss children's weight status with parents	1 (0.8)	9 (7.3)	67 (54.5)	46 (37.4)
Increasing fruit and vegetable consumption	2 (1.6)	17 (13.8)	58 (47.1)	46 (37.4)
Decreasing sweetened beverage consumption	1 (0.8)	7 (5.7)	60 (48.8)	55 (44.7)
Decreasing juice consumption	1 (0.8)	9 (7.3)	56 (45.5)	57 (46.3)
Switching to lower fat milk	0 (0.0)	9 (7.3)	57 (46.3)	57 (46.3)
Decreasing "junk food" consumption	2 (1.6)	11 (8.9)	64 (52.0)	46 (37.4)
Decreasing general behavior problems	1 (0.8)	32 (26.0)	72 (58.5)	18 (14.6)
Reducing screen time (n=121)	3 (2.5)	23 (19.0)	58 (47.9)	37 (30.6)
Increasing outdoor activity	2 (1.6)	14 (11.4)	68 (55.3)	39 (31.7)
Decreasing age-specific injury risk	1 (0.8)	19 (15.4)	79 (64.2)	24 (19.5)
Outcome expectations^a				
Discuss children's weight status with parents	6 (4.9)	32 (26.0)	80 (65.0)	5 (4.0)
Increasing fruit and vegetable consumption	3 (2.4)	32 (26.0)	82 (66.7)	6 (4.9)
Decreasing sweetened beverage consumption	4 (3.2)	19 (15.4)	81 (65.8)	19 (15.4)
Decreasing juice consumption	3 (2.4)	22 (17.9)	82 (66.7)	16 (13.0)
Switching to lower fat milk	3 (2.4)	14 (11.4)	83 (67.5)	23 (18.7)
Decreasing "junk food" consumption	7 (5.7)	31 (25.2)	79 (64.2)	6 (4.9)
Decreasing general behavior problems	4 (3.2)	36 (29.3)	79 (64.2)	4 (3.2)
Reducing screen time (n=122)	10 (8.2)	32 (26.2)	73 (59.8)	7 (5.7)
Increasing outdoor activity	6 (4.9)	38 (30.9)	70 (56.9)	9 (7.3)
Counseling frequency^a				
Healthy eating	0 (0.0)	6 (4.9)	50 (40.6)	67 (54.5)
Physical activity	0 (0.0)	10 (8.1)	61 (49.6)	52 (42.3)
Achieving/maintaining a healthy weight	0 (0.0)	23 (18.7)	60 (48.8)	40 (32.5)
General behavior problems	0 (0.0)	29 (23.6)	57 (46.3)	37 (30.1)
School problems	1 (0.8)	27 (21.9)	56 (45.5)	39 (31.7)
Age-specific injury risk prevention	0 (0.0)	19 (15.4)	52 (42.3)	52 (42.3)

Reported frequencies and proportions/percentages

^aResponse categories for self-efficacy are 1 = not at all confident, 2 = minimally confident, 3 = confident, 4 = very confident; outcome expectations are 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree; and counseling frequency are 1 = never, 2 = some of the time, 3 = most of the time, 4 = all of the time.

were also more likely to believe that their counseling efforts were effective for increasing FV consumption (OR=2.7; 95% CI=1.5, 4.9), decreasing SSB consumption (OR=2.2; 95% CI=1.0, 4.7), decreasing juice consumption (OR=2.2; 95% CI=1.1, 4.5), healthy eating (OR=1.9; 95% CI=1.3, 2.8), increasing outdoor activity (OR=2.1; 95% CI=1.1, 4.3) and PA (OR=2.0; 95% CI=1.0, 4.1), and preventive counseling (OR=1.8; 95% CI=1.2, 2.7). Females were also more likely to counsel

frequently about healthy eating (OR=3.2; 95% CI=1.5, 6.7), PA (OR=2.5; 95% CI=1.2, 5.4) and overall obesity specific counseling (OR=2.3; 95% CI=1.1, 4.8).

Providers who had any obesity training reported higher levels of self-efficacy decreasing SSB (OR=2.7; 95% CI=1.2, 6.2), decreasing juice (OR=2.6; 95% CI 1.1, 5.99), switching to lower fat milk (OR=2.8; 95% CI=1.3, 6.3), decreasing "junk food" (OR=1.9; 95% CI=1.0, 3.5), and reducing screen time (OR=2.5; 95% CI=1.1,

5.7). Providers who had any obesity training reported higher levels of outcome expectations for increasing outdoor activity (OR=2.5; 95% CI=1.1, 5.9). Obesity training also influenced how frequently providers reported counseling about nutrition (OR=2.3; 95% CI=1.2, 4.2) but not PA or weight. Providers' years in practice, perceived weight status, provider type (physician, NP, or PA), motivational interviewing training, or patient volume were not associated with reported self-efficacy, outcome expectations, or counseling frequency for obesity prevention.

Providers who reported greater self-efficacy for increasing outdoor activity (OR=3.5; 95% CI=1.0, 11.9) and overall physical activity (OR=4.0; 95% CI=1.7, 9.3) were

more likely to counsel about physical activity (Table 3). Providers who expected changes (higher outcome expectations) from their counseling efforts for healthy eating (OR=3.2; 95% CI=1.6, 6.7), PA (OR=3.3; 95% CI=1.6, 6.6), and obesity prevention (OR=3.4; 95% CI=1.7, 6.7) were more likely to counsel about obesity prevention. Providers' outcome expectations remained significant for healthy eating (OR=3.1; 95% CI=1.5, 6.5), PA (OR=2.4; 1.1, 5.1), and obesity prevention (OR=2.9; 95% CI=1.5, 5.8) after controlling for providers' self-efficacy and gender.

The practice level assessment tool characterized practice level support for addressing childhood obesity. Only 3 out of the 23 practices reported having an electronic medical

Table 3. Relationship of Provider Attitudes and Beliefs with Reported Obesity-Related Counseling Frequency

	Model 1 (SE)		Model 2 (OE)		Model 3 (SE and OE)	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Healthy eating CF						
Increasing fruit and vegetable consumption	1.5 (0.5, 4.4)	1.3 (0.4, 3.9)	3.3 (1.6, 6.9)	2.8 (1.4, 5.9)	1.1 (0.4, 3.2) 3.2 (1.6, 6.6)	1.0 (0.3, 2.9) 2.9 (1.4, 6.0)
Decreasing sweetened beverage consumption	1.7 (0.4, 6.6)	1.1 (0.3, 4.2)	3.2 (0.2, 50.7)	2.7 (0.8, 9.5)	1.2 (0.1, 11.6) 3.1 (0.4, 23.3)	0.9 (0.1, 12.2) 2.8 (0.8, 9.1)
Decreasing juice Consumption	1.6 (0.0, 28.1)	1.2 (0.2, 8.9)	2.5 (0.9, 6.8)	2.3 (0.9, 6.0)	1.1 (0.1, 7.9) 2.4 (0.8, 7.5)	0.9 (0.1, 6.6) 2.4 (0.9, 6.7)
Switching to lower fat milk	2.0 (0.6, 6.4)	1.5 (0.4, 4.8)	1.4 (0.5, 4.1)	1.5 (0.4, 5.4)	1.8 (0.2, 21.1) 1.2 (0.3, 4.3)	1.3 (0.3, 4.9) 1.4 (0.4, 4.9)
Decreasing "junk food" consumption	1.7 (0.5, 5.8)	1.1 (0.4, 3.3)	2.6 (1.2, 5.4)	2.6 (1.2, 5.5)	1.3 (0.3, 5.1) 2.5 (1.2, 5.0)	0.8 (0.1, 5.4) 2.7 (1.3, 5.7)
Overall nutrition	1.7 (0.6, 4.5)	1.4 (0.6, 3.5)	3.2 (1.6, 6.7)	3.1 (1.5, 6.3)	1.1 (0.4, 3.1) 3.2 (1.4, 6.9)	1.0 (0.4, 2.6) 3.1 (1.5, 6.5)
Physical activity CF						
Reducing screen time	1.7 (0.6, 4.2)	1.1 (0.5, 2.4)	2.8 (1.3, 6.0)	2.6 (1.3, 5.4)	1.3 (0.4, 4.1) 2.5 (1.0, 6.3)	1.0 (0.1, 6.2) 2.3 (0.9, 5.8)
Increasing outdoor activity	3.5 (1.0, 11.9)	2.8 (0.7, 10.5)	2.5 (1.2, 5.1)	2.3 (1.2, 4.7)	2.7 (0.9, 8.4) 2.2 (1.1, 4.4)	2.2 (0.6, 7.9) 2.1 (1.0, 4.4)
Overall physical activity	4.0 (1.7, 9.3)	3.4 (1.5, 7.7)	3.3 (1.6, 6.6)	3.0 (1.5, 6.3)	3.1 (1.3, 7.2) 2.5 (1.2, 5.4)	2.8 (1.2, 6.4) 2.4 (1.1, 5.1)
Achieving/maintaining a healthy weight CF						
Discuss children's weight status with parents	2.1 (0.0, 113.0)	1.9 (0.0, 312.4)	1.5 (0.6, 3.7)	1.5 (0.7, 3.4)	1.8 (0.0, 173.0) 1.4 (0.6, 3.3)	1.7 (0.0, 214.8) 1.4 (0.6, 3.3)
Obesity prevention CF						
Prevention counseling	0.7 (0.0, 1.4)	1.8 (1.0, 3.5)	3.4 (1.7, 6.7)	3.3 (1.7, 6.5)	1.3 (0.6, 2.8) 3.1 (1.5, 6.3)	1.3 (0.6, 2.5) 2.9 (1.5, 5.8)

The dependent variables are presented in the far most left column. The statistically significant associations are in bold. Model 1 models self-efficacy with the dependent variables. Model 2 models the relationship of outcome expectations with the dependent variables. Model 3 models the relationship of both self-efficacy and outcome expectations as predictor variables with the dependent variables. For each outcome, the first line under the columns for model 3 shows the ORs and AORs for self-efficacy controlling for outcome expectations, and the second line shows the ORs and AORs for outcome expectations controlling for self-efficacy.

CF, counseling frequency; SE, self-efficacy; OE, outcome expectations; OR, odds ratio; AOR, adjusted odds ratio (95% confidence interval), controlling for gender.

record (EMR) system that calculated BMI. The majority of the practices reported that BMI was plotted by someone other than the provider (83%) and that they are currently using resources to promote obesity prevention (74%), including educational handouts, posters, and sometimes referrals to a community program or dietitian. The association of these practice characteristics was tested with provider self-efficacy, outcome expectations, and counseling frequency. The characteristic practice resources was significantly associated with provider's self-efficacy for counseling about increasing FV consumption (OR=1.8; 95% CI=1.0, 3.1) and increasing outdoor activity (OR=1.8; 95% CI=1.1, 2.9). The association between the other practice characteristics, presence of an EMR, and having someone other than the provider plot the BMI, were not significantly associated with providers reported self-efficacy, outcome expectations, or obesity counseling frequency.

Discussion

This study has three key findings: (1) Providers are confident and expect changes from their counseling efforts; (2) female providers are more likely to report higher levels of self-efficacy, outcome expectations, and frequently counseling about obesity; and (3) provider attitudes and beliefs are associated with reported counseling frequency. This finding correlates with social cognitive theory, suggesting that social cognitive theory may be a useful framework for describing provider behavior regarding obesity prevention and treatment.

Contrary to previous studies, many providers in our sample expressed confidence in their ability to counsel families about obesity.^{15,16,23} It is encouraging that we found that providers in this study reported that they felt that counseling about obesity-related topics would result in actual change in that behavior, such as switching to lower-fat milk, which also contrasted with previous reports where providers felt that obesity treatment was ineffective^{16,17} The high levels of reported self-efficacy and effectiveness of obesity-related counseling may highlight the conceptual difference between "prevention" (addressing key obesigenic behaviors) and "treatment" (behaviors leading to weight loss), with the latter being more difficult.⁴ Furthermore, the increased availability of training opportunities and increased awareness about childhood obesity may have all impacted this shift in provider attitudes and beliefs.

We found that providers' gender was associated with their reported self-efficacy, outcome expectations, and obesity-related counseling frequency in our study. Rattay and colleagues also found that female providers are more likely to counsel about obesity.³⁰ The reason for the gender difference is unclear in Rattay's study and our study. Previous studies have found that female providers have longer visits with patients and spend more time building rapport, which may offer a partial explanation for why females counsel more about obesity-related behaviors.³¹⁻³³

Our findings confirmed our hypothesis that providers' attitudes and beliefs are associated with the frequency of obesity-related counseling. We found a stronger relationship for providers' outcome expectations with counseling about obesity-specific topics than providers' self-efficacy for counseling about obesigenic behaviors, suggesting that outcome expectations is more predictive of reported counseling behavior. The findings suggest that having obesity training has a positive impact on provider's self-efficacy. It is also possible that providers have had positive experiences working with patients regarding obesity-specific topics, thus influencing their self-efficacy and outcome expectations. The finding by Kant et al. gives some hope that provider counseling may impact behavior. They found that 60% of adolescents who were counseled about overweight had tried to lose weight in the past year and, compared to those who were not counseled, ate fewer calories per kilogram of body weight.³⁴

This study has several limitations that need to be considered. The findings may not be generalizable given that the sample was made up of providers in practices that agreed to participate in a childhood obesity intervention trial in one state and may have been more motivated than providers in nonparticipating practices. We were unable to objectively measure counseling frequency; therefore, the providers may have overreported their counseling frequency. The high levels of reported self-efficacy could also be attributed to the fact that these providers were very motivated and to the statewide activities around obesity prevention, North Carolina's Eat Smart, Move More campaign.^{16,23} Although there was a high level of internal reliability for the provider survey, we must rely on face validity based upon its use in studies by Perrin et al.²²⁻²⁴ We cannot be confident that all model assumptions were met due to small cell sizes for some response categories; thus, our findings are exploratory in nature.

Nevertheless, our study adds to the literature on provider attitudes, beliefs, and counseling behavior regarding obesity prevention and treatment in several ways. First, to our knowledge, this is the first study to report provider outcome expectations for specific obesity-related behaviors. Second, we have shown that females are more likely to report higher levels of self-efficacy, outcome expectations, and counseling frequency for obesity. We found that providers in practices with resources for healthy eating and PA were more likely to report higher self-efficacy and counseling about weight. Last, we have demonstrated that providers' attitudes and beliefs are associated with reported obesity counseling frequency.

Conclusion

Primary care providers have the opportunity and responsibility to participate in the prevention and management of childhood obesity. Although primary care providers may not be able to manage obese children and adolescents sufficiently without additional support and

referral resources as concluded by the United States Preventive Services Task Force (USPSTF) recommendations,³⁵ they have an important role in prevention and early identification. Providers are in a position to assess healthy eating and PA patterns in all children and adolescents, regardless of weight status, to promote the achievement or maintenance of a healthy weight.⁶

Our findings, if confirmed with a larger sample, have several implications for studies to implement the guidelines set forth by the Expert Review Committee and the most recent USPSTF guidelines.^{6,35} First, strategies to enhance providers' outcome expectations in addition to self-efficacy should be incorporated, such as those suggested by Perrin et al. for self-efficacy.²³ According to social cognitive theory, if providers' self-efficacy is increased, providers will have more positive outcome expectations, which will in turn lead to increased counseling about obesity.¹⁴ The second is that our finding that there was a gender difference regarding provider attitudes, beliefs, and counseling behavior warrants further study. Last, studies that help providers employ resources effectively for healthy eating and PA to enhance their self-efficacy and increase obesity counseling frequency are needed.

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