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Prevention and Management of Obesity in Children with Autism Spectrum Disorder among Primary Care Pediatricians

Morgan Walls, MD^a, Sarabeth Broder-Fingert, MD, MPH^b, Emily Feinberg, ScD^c, Mari-Lynn Drainoni, PhD^d, and Megan Bair-Merritt, MD, MSCE^e

^aDepartment of Pediatrics, Boston University School of Medicine, Boston Medical Center, 88 East Newton Street, Vose 3, Boston, MA 02118; Current affiliation: Department of Pediatrics, Carolinas Healthcare System, 1350 S. Kings Drive, Charlotte, 28207

^bDepartment of Pediatrics, Boston University School of Medicine, Boston Medical Center, 88 East Newton Street, Vose 3, Boston, MA 02118

^cDepartment of Pediatrics, Boston University School of Medicine; Department of Community Health Sciences, Boston University School of Public Health, 801 Massachusetts Ave, Boston, MA, 02118

^dDepartment of Health Law, Policy and Management, 715 Albany Street, Talbot building, Boston, MA 02118; Department of Medicine, Boston University School of Medicine

^eDepartment of Pediatrics, Boston University School of Medicine, Boston Medical Center, 88 East Newton Street, Vose 3, Boston, MA 02118

Abstract

Children with autism spectrum disorder (ASD) are at high risk for being overweight and obese. Little is known about how obesity in children with ASD is being addressed in primary care. This article reports findings from a survey completed by 327 general pediatricians, which included a fictional clinical vignette and Likert-scales assessing attitudes, practices, self-efficacy, and barriers to obesity management. Although the majority of respondents agreed pediatricians should be the main providers to manage obesity in children with ASD, few reported receiving adequate training to do so. Pediatricians were more likely to refer to developmental-behavioral pediatricians and

Correspondence concerning this article should be addressed to: Morgan Walls, 1350 S. Kings Drive, Charlotte, NC 28207. mwalls@bu.edu.

Morgan Walls, MD is now at Carolinas Healthcare System, Department of Pediatrics, Charlotte, NC.

Morgan Walls, MD, Department of Pediatrics, Boston University School of Medicine, Boston Medical Center, Boston, MA; Sarabeth Broder-Fingert, MD, MPH, Boston University School of Medicine, Boston Medical Center, Boston, MA; Emily Feinberg, ScD, Department of Pediatrics, Boston University School of Medicine; Department of Community Health Sciences, Boston University School of Public Health, Boston, MA; Mari-Lynn Drainoni, PhD, Department of Health Law, Policy and Management, Department of Medicine, Boston University School of Medicine, Boston, MA; Megan Bair-Merritt, MD, MSCE, Department of Pediatrics, Boston University School of Medicine, Boston Medical Center, Boston MA

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dietitians for a child with ASD compared to a child without ASD. Higher self-efficacy was associated with increased weight-related counseling frequency by pediatricians.

Keywords

autism spectrum disorder; obesity; overweight; weight management; primary care

Childhood obesity is a significant public health problem, with nearly 32% of US children classified as overweight and 17% classified as obese (Ogden CL, Carroll MD, Kit BK, & Flegal KM, 2014). Children with Autism Spectrum Disorder (ASD) have been shown to have an even higher prevalence of overweight and obesity than children without ASD, with estimates of obesity prevalence as high as 30% (Broder-Fingert, Brazauskas, Lindgren, Iannuzzi, & Van Cleave, 2014; Curtin, Jojic, & Bandini, 2014; Phillips et al., 2014). In addition, similar to typically developing children, Hispanic ethnicity, lower parental education and public insurance further increase the risk of obesity in children with ASD (Broder-Fingert, Brazauskas, et al., 2014; Hill, Zuckerman, & Fombonne, 2015). It is likely that multiple factors such as restricted food variety, challenging mealtime behaviors, pharmacological therapies, genetics and disordered sleep impact weight gain in this population (Curtin, Anderson, Must, & Bandini, 2010; Curtin et al., 2014; Hill et al., 2015; Must, Phillips, Curtin, & Bandini, 2015; Nadon, Feldman, Dunn, & Gisell, 2011). Parents of children with ASD also are more likely to report barriers to physical activity compared to those of typically developing children (Must et al., 2015). Given these factors, pediatricians may need to tailor nutrition and weight management counseling to the specific circumstances of children with ASD.

Childhood obesity increases the risk of future conditions such as obstructive sleep apnea, metabolic syndrome, impaired glucose tolerance and type 2 diabetes (Kolagotla & Adams, 2004). Given the potential implications of obesity, several national health-related organizations have emphasized the importance of addressing childhood obesity (Daniels, Hassink, & Nutrition, 2015; US Preventive Services Task Force et al., 2017). The US Preventative Services Task Force published a statement in 2017, continuing to recommend obesity screening for children and adolescents ages 6 and older (US Preventive Services Task Force et al., 2017). The American Academy of Pediatrics (AAP) and the Institute of Medicine agree that healthcare providers are a crucial component of successful weight control and obesity prevention (Daniels et al., 2015). Recent studies have shown primary care interventions can be effective for reducing childhood body mass index (BMI) and improving quality of life (O'Connor et al., 2017; Resnicow et al., 2015; Taveras et al., 2017). In addition to addressing obesity, the AAP also stresses the importance of primary care pediatricians (PCPs) increasing their knowledge of ASD and management of its associated conditions (Myers & Johnson, 2007). Prior research has shown that children with ASD and their families have more frequent primary care visits, and also have longer physician visits than children without ASD (Liptak, Stuart, & Auinger, 2006). This more frequent interface provides a unique opportunity for PCPs to positively affect children with ASD and their families during their interactions. As such, it is important that pediatricians are comfortable and competent with screening and counseling on obesity for children with ASD.

Little is known about how pediatricians are managing overweight and obese children with ASD in primary care practice. In order to develop effective interventions around weight management children with ASD, it is important to first examine existing practices of pediatricians who care for this population. Therefore, the objectives of this study were to examine pediatricians' attitudes, self-efficacy, practices, and barriers around obesity management in children with ASD. We also sought to examine if practices and self-efficacy differ when caring for children with ASD compared to typically developing children, and if there is an association between self-efficacy and likelihood of weight-related counseling during well-visits.

Methods

Study Design

We conducted an anonymous, cross-sectional survey study of a national sample of primary care pediatricians practicing in the US in 2016. The authors' institutional IRB approved the study. The survey included adapted validated Likert-scale measures from prior childhood obesity literature, as well as fictional case vignettes of a well-care visit for an obese child. Participants were randomized 1:1 to receive either a case vignette with a child with ASD or to receive a vignette with a child who did not have ASD. Vignettes varied only on this developmental diagnosis.

Participants

A sample of 1500 pediatricians received the survey via mail. The sample was selected at random from the American Medical Association Masterfile, a comprehensive physician listing of licensed physicians in the US. Pediatricians were eligible if they were listed as practicing outpatient general pediatrics. Respondents who self-identified as specialists or spending less than 50% of their time in clinical care were asked to return the survey blank, indicating their ineligibility on the survey. To encourage participation, pediatricians received a two-dollar bill along with the initial survey and non-respondents received a second survey mailing six weeks after the initial mailing.

Survey Development

The survey instrument was designed using the conceptual framework of the Attitudes, Social-norms, and Self-efficacy model or ASE model (Es, Nagelkerke, Colland, Scholten, & Bouter, 2001; Schellart, Zwerver, Anema, & van der Beek, 2013; Vries, Dijkstra, & Kuhlman, 1988). The ASE model suggests that individuals with greater knowledge, higher self-efficacy and positive attitudes regarding an outcome of a behavior are more likely to engage in the behavior. Based on the ASE model, the survey assessed four primary areas: attitudes, self-efficacy toward nutrition and obesity counseling, practices in obesity counseling and management, and perceived barriers to addressing unhealthy weight in children with ASD. Item measures were largely adapted from previously validated survey instruments identified in the literature (Kolagotla & Adams, 2004; Lowenstein et al., 2013; Perrin, Flower, Garrett, & Ammerman, 2005; Story et al., 2002). Survey demographic measures included provider sex, race/ethnicity, age, years since pediatric residency, practice type, practice location, percentage of Medicaid-insured patients, and estimated percentage of

patients with ASD. Prior to its use, the survey was tested for face validity in 5 outpatient general pediatricians not included in the study and clarifications were made on any survey items that were not well understood.

Attitudes

Based on a prior study assessing practitioner attitudes about obesity treatment (Story et al., 2002), attitudes were assessed with attitudinal statements, such as “Obesity is a significant problem for children with autism” (Table 2). Responses assessed level of agreement on a 5-point Likert scale (1=Strongly disagree, 5=Strongly agree).

Self-efficacy and practices

We developed fictional clinical vignettes to assess self-efficacy and practices. Respondents either received a survey about a child with an ASD diagnosis or a survey about a child who did not have ASD but did have dyslexia (Appendix 1). The vignette began with a case of a 12 year-old child (either with or without ASD) presenting to the pediatrician for a well-child visit. The child’s mother reports that she is concerned about the child’s behavior and poor sleep. While reviewing the growth chart, it is evident that the child meets the body mass index (BMI) criteria for obesity (95th percentile for BMI). Respondents were then asked to rank order topics that they feel are the most important to discuss at the well-child visit. This question included the option to rank topics related to weight but also to address other concerns raised at the visit or provide age-appropriate anticipatory guidance.

The vignette continued with the same child/mother returning for a visit 6-months later with the chief complaint of weight gain. The mother describes the child as a picky eater and spending many hours on his tablet and watching TV. Adapted from previously published work (Lowenstein et al., 2013), following the vignette, self-efficacy was assessed by having pediatricians rate their level of confidence on a 5-point Likert scale (1=Not at all confident to 5=Very confident) in their ability to counsel the mother on healthy weight habits, such as increasing fruits and vegetable consumption and increasing physical activity (Table 3). A 5-point Likert scale assessed the likelihood of taking particular actions following the visit, such as referring to a dietitian or a development-behavioral pediatrician. Independent of the vignettes, we asked pediatricians about their frequency of counseling on weight-related items, such as healthy eating and physical activity, when seeing children with ASD at well visits, also adapted from a validated scale (Likert scale: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=All of the time, Lowenstein et al., 2013, Table 4).

Barriers

We assessed barriers to weight counseling for children with ASD by having respondents rank order potential barriers to weight counseling that they have experienced in their clinical practice. Potential barriers were guided by prior literature on childhood obesity (Kolagotla & Adams, 2004; Story et al., 2002), with the addition of barriers hypothesized to be more common for children with ASD, such as presence of other medical conditions in the child.

Statistical Analysis

Data were analyzed using SAS 9.3 software (Cary, NC). We assessed for non-response bias by comparing demographics for the survey respondents to non-respondents using chi-square test for categorical variables and t-tests for continuous variables. Descriptive statistics were conducted using frequencies and percentages. Five-point Likert responses were dichotomized for comparison (scores of 4 and 5 versus other responses). We used chi-square tests to examine differences in self-efficacy and in management practices, by vignette type (child with ASD compared to child without ASD).

Based on prior work, we developed average scores for self-efficacy and frequency of weight-related counseling at well-visits (Lowenstein et al., 2013). We first measured internal consistency between the survey items for the self-efficacy construct and for the counseling frequency construct using Cronbach's alpha. There was high internal consistency between the five items for self-efficacy (Cronbach's alpha=0.90) and among the four items for counseling frequency (Cronbach's alpha=0.82). All item measures were scaled on a 5-point Likert scale with a neutral anchor of "3". Scores of 4 or 5 indicated positive responses (confident or very confident for self-efficacy, and often or always for counseling frequency). To create the average scores for self-efficacy and counseling frequency, we summed the 5-point Likert responses for the items within the construct and divided by the number of total items included in the construct. We then dichotomized the self-efficacy average score to reflect lower or higher self-efficacy (with scores <4 representing lower self-efficacy and scores ≥4 representing higher self-efficacy). We repeated this for counseling frequency, dichotomizing the average score to reflect lower or higher counseling frequency (scores <4 represent less frequent counseling and scores ≥4 more frequent). We used multivariable regression modeling with dichotomized variables to determine the association between physician self-efficacy (independent variable) and frequency of weight-related counseling (outcome). We assessed for potential confounding variables including age, gender, race/ethnicity, years in practice, practice location, and training and included variables that were associated with the independent variable and outcome in the adjusted regression model. In addition, using chi-square tests, we examined associations between provider/practice characteristics and self-efficacy and weight-related counseling frequency. We also examined associations between responses to attitudinal statements and self-efficacy and weight-related counseling frequency.

Results

Response rate

We mailed the survey to 1500 physicians identified as general pediatricians through the AMA Masterfile. Eighty surveys were returned to sender due to incorrect addresses and 30 surveys were returned blank with indication that respondent was either retired, not a primary care pediatrician or ineligible for the survey based on criteria given. We received 327 completed surveys, for a response rate of 24%. There was no significant difference between survey responders and non-responders by age ($p=0.17$), sex ($p=0.48$) or location by US region ($p=0.23$).

Sample

Demographics and practice characteristics of the study sample are summarized in Table 1. The majority of the survey respondents were female (65%). Pediatricians between the ages 36–50 represented 48.6% of the sample. Regarding practice characteristics, the majority of respondents worked in private practice (61%) or a community hospital/network (24%). The most common practice locations were suburban (55%) and urban (31%) locations. After randomization, there were no significant differences found in physician or practice characteristics by vignette type.

Attitudinal Statements

The majority of pediatricians agreed/strongly agreed that obesity is a significant problem for children with ASD (65.1%) and that it is more challenging to manage obesity in children with ASD when compared to typically developing children (94%). While most pediatricians (62%) agreed that pediatricians should be the main providers to manage overweight/obesity in children with ASD, only 5.5% of pediatricians agreed that PCPs receive the appropriate training to manage obese children with ASD. Pediatricians generally did not feel like obesity is a priority for families of children with ASD (Table 2). Despite this, 54.4% of pediatricians believe that their counseling of families of children with ASD could result in actual change in the child's diet and activity behavior.

Self-Efficacy

Pediatricians reported high levels of self-efficacy in their ability to counsel on weight-related topics, irrespective of vignette type. Pediatricians felt most confident in their ability to counsel on decreasing sugary beverages (92.1% confident/very confident) and their ability to counsel on increasing physical activity (81.7% confident/very confident). When comparing self-efficacy on counseling ability for the ASD vignette vs. non-ASD vignette, pediatricians had significantly lower self-efficacy with regards to counseling on screen time/media use for children with ASD (OR: 0.57, 95% CI: 0.35,0.94). We did not find significant differences in self-efficacy between the ASD and non-ASD vignette for diet or physical activity counseling (Table 3).

Obesity Prevention and Management Practices

After being presented with the vignettes, respondents with the ASD vignette were less likely to rank discussion around screen time (4.4% vs. 13.1%, $p=0.006$) and the child's diet (35.7% vs. 45.6%, $p=0.09$) as a first or second priority for the visit compared to the non-ASD vignette. Respondents with the ASD vignette were more likely to prioritize discussion on sleep concerns compared to those with the non-ASD vignette (67.9% vs. 52.7%, $p=0.005$).

When comparing management practices for the ASD vignette versus the non-ASD vignette, respondents were more likely to refer the child with ASD to a dietitian (OR: 1.79, CI: 1.14, 2.79) and a developmental-behavioral pediatrician (OR: 3.85, CI: 2.32, 6.38). Pediatricians were less likely to assess access to healthy food items for the ASD-child vignette compared to the non-ASD vignette (OR: 0.63, CI: 0.40, 0.99). We found no significant difference in practices by vignette type for counseling on diet or exercise, referral to weight management or physical activity programs, or assessing access to safe space for play (Table 4).

Self-efficacy and Likelihood of Weight-Related Counseling

Reported self-efficacy for weight-related counseling was significantly associated with likelihood of counseling on weight-related topics at well visits for children with ASD. After adjusting for survey vignette type, respondent age, sex and years since pediatric training, respondents with higher self-efficacy had 2.58 times the odds (95% CI: 1.57, 4.24) of reporting more frequent weight-related counseling at well-visits for children with ASD.

Association between Pediatrician Characteristics and Attitudes and Self-efficacy and Weight-Related Counseling

We found no significant association between the percentage of patients with ASD a pediatrician has and their reported self-efficacy or reported weight-related counseling frequency. We did find that agreeing/strongly agreeing that general pediatricians should be the main providers to manage obesity in ASD was associated with more frequent weight-related counseling (OR: 1.72, 95% CI: 1.10, 2.70). Similarly, agreement that counseling of families of children with ASD on healthy eating and activity behaviors can result in actual change was associated with more frequent weight-related counseling ($p<0.01$) and with higher self-efficacy ($p<0.01$). Pediatricians who agreed that weight management was a priority for families of children with ASD had higher odds of reporting increased counseling frequency (OR: 3.16, 95% CI: 1.83, 5.47, $p<0.001$).

Barriers

The most frequent barriers reported by pediatricians to the management of obesity in children with ASD were lack of clinician time (ranked in top 2 barriers by 42.2%) and pediatricians' perception that caregivers did not perceive the child's weight as a concern (ranked top 2 by 37.9%). Other frequent barriers to management included the lack of support/referral services for weight management (top 2: 33.6%) and the perceived lack of effective therapies for obesity management in children (top 2: 30.9%). Few pediatricians reported lack of knowledge or skills as a barrier to management.

Discussion

Our study results suggest that pediatricians find obesity and overweight to be more challenging to manage in children with ASD compared to typically developing children. Nearly all respondents reported that pediatricians were not adequately trained to manage obesity in children with ASD, and were more likely to refer children with ASD to specialty services such as a dietitian or developmental-behavioral pediatrician. Having higher self-efficacy regarding weight management and counseling was positively associated with more frequent weight-related counseling at routine visits for children with ASD. The most frequent reported barriers to obesity management in children with ASD were lack of adequate clinician time and caregivers not perceiving their child's weight as a concern.

This is the first study to our knowledge to assess pediatricians' self-efficacy and attitudes toward obesity management in children with ASD. Our finding that pediatricians are more likely to refer children with ASD compared to those without ASD to a dietitian and developmental-behavioral pediatrician may reflect lower levels of perceived competency

with obesity management in this population. These findings are consistent with results of a prior study of pediatric residents, which found low self-perceived competency and comfort when caring for children with ASD in the hospital setting (Broder-Fingert, Ferrone, Giauque, & Connors, 2014). A study by Golnik et al found that physicians reported lower competency in caring for children with ASD when compared to other children with chronic medical diagnoses, such as other neurodevelopmental disorders or complex medical conditions (Golnik, Ireland, & Borowsky, 2009). Conversely, these findings may also suggest that pediatricians have increased awareness of the complexity of caring for this population and therefore recognize the need for specialty support services in their management. Little is known however regarding if and how specialists, such as developmental-behavioral pediatricians, are currently addressing obesity and weight-related concerns in their practice.

The finding that pediatricians may feel less confident in their ability to counsel on screen time is important given prior evidence that increased sedentary media use is associated with childhood obesity (Chassiakos et al., 2016). Our finding is consistent with the comparatively lower self-efficacy in counseling on screen time, when compared to self-efficacy in counseling on dietary habits reported in the study by Lowenstein et al (Lowenstein et al., 2013). In a study of children with ASD and their typically developing siblings, children with ASD spent significantly more time TV watching and playing video games compared to their siblings (Mazurek & Wenstrup, 2013). Screen time in children with ASD may also be complicated by increased use of technology for behavioral interventions and adaptive purposes (Lee et al., 2015). Media use, however, has been shown to be a potentially modifiable risk factor for obesity (Liao, Liao, Durand, & Dunton, 2014). Therefore, despite these challenges, it is important that pediatricians feel equipped to discuss screen time and media use with families and promote healthy activity behaviors for obese children with ASD.

Pediatricians generally reported higher levels of self-efficacy around dietary counseling. Self-efficacy in dietary and nutrition counseling is particularly important given that children with ASD have been shown to consume more sweetened beverages and fewer vegetables than typically developing children (Evans et al., 2012), and pediatricians may be able to advise to families about healthier dietary options when caring for an obese child with ASD. Although pediatricians had higher self-efficacy in dietary counseling, we found that pediatricians were more likely to refer a child with ASD to the dietitian and developmental-behavioral pediatrician. This finding suggests that children with ASD may present certain challenges around mealtime behaviors and food selectivity that pediatricians may find more difficult to manage and consequently increases the need for assistance from specialty providers.

The study findings align with the ASE model, which describes attitudes and self-efficacy as being related to intention and behavior. Positive outcome expectation regarding weight-related counseling resulting in actual change was associated with increased counseling frequency. In regards to self-efficacy, we found that pediatricians who reported higher self-efficacy, irrespective of survey vignette type, had higher odds of counseling on weight-related topics at well visits. Prior studies have aimed to leverage the association between

self-efficacy and practices, by using targeted education and training interventions to improve physician self-efficacy and ultimately increase desired practices (Welsh et al., 2015). Welsh et al examined the use of a brief training session in patient-centered counseling to improve pediatrician self-efficacy around weight management and found it effective for increasing self-efficacy and significantly increasing the documentation of weight counseling at 6-months and 12-months post-training (Welsh et al., 2015). Our study results suggest pediatricians desire more training in obesity management for children with ASD. Developing educational/training interventions that target both pediatricians' knowledge and self-efficacy may result in increased obesity prevention and management in children with ASD, potentially benefitting both patients and providers.

One major barrier to obesity management in children with ASD in this study was pediatricians' perception that caregivers do not perceive their child's weight as a concern. This perception is consistent with prior findings indicating that parents are often more concerned about a child being underweight compared to overweight (Pagnini, Wilkenfeld, King, Booth, & Booth, 2007). As opposed to being guided by BMI percentiles, parents may be more concerned about obesity if their child is the subject of bullying or teasing secondary to their weight or if their weight limits their physical activity (Jain et al., 2001). Children with ASD often have other co-morbid issues, such as seizures, chronic constipation, sleep disturbances that parents and providers may prioritize above weight management. Also, while some parents truly may not perceive their child's weight as a concern, parents of children with ASD frequently have to "choose their battles" and make decisions led by the desire to prevent a negative behavioral response from their child (Polfuss et al., 2016). This may lead to parents accepting the potential consequences of not making changes in the child's diet or physical activities in order to avoid behavioral problems or meltdowns and subsequently deprioritize weight management. To address these barriers, pediatricians should recognize these potential parental challenges and consider how to convey the importance of healthy weight while balancing the needs and priorities of the child and family. More research is needed to investigate parental perspectives on weight management approaches for children with ASD and further explore how parents make decisions about addressing obesity in children with other medical and behavioral concerns.

This study has several important limitations. First, our response rate is lower than the mean response rate of 53% for studies surveying health professionals calculated in a systematic review (Cho, Johnson, & VanGeest, 2013). The survey response rate may decrease the generalizability of our findings and raise concern for potential non-response bias. It is possible that non-response bias may affect our study results if pediatricians who were less interested in either obesity or ASD purposefully chose not to respond to the survey for that reason. Our study is strengthened by the use of a national database for our sample, and the ability to compare demographic factors between responders and non-responders (with no significant differences between the two groups on measured variables). Despite the response rate, this study serves as a step toward deepening our understanding of how pediatricians may approach obesity in children with ASD, and provides foundational data on which to build future research. Second, the use of self-reported survey measures may not reflect actual physician practices and physicians may report higher counseling frequencies and higher levels of self-efficacy compared to a more objective assessment. We aimed to limit

the effect of this social desirability bias by using anonymous surveys, identified with only with a numerical study ID. In addition, the use of clinical vignettes has been shown to more accurately reflect actual practice compared to other study designs like a medical chart abstraction (Peabody, Luck, Glassman, Dresselhaus, & Lee, 2000), and provides insight into how pediatricians may typically approach management of a child in their practice. Last, many children in the US who are at high-risk for obesity, particularly low-income children (Eagle et al., 2012), do not report having a usual source of care (Larson, Cull, Racine, & Olson, 2016) and may not have a pediatrician. By focusing on the pediatric primary care approach to obesity in ASD in the present study, we are unable to make inferences about management or barriers occurring outside of the medical home.

Despite these limitations, children with ASD have been shown to have more frequent interface with the medical system compared to the typically-developing children (Liptak et al., 2006), making primary care a key opportunity for intervention. However, PCPs lower self-efficacy around ASD management reflected in this and prior studies ((Broder-Fingert, Ferrone, et al., 2014; Golnik et al., 2009), paired with the barriers to obesity management in general, can make addressing unhealthy weight in children with ASD within the primary care setting challenging. Nevertheless, research has demonstrated the effectiveness of targeted educational interventions to improve pediatricians' management of developmental disorders. For example, one study utilizing peer educators to improve the rates of validated developmental screening tools among PCPs showed significant improvement in screening rates across primary clinic sites (Allen, Berry, Brewster, Chalasani, & Mack, 2010). Another example of ongoing efforts to improve the primary care management of children with ASD is the Extension for Community Healthcare Outcomes (ECHO) Autism model (Mazurek, Brown, Curran, & Sohl, 2017). ECHO Autism uses videoconferencing between autism specialists at academic medical centers and PCPs to educate PCPs on best-practices, including screening, identification and management of ASD, through education and case-based learning. A study published in 2017 found that ECHO Autism improved PCPs reported self-efficacy across all domains of ASD care, including identification and management of medical and psychiatric co-morbidities (Mazurek et al., 2017). Given the potential benefit to both providers and patients, future research should investigate the role of innovative training programs for PCPs to improve their self-efficacy and abilities in addressing weight management in children with ASD.

Conclusion

This study offers important insight into current practices and attitudes of pediatricians in the US regarding weight management in children with ASD. The observed association between self-efficacy and physician practices provides key formative data and helps identify potentially modifiable targets to improve the care for children with ASD. As more evidence emerges on effective approaches for the prevention and management for children with ASD, training pediatricians in these methods may result in increased self-efficacy and subsequently increase physicians' counseling practices. Future research should consider approaching obesity management in this population using shared-decision making or motivational interviewing techniques to address potential barriers and competing priorities for families of children with ASD. In addition, future studies should examine the current

practices and role of subspecialists that are often involved and receive referrals for children with ASD, such as dietitians and developmental-behavioral pediatricians, in managing obesity and weight-related issues.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Appendix 1: Fictional Clinical Survey Vignettes

Child with Autism Spectrum Disorder

Scenario

You are seeing a 12 year-old white male, Henry, in your clinic for well-child visit. Henry was diagnosed with autism spectrum disorder at age 2. He is minimally verbal and is currently in speech and occupational therapy. He sometimes displays his frustrations with self-injurious behaviors such as head-banging. He occasionally gets in trouble for hitting his siblings or peers at school but Mom has found using the tablet as a part of a behavior reward system has worked well. Mom shares with you that he is only getting about 5 hours of sleep per night and is interested in talking with you about possible medications to help his sleep. On review of his growth chart, you observe he is gaining in height appropriately but is in the 95th percentile for BMI.

Scenario, continued

Six months later, Henry returns to your clinic with his Mom for the chief complaint of weight gain. On review of his growth chart, you note he has had a 10-pound weight gain since the last visit. Mom reports that he is very selective about his foods but likes to eat soft foods like rice, pasta, and French fries. He mostly drinks boxed juices and does not like milk or water. He does enjoy playing games on his tablet and Mom continues to find it very useful for behavior management. He spends about 3 hours a day watching his favorite cartoons. Mom thinks his weight gain is due to his diet and minimal physical activity but asks your advice on how to proceed.

Child with Typical Development**Scenario**

You are seeing a 12 year-old white male, Henry, in your clinic for well-child visit. His development is appropriate for age but he does have dyslexia that was diagnosed 2 years ago. He occasionally gets in trouble for hitting his siblings or his peers at school but Mom has found using the tablet as a part of a behavior reward system has worked well for her children. Mom shares with you that he is only getting about 5 hours of sleep per night and is interested in talking with you about possible methods to help him get to sleep at night. Upon review of his growth chart, you observe he is gaining in height appropriately but is in the 95th percentile for body mass index (BMI).

Scenario, continued

Six months later, Henry returns to your clinic with his Mom for the chief complaint of weight gain. On review of his growth chart, you note he has had a 10-pound weight gain since the last visit. Mom reports that he is picky about his foods but likes to eat chicken nuggets, macaroni and cheese, and French fries and refuses to eat most vegetables. He mostly drinks boxed juices or milk and does not like water. He is often playing games on his tablet but Mom continues to find it very useful for behavior management. He spends about 3 hours a day watching his favorite cartoons. Mom thinks his weight gain is due to his diet and minimal physical activity but asks your advice on how to proceed.

Table 1

Sample Characteristics

	n (%)
Gender	
Female	212 (65)
Male	115 (35)
Race/Ethnicity	
White	229 (70.9)
Black or African American	15 (4.6)
Hispanic or Latino	17 (5.3)
Asian	54 (16.7)
American Indian or Alaskan Native	1 (0.3)
Other	7 (2.2)
Physician Age (years)	
25–35	28 (8.6)
36–50	159 (48.6)
51–65	136 (41.6)
>65	4 (1.2)
Percent of Patients with Autism Spectrum Disorder	
Less than 1%	52 (16.1)
1–5%	228 (70.4)
Over 5%	44 (13.6)
Practice Type	
Community Hospital or Network	78 (23.9)
Academic Hospital or Network	27 (8.3)
Private Practice	199 (61.0)
Other	22 (6.8)
Percent of Non-English Proficient patients	
<25% of Patients	254 (78.2)
25–50%	43 (13.2)
>50%	28 (8.6)
Percent Medicaid/CHIP insured patients	
<25%	145(44.8)
25–50%	89 (27.5)
51–75%	43 (13.3)
>75%	47 (14.5)
Practice Location	
Rural	35 (10.7)
Urban	101 (30.9)
Suburban	180 (55.1)

	n (%)
Other	11 (3.4)
Years Since Residency Training	
<5 years	26 (8)
5 to 10 years	37 (11.3)
10 to 20 years	127 (39)
>20 years	136 (41.7)

Table 2

Responses to Attitudinal Statements

	Agree/Strongly Agree, n (%)
Primary Care Pediatricians should be the main providers to manage overweight and obesity.	203 (62.1)
Primary Care Pediatricians receive adequate training to manage obesity in children with autism.	18 (5.5)
Obesity should be managed in children with autism similarly to how obesity is managed in children with typical development.	105 (32.1)
My counseling of families of children with autism on healthy eating and activity can result in actual change regarding the child's behaviors.	178 (54.4)
Managing in obesity in children with autism is more challenging than managing obesity in children with typical development.	307 (93.9)
Obesity is a significant problem for children with autism.	213 (65.1)
Subspecialists (such as Developmental pediatricians) should be involved in managing obesity in children with autism.	172 (52.6)
Weight management is a priority for the families of children with autism.	83 (25.4)

Table 3

Reported self-efficacy by vignette type (ASD compared to dyslexia)

	High Self-Efficacy, n (%)	OR [95% CI]	<i>P</i>
Increasing fruits and vegetables			
Dyslexia	125 (75.8)	Reference	0.92
ASD	122 (75.3)	0.98 [0.59, 1.62]	
Decreasing sugary beverages			
Dyslexia	155 (93.9)	Reference	0.2
ASD	146 (90.1)	0.59 [0.26, 1.34]	
Increasing physical activity			
Dyslexia	137 (83.0)	Reference	0.52
ASD	130 (80.3)	0.83 [0.47, 1.46]	
Decreasing intake of high-calorie foods			
Dyslexia	131 (79.4)	Reference	0.31
ASD	121 (74.7)	0.77 [0.46, 1.29]	
Decreasing screen time/media use			
Dyslexia	130 (78.8)	Reference	0.0259
ASD	110 (67.9)	0.57 [0.35, 0.94]	

ASD: Autism Spectrum Disorder

High Self-Efficacy is defined by scores of 4 or 5 (confident/very confident) on 5-point Likert scale.

P value derived from chi-square tests

Table 4

Reported practices by vignette type (ASD compared to dyslexia)

	Likely Practice, n (%)	OR [95% CI]	P
Provide counseling on diet/nutrition			
Dyslexia	163 (98.8)	Reference	1.0
ASD	160 (98.8)	0.98 [0.14, 7.05]	
Provide counseling on exercise			
Dyslexia	159 (96.4)	Reference	0.75
ASD	158 (97.5)	1.49 [0.41, 5.38]	
Refer to a nutritionist or dietitian			
Dyslexia	86 (52.1)	Reference	0.01
ASD	107 (66.1)	1.79 [1.14, 2.79]	
Refer to Weight Management Clinic			
Dyslexia	47 (28.5)	Reference	0.48
ASD	52 (32.1)	1.19 [0.74, 1.90]	
Refer to Developmental-Behavioral Pediatrician			
Dyslexia	29 (17.6)	Reference	<0.001
ASD	73 (45.1)	3.85 [2.32, 6.38]	
Refer to recreational physical activity program			
Dyslexia	85 (51.8)	Reference	0.18
ASD	72 (44.4)	0.74 [0.48, 1.15]	
Assess access to healthy food options			
Dyslexia	114 (69.1)	Reference	0.049
ASD	95 (58.6)	0.63 [0.40, 0.99]	
Assess access to safe space for play			
Dyslexia	113 (68.5)	Reference	0.06
ASD	95 (58.6)	0.65 [0.42, 1.03]	

ASD: Autism Spectrum Disorder

Likely Practice is defined by scores of 4 or 5 (likely/very likely) on 5-point Likert scale.

P value derived from chi-square tests