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Can the Internet be used to Reach Parents for Family-Based Childhood Obesity Interventions?

Katherine H. Hohman, MPH[1], **Sarah N. Price, MPH**[2], **Kendrin Sonneville, ScD, RD, LDN**[3], **Sheryl L. Rifas-Shiman, MPH**[2], **Steven L. Gortmaker, PhD**[3], **Matthew W. Gillman, MD, SM**[2,4], and **Elsie M. Taveras, MD, MPH**[2]

[1]YMCA of the USA, Activate America, Washington, DC

[2]Obesity Prevention Program, Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, MA

[3]Department of Society, Human Development and Health, Harvard School of Public Health, Boston, MA

[4]Department of Nutrition, Harvard School of Public Health, Boston, MA

Abstract

Objective—Identify socioeconomic correlates of computer/Internet use among parents of overweight preschool-aged children.

Methods—Studied 470 baseline participants in a trial to prevent obesity in children 2–6.9 years with BMI ≥ 95th percentile or 85th–95th percentile with one overweight parent. Interviews with parents used Health Information National Trends Survey (HINTS) questions.

Results/Conclusions—Ninety-four percent had home computers and 93% reported Internet usage. In adjusted models, parents with ≤ college degree (OR 4.8 [95% CI 1.2, 18.3]) or with household income ≤ $50,000 (OR 7.6 [95% CI 2.2, 26.8]) had decreased likelihood of computer ownership. Of parents who reported going on-line, 63% used Internet to look for health/medical information for themselves and 42% for their children. Parents with ≤ a college degree or with BMI <25 kg/m^2 were less likely to use Internet. Results support using the Internet for early childhood obesity prevention with enhanced outreach efforts for low socioeconomic families.

Keywords

Computers; Internet; health information seeking; overweight; obesity; preschool age children

Introduction

In the United States (US), childhood obesity is highly prevalent and spares no age group. The National Health and Nutrition Examination Survey (NHANES) indicates that rates of obesity among preschool-age children (2–5 years of age) almost doubled from 1988–1994 (7%) to 2003–2006 (12.4%) [1,2]. Overweight and obesity in early childhood increase the risk for social discrimination, sleep apnea, high cholesterol, high blood pressure, type 2 diabetes and obesity later in life [3–5]. Family based interventions elicit behavior change in

Corresponding Author: Katherine H. Hohman, MPH, YMCA of the USA, 1129 20th St., NW, Suite 301, Washington, DC 20036, Katherine.hohman@ymca.net, Tel: (202) 688-4735, Fax: (202) 835-9030.

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children [6–9]) and lend themselves well to the pre-school age group when parents still have control over their children's environment.

As outlined in the Institute of Medicine's recommendations on preventing childhood obesity, the complex causes of childhood obesity require multi-component intervention efforts to slow its growing prevalence [10]. One promising modality to include in multi-component family-based prevention efforts is the Internet; 77% of the US adult population used the Internet in 2010 [11]. Eighty percent of adult Internet users seek health and medical information online, with 49% of users looking for information on diet and nutrition, and 44% for exercise and fitness information [12]. Differences in Internet use have been documented across age, income and education levels [13], but this digital divide is decreasing with the overall growth of the Internet [14–16]. Now used in obesity interventions among adults, the Internet could also be used as part of interventions to address obesity prevention in young children [17–19]. However, little is known on the Internet use of parents with overweight and obese preschool children.

The purpose of this paper is to identify socio-demographic correlates of computer ownership and Internet use among parents of overweight and obese preschool children enrolled in an obesity prevention trial, and to describe parents' health seeking behavior on the Internet.

Methods

Study Design and Setting

This was a cross-sectional study of overweight and obese preschool aged children enrolled in a cluster-randomized controlled trial called High Five for Kids. The trial took place in 10 primary care pediatric practices of Harvard Vanguard Medical Associates (HVMA), a large multispecialty group practice in Massachusetts with privately- and Medicaid–insured patients. The aim of the parent study is to assess a primary care practice change intervention to prevent obesity among children age 2 through 6.9 years at elevated risk of obesity, and is described elsewhere [20]. The study was approved by the institutional review boards of Harvard Pilgrim Health Care and the Harvard School of Public Health.

Participants

To be eligible, children had to be 2 to 6.9 years with an age and sex specific BMI ≥ 95th percentile or an age and sex specific BMI between the 85th and 95th percentile with at least one overweight parent (BMI ≥ 25 kg/m^2). Responding parents needed to be comfortable speaking English or Spanish, and to plan to continue their children's primary care with the current pediatric office for the subsequent two years. Children were excluded if they had a chronic condition that would limit the ability to measure their height and weight or that could interfere with their growth, physical activity, or ability to comply with dietary recommendations. Children were also excluded if they were already enrolled in a formal weight management program. Details of recruitment are described elsewhere [20]. We enrolled 475 children in the study. We excluded 5 children for whom someone other than the child's mother or father completed the baseline interview, leaving 470 children in the analysis cohort.

Outcome Measures

Using a structured 25-minute interview script, trained research assistants interviewed parents of eligible children by phone in English or Spanish between August 2006 and May 2008. Parents received a $20 gift card as a thank you for their time. The baseline survey included questions about parent computer and Internet use that we modified from the Health Information National Trends Survey (HINTS) [21]. The initial questions were as follows:

"Is there a computer in your home?" and "Do you ever go on-line to access the Internet or to send and receive e-mail?" To parents who answered "yes" to that question, we asked, "In the past 12 months, did you use the Internet to look for health or medical information for yourself?" and "In the past 12 months did you use the Internet to look for health or medical information for your child?" Socio-demographic and anthropometric measures collected from the child's electronic medical record included the child's age, sex, and BMI, which trained clinical assistants measured. In the baseline telephone survey parents reported child's race/ethnicity, which we categorized as White, Black, Latino or Other (children with other or more than one race/ethnicity). If the parent reported the child's ethnicity as Latino, we categorized the child as Latino regardless of race. To ascertain parent BMI, we first asked respondents to report their own height. Based on that height we read a series of weight ranges that corresponded to normal (BMI < 25.0 kg/m^2), overweight (BMI 25.0–29.9), and obese (BMI ≥ 30.0) BMI categories. We asked the parent to identify which range captured his or her current weight. The respondent also reported the same for the spouse or partner. Parents also reported their educational attainment, marital status, and annual household income.

Data Analysis

We first conducted descriptive statistics of child and parent socio-demographic and anthropometric characteristics overall and by each computer/Internet question, reporting the mean (SD) for continuous variables and N (%) for categorical variables. We then conducted unadjusted and multivariable logistic regression models for each of the outcomes, modeling the odds of not owning a home computer, not going on-line to access the Internet, and among Internet users, not using the Internet to look for health and/or medical information for themselves and their child. Using generalized linear mixed models (GLIMMIX) to correct for clustering by study site, we also adjusted multivariable models for child age, sex, race/ethnicity, continuous BMI; parental BMI categories; the responding parent's education, marital status, and household income. We conducted the entire analysis using SAS version 9.2 (SAS Institute, Inc, Cary, North Carolina).

Results

Participant characteristics

Characteristics of the 470 parent-child pairs are presented in Table 1. Children's mean (SD) age was 5.0 (1.2), mean (SD) BMI was 19.2 (2.3), 52% were male, 57% were obese (BMI ≥ 95^{th} percentile) and 56% were white. Fifty-four percent of parent respondents were obese (≥30 kg/m^2), 76% were married, 61% had at least a college degree, and 71% had household incomes > $50,000. Because of the eligibility criteria, only 18% of parents had normal BMI. Table 1 also shows the distribution of parent-child characteristics across computer, Internet, and health seeking behavior questions.

Computer and Internet access and use

Overall, 440 (94%) parents had a home computer, and 438 (93%) parents reported ever going on-line to use the Internet or email. Among the 438 parents who reported ever going on-line, 276 (63%) used the Internet to look for health/medical information for themselves in the previous 12 months and 186 (42%) for their children.

In unadjusted models, Latino participants were more likely not to have a home computer than white participants (OR 2.6 [95% CI 1.06, 6.34]). However, adjustment for parental and child characteristics, specifically education, marital status, and income, nullified this association (OR 0.71 [95% CI 0.24, 2.11]). In adjusted models, parents with less than a college degree (OR 4.8 [95% CI 1.2, 18.3]) or with household income ≤ $50,000 (OR 7.6

[95% CI 2.2, 27.8]) were more likely to not have a home computer. In adjusted models, parents with less than a college degree (OR 16.9 [95% CI 3.4, 84.7]) or with BMI <25 kg/m^2 (OR 8.4 [95% CI 1.5, 48.0]) were more likely not to use the Internet. (Tables 2 and 3) There were no substantial differences in characteristics among those who used the Internet to look for health or medical information for themselves or their child versus those who did not. For example, in adjusted models, parents with less than a college degree were just as likely as those with a college degree to use the Internet to access health information for themselves (OR 1.17 [95% CI 0.71, 1.92]) and their child (OR 0.91 [95% CI 0.56, 1.47]).

Discussion

In this study of computer and Internet use among parents of preschool aged children enrolled in an obesity prevention trial, we found that computer ownership and use of the Internet was high. Despite these high rates, both computer ownership and use of the Internet were lower among parents with less education, as previously reported among adults [13] and computer ownership was also lower among participants from lower income household.

Differences in computer ownership and use by socioeconomic position, sometimes called “the digital divide,” are decreasing as overall computer use continues to climb [14–16]. Parents in our study were more likely to use the Internet (93%) compared to the general US adult population (77%) [11]. This finding is possibly due to the relatively high educational and income levels of the High Five for Kids population. The Pew Research Center’s Internet & American Life Project’s Internet Survey shows that rates of internet use increases with income and educational attainment, with top categories reaching 90% Internet use [11]. Although parental age was not measured in this study, we hypothesize that parents of preschool aged children are younger than the general US adult population and according to Pew’s Internet Survey rates of internet use increase as age decreases [11]. Overall, the high usage rate implies that parents of preschool children are a ripe audience for Internet based interventions. We also found that parents with normal (v. elevated) weight status were less likely to use the Internet, an unexpected finding that warrants further investigation.

In this study, 63% and 42% of parents reported going on-line to look for health or medical information for themselves and their preschool age children, respectively. These rates are based on one general question in the absence of an intervention. It is possible that with a dedicated intervention that offers specific health information for a child’s condition, rates would be higher. Studies have shown that parent-focused interventions lead to behavior changes in children [6–9]. Also, we and others have shown that interactive Internet-based interventions can lead to beneficial weight changes in adults [18]. Our results raise the possibility that a parent-focused intervention that incorporates an interactive Internet component could be effective for obesity prevention in young children.

Several limitations should be considered when interpreting the results of this study. The study population as a whole had relatively high educational and income levels and thus results may not be generalizable to a more disadvantaged population. Furthermore, since the majority of parents and all of the children were either overweight or obese the results may not be generalizable to a population with normal weight status. Finally, we did not assess the use of mobile technology such as Smart Phones or other interactive devices. Thus, we were not able to determine whether mobile Internet use was another potential component to be considered in future childhood obesity studies.

Despite these limitations, our findings suggest that future preschool age childhood obesity interventions might benefit by delivering intervention components via the Internet. The inclusion of Internet-based components is consistent with the Institute of Medicine’s

recommendation that interventions use multi-component efforts to address the complexity of childhood obesity [10].

In conclusion, our findings support using the Internet for early childhood obesity prevention with enhanced outreach efforts for parents of lower socioeconomic position, who are less likely to own a computer or use the Internet.

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Table 1

Characteristics of 470 parent-child pairs, overall and by computer and Internet use.

	Total	No computer at home	No Internet use	Use Internet for health information – self*	Use Internet for health information – child*
N (%)	470 (100)	30 (6)	32 (7)	276 (63)	186 (42)
				Mean (SD)	
Child Characteristics					
Age, years	5.0 (1.2)	4.9 (1.2)	5.0 (1.0)	4.9 (1.1)	4.9 (1.2)
BMI, kg/m2	19.2 (2.3)	20.0 (3.4)	19.9 (3.0)	19.0 (2.2)	19.0 (2.3)
				N (column %)	
Sex					
Male	245 (52)	18 (60)	17 (53)	145 (53)	96 (52)
Female	225 (48)	12 (40)	15 (47)	131 (47)	90 (48)
Race/Ethnicity					
Black	96 (20)	7 (23)	7 (22)	48 (17)	35 (19)
Latino	76 (16)	9 (30)	7 (22)	44 (16)	28 (15)
Other	34 (7)	1 (3)	1 (3)	19 (7)	10 (5)
White	264 (56)	13 (43)	17 (53)	165 (60)	113 (61)
BMI					
Overweight (85^{th} –<95^{th} percentile)	204 (43)	11 (37)	10 (31)	125 (45)	86 (46)
Obese (≥95^{th} percentile)	266 (57)	19 (63)	22 (69)	151 (55)	100 (54)
Parent and Household Characteristics					
BMI					
Normal (BMI <25 kg/m^2)	18 (4)	3 (10)	4 (13)	8 (3)	7 (4)
Overweight (25.0–29.9 kg/m^2)	199 (42)	8 (27)	9 (29)	117 (42)	75 (40)
Obese (≥30 kg/m^2)	252 (54)	19 (63)	18 (58)	151 (55)	104 (56)
Education					
Less than college graduate	182 (39)	26 (87)	27 (84)	90 (33)	63 (34)
College graduate	288 (61)	4 (13)	5 (16)	186 (67)	123 (66)
Marital status					
Not Married	111 (24)	20 (67)	17 (53)	54 (20)	36 (19)
Married	359 (76)	10 (33)	15 (47)	222 (80)	150 (81)

	Total	No computer at home	No Internet use	Use Internet for health information – self*	Use Internet for health information – child*
Household income					
≤ $50,000	133 (29)	25 (86)	21 (72)	60 (22)	38 (21)
>$50,000	329 (71)	4 (14)	8 (28)	213 (78)	146 (79)

*Question restricted to those who answered yes to using the Internet (n=438)

Table 2

Unadjusted and multivariable adjusted correlates (OR, 95% CI) of having no computer at home (N=470).

	No Computer at home			
	Unadjusted		Adjusted[a]	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age, years	0.98 (0.71, 1.35)	0.90	0.88 (0.62, 1.24)	0.45
BMI, kg/m2	1.13 (1.00, 1.27)	0.05	1.08 (0.94, 1.26)	0.28
Sex				
Female	0.71 (0.33, 1.51)	0.37	0.68 (0.29, 1.63)	0.39
Male	1.0 (ref)		1.0 (ref)	
Race/ethnicity		0.16		0.63
Black	1.52 (0.59, 3.94)	0.39	0.49 (0.16, 1.49)	0.21
Latino	2.59 (1.06, 6.34)	0.04	0.71 (0.24, 2.11)	0.54
Other	0.59 (0.07, 4.64)	0.61	0.69 (0.07, 6.59)	0.75
White	1.0 (ref)		1.0 (ref)	
Parent BMI				
<25	2.45 (0.65, 9.26)	0.19	3.19 (0.55,18.44)	0.19
25–<30	0.51 (0.22, 1.20)	0.12	0.90 (0.34, 2.36)	0.83
≥30	1.0 (ref)		1.0 (ref)	
Education				
Less than college degree	11.83 (4.04, 34.62)	<.0001	**4.76 (1.24,18.31)**	**0.02**
College graduate	1.0 (ref)		1.0 (ref)	
Marital status				
Not Married	7.67 (3.46, 16.99)	<.0001	2.32 (0.88, 6.11)	0.09
Married	1.0 (ref)		1.0 (ref)	
Household income				
≤ $50,000	18.81 (6.38, 55.42)	<.0001	**7.61 (2.16,26.79)**	**0.00**
>$50,000	1.0 (ref)		1.0 (ref)	

[a]Adjusted for all characteristics in the table.

Table 3

Unadjusted and multivariable adjusted correlates (OR, 95% CI) of not using the Internet (N=470).

	No Internet use			
	Unadjusted		Adjusted[a]	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age, years	1.08 (0.79, 1.49)	0.63	0.95 (0.66, 1.36)	0.77
BMI, kg/m2	1.11 (0.99, 1.25)	0.07	1.09 (0.95, 1.25)	0.23
Sex				
Female	0.94 (0.46, 1.95)	0.87	0.90 (0.37, 2.20)	0.82
Male	1.0 (ref)		1.0 (ref)	
Race/ethnicity				
Black	1.32 (0.50, 3.46)	0.58	0.73 (0.22, 2.43)	0.61
Latino	1.57 (0.61, 4.01)	0.35	0.66 (0.20, 2.16)	0.49
Other	0.47 (0.06, 3.71)	0.47	0.81 (0.08, 7.83)	0.85
White	1.0 (ref)		1.0 (ref)	
Parent BMI				
<25	3.89 (1.13, 13.3)	0.03	**8.44 (1.48,47.95)**	**0.02**
25–<30	0.62 (0.27, 1.42)	0.26	1.24 (0.48, 3.24)	0.65
≥30	1.0 (ref)		1.0 (ref)	
Education				
Less than college degree	10.07 (3.77,26.93)	<.0001	**16.88 (3.37,84.69)**	**0.00**
College graduate	1.0 (ref)		1.0 (ref)	
Marital status				
Not Married	4.84 (2.27,10.30)	<.0001	1.23 (0.47, 3.22)	0.67
Married	1.0 (ref)		1.0 (ref)	
Household income				
≤ $50,000	8.02 (3.39,18.96)	<.0001	2.69 (0.92, 7.85)	0.07
>$50,000	1.0 (ref)		1.0 (ref)	.

[a]Adjusted for all characteristics in the table.