Early Childhood Screen Time and Parental Attitudes Toward Child Television Viewing in a Low-Income Latino Population Attending the Special Supplemental Nutrition Program for Women, Infants, and Children

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Abstract

Background: Early childhood media exposure is associated with obesity and multiple adverse health conditions. The aims of this study were to assess parental attitudes toward childhood television (TV) viewing in a low-income population and examine the extent to which child BMI, child/parent demographics, and household media environment are associated with adherence to American Academy of Pediatrics (AAP) guidelines for screen time.

Methods: This was a cross-sectional survey study of 314 parents of children ages 0–5 years surveyed in English or Spanish by self-administered questionnaire at a Special Supplemental Nutrition Program for Women, Infants and Children (WIC) clinic in Oregon.

Results: In this majority Latino sample (73%), half (53%) of the children met AAP guidelines on screen time limits, 56% met AAP guidelines for no TV in the child's bedroom, and 29% met both. Children were more likely to meet AAP guidelines when there were <2 TVs in the home, there was no TV during dinner, or their parents spent less time viewing electronic media. Parents who spent less time viewing electronic media were more likely to report believing that TV provides little value or usefulness.

Conclusions: In this low-income, predominantly Latino population attending WIC, parent media-viewing and household media environment are strongly associated with child screen time. Programs aimed at reducing child screen time may benefit from interventions that address parental viewing habits.

Introduction

Excess media exposure is a major threat to children's health.[1] The association between media exposure and childhood obesity has been supported by research over the past several decades,[1–3] with both media exposure and obesity more prevalent among minorities and lower socioeconomic groups.[4–7] In addition, increased media exposure is associated with higher risk of multiple medical problems, including hypertension,[8] high cholesterol,[8] diabetes,[9] psychological and social issues,[9,10] and sleep disorders.[1] As a result, the American Academy of Pedia-

trics (AAP) recommends limiting children's noneducational screen time to less than 2 hours per day, avoiding placing television (TV) sets in children's bedrooms, and restricting any screen exposure among infants under age 2.[11–13] However, despite these guidelines, many US children experience excessive media exposure.[14,15]

An ideal setting for interventions targeting excessive media exposure in low-income, minority children is the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), a federally funded program that provides supplemental foods, nutrition education, and health screening to low-income pregnant women, mothers,

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and children under age 5. WIC programs improve multiple health outcomes in women, infants, and children.[16] Given that WIC serves a population with low income and lower parental education,[17] children in WIC may be at risk for excessive media exposure. However, given that families regularly visit WIC in early childhood, WIC may also present opportunity for intervention. Several campaigns to reduce screen time have been developed by state WIC programs or have been adapted from larger national initiatives[18–20]; however, evidence is lacking as to which types of intervention most effectively target media exposure for WIC participants.

Research suggests that parents' cultural attitudes[21] and TV viewing[22] contribute to child media use, but family media habits and attitudes toward media have not been rigorously studied in minority groups. Likewise, few interventions addressing children's media exposure have targeted young children from low-income and racial minority populations.[23] Several studies have examined factors contributing to family media use in minorities,[6,21,24–28] hourly screen time usage in low-income populations,[29] and adherence to AAP guidelines among children generally.[14] However, adherence to AAP screen time guidelines has not been previously investigated specifically among WIC participants, and no studies have investigated environmental factors, family habits, and parental correlates of guideline adherence in this population.

In this study, we surveyed predominantly Latino parents at an Oregon WIC clinic. Study goals were to (1) assess the rates of adherence to AAP screen time guidelines in this population, (2) assess parental attitudes toward childhood electronic media use, and (3) examine the associations of child BMI, child and parent demographic characteristics, and household media environment with adherence to AAP screen time guidelines and with parent attitudes toward childhood media use.

Methods

Survey Administration

We conducted a cross-sectional study, surveying 314 parents at a WIC clinic in a diverse Oregon community (population 95,000, 22.6% Latino; 30.2% non-English household language).[30] Families with an individual WIC nutrition appointment were approached by bilingual study staff and asked to complete a survey for 1 child per family. If more than 1 child had an appointment, parents completed the survey for a child chosen randomly by study staff. The survey instrument contained a face page explaining that participation was voluntary and would not affect services received at WIC. Families could refuse to participate or return blank forms; by completing the survey, consent to participate was implied. Surveys were collected 1–4 days per week in July and August 2013, with approximately 90% of clinic attendees sampled on each study day. The survey was written at a sixth-grade reading level and was available in English and Spanish. Bilingual oral assistance was available for parents with difficulty completing a written survey ($n = 13$). The Oregon Health & Science University Institutional Review Board approved the study.

Survey Content

Survey domains included child and parent screen time, household media environment, parental attitudes toward media, child anthropometrics, and sociodemographics. Validated items were adapted from the National Survey of Children's Health (NSCH) 2007 and 2011,[31] Viner and Cole's child TV-viewing scale,[32] and Pearson's scale of restrictive parental practices regarding TV use.[33] The survey was translated into Spanish by a bilingual staff member trained in medical translation.

Measures

Child and parent screen time. To assess total child screen time, we asked parents to estimate the number of hours per average weekday and weekend day their child "usually spends with TV, video games, computers, cell phones and other electronic devices." Questions were open ended and responses provided in whole numbers. Parents answered similar questions for their own media use. We calculated daily screen time as a weighted average of weekday and weekend screen time. Parent-weighted daily screen time was dichotomized as <2 or ≥2 hours.

Meeting American Academy of Pediatrics guidelines. We assessed survey responses for adherence to AAP guidelines for screen time and no bedroom TV individually as well as adherence to both guidelines. Because guidelines for screen time vary by age (no screen time for children <2 years; <2 hours for children ≥2 years), separate analyses were performed for each age group.

Parent attitudes toward childhood media use. Parents used a 5-point Likert scale to report agreement/disagreement with views about child TV viewing. The statements used in the survey were adapted from Viner and Cole's child TV-viewing scale[32] and Pearson's scale of restrictive parental practices regarding TV use.[33] For brevity, we selected scale items most relevant to media viewing in the WIC setting. Statements assessed whether parents perceived TV as valuable or useful ("young children who never watch TV miss a lot that is of value"; "TV is a useful way of keeping the children amused") and whether parents are restrictive about child TV viewing ("I restrict how much time my child spends watching TV"; "I have to be sure my child does not watch too much TV"; "I will switch off the TV if I think my child is watching too much"). We coded parental attitudes as "healthy" or "not healthy" based on whether the response pattern would be correlated with reduced versus increased screen time. For example, parents responding "completely disagree" or "disagree" to the statement "Young children who never watch TV miss a lot that is of value" were coded as having "healthy" beliefs about the value of TV.

Child anthropometrics and body mass index. Per usual clinic procedure, weight was directly measured on a standardized scale. Height was measured for children ≥2 years old using a wall-mounted stadiometer. For children <2 years, length was measured using a recumbent board. Children's height, length, and weight were measured by trained WIC staff and recorded by study staff at the time of survey completion. We categorized each child's age- and gender-specific BMI percentile as underweight (<5%), healthy weight (5–84.9%), overweight (85–95%), or obese (>95%) per World Health Organization (WHO) growth standards. For children with missing gender information, we used the BMI clinical categorization only if the categorization was the same by growth standards for both genders; 15 children had missing data owing to indeterminate BMI clinical categorization.

Household media environment. Survey items measured how many days the TV was on while the child eats dinner during an average week, and how many televisions were present in the home. These questions were open ended and responses were provided in whole numbers. One item asked whether there was a TV in the room where the child usually sleeps.

Sociodemographics. The survey assessed child and parent age and race/ethnicity. Race/ethnicity items were based on items in the 2011 NSCH.[31]

Statistical Analyses

SPSS software (version 19; IBM Corp, Armonk, NY) was used for statistical analysis. EpiInfo7 statistical software (CDC, Atlanta, GA)[34] was used to determine BMI percentile for age and gender based on WHO 2006 Child Growth Standards.[35] Statistical significance for all analyses was set *a priori* at $p < 0.05$.

Sample. Using descriptive statistics, we assessed sample characteristics, including child (age, ethnicity, and BMI category), parent (age, ethnicity, and daily screen time), household media environment (TV on during dinner, number of TVs in home), and survey characteristics (Table 1). We then computed overall child-weighted screen time, overall rate of adherence to AAP screen time guidelines, and overall parent media attitudes.

Child daily screen time. We compared child-weighted daily screen time in hours according to child, parent, and household media environment characteristics (Table 1), as well as adherence to AAP guidelines, and parental media beliefs (Supplementary Table 1) (see online supplementary material at http://www.liebertpub.com). Because child-weighted daily screen time was nonparametric, Mann-Whitney's and Kruskal-Wallis' tests were used to examine associations of weighted daily screen time with child characteristics, parent characteristics, household media environment, and survey delivery.

Adherence to American Academy of Pediatrics guidelines. Chi-square tests compared variation in adherence to AAP guidelines by child characteristics, parent characteristics, and household media environment (Table 2). We performed multivariate logistic regression to determine the association of adherence to AAP guidelines with child, parent, and household media environment characteristics (Table 3). We also used regression analyses to compare the associations of parental healthy media attitudes with child and parent characteristics (Table 5).

Parental media attitudes. Chi-square tests were also used to assess variation in parents' healthy beliefs about child TV viewing by child characteristics, parent characteristics, and adherence to AAP guidelines (Table 4).

Results

Sample

Of 314 participants approached, 302 surveys were returned completed or partially completed for a participation rate of 99.4%. Of participating children, 40% were <2 years and 60% were ages 2–5 years. Mean parent age was 30.5 years. Twenty-two percent of children were obese, 19% were overweight, 58% were healthy weight, and <1% were underweight (Table 1). All Oregon WIC participants have a household income less than 185% of the poverty guidelines or are adjunctively eligible for WIC owing to participation in one of four public assistance programs.[36] The sample had similar ethnic breakdown when compared to overall demographics of the WIC clinic (70% of survey participants were Latino vs. 65% of clinic clients identify as Latino).[37]

Child Screen Time, Adherence to American Academy of Pediatrics Guidelines, and Parent Media Attitudes

Overall, child mean weighted daily screen time was 1.6 hours, with 53% of children meeting AAP guidelines for screen time allowance, 56% meeting guidelines for no TV in the child's bedroom, and 29% meeting both guidelines (Supplementary Table 1) (see online supplementary material at http://www.liebertpub.com). One third (34%) of parents reported healthy beliefs about the value of child TV viewing, 42% reported healthy beliefs about usefulness of TV for entertaining children, and 70% reported restricting their child's TV viewing (Table 4).

Associations with Child Weighted Daily Screen Time

Daily screen time was less in children who were younger (<2 vs. ≥2 years), had less parent daily screen time (<2 vs. ≥2 hours), had no TV on during dinner, and had fewer TVs in the home (0–1 vs. ≥2 TVs). Screen time did not vary significantly by child ethnicity, child BMI category, parent age, parent ethnicity, presence of a TV in the child's bedroom, or survey language (Table 1). Healthy parental

Table 1. Sample Characteristics and Mean Weighted Screen Time for Characteristics

	Percent of sample with characteristic (n) (n = 302)	Mean (SD) weighted screen time, hours	Mann-Whitney's or Kruskal-Wallis' p value for group
Child characteristics			
Age, months, %			
0–11	24 (71)	**0.5 (0.9)**	
12–23	16 (49)	**1.5 (1.9)**	
24–35	21 (61)	**1.8 (1.4)**	**<0.001**
36–47	19 (57)	**2.4 (1.3)**	
48–60	20 (59)	**2.4 (1.5)**	
Sex, %			
Boy	55 (58)	1.8 (1.6)	0.67
Girl	45 (48)	1.8 (2.0)	
Race/ethnicity, %			
Latino	73 (207)	1.7 (1.5)	
Non-Latino white	20 (56)	1.6 (1.8)	
Non-Latino black/African American	2 (6)	1.6 (0.9)	0.76
Non-Latino Asian/Pacific Islander	0 (0)	—	
Non-Latino other/multiracial	5 (13)	1.5 (1.2)	
BMI category, %			
Obese	22 (62)	1.6 (1.1)	
Overweight	19 (54)	1.8 (1.7)	0.51
Healthy weight	60 (161)	1.6 (1.7)	
Underweight (excluded from analysis)	0.4 (1)	—	
Parent characteristics			
Age, %			
Younger than 30	47 (131)	1.6 (1.5)	0.70
30 or older	53 (150)	1.7 (1.6)	
Race/ethnicity, %			
Latino	70 (198)	1.7 (1.5)	
Non-Latino white	24 (69)	1.6 (1.7)	
Non-Latino black/African American	2 (6)	1.4 (1.1)	0.68
Non-Latino Asian/Pacific Islander	1 (2)	—	
Non-Latino other/multiracial	3 (9)	1.1 (1.5)	
Parent-weighted daily screen time, hours, %			
<2	32 (91)	**1.2 (1.3)**	**<0.001**
≥2	68 (194)	**1.8 (1.6)**	
Household media environment			
TV on during dinner, %			
0 days	49 (139)	**1.2 (1.2)**	**<0.001**
More than 0 days	51 (143)	**2.1 (1.7)**	
TVs in home, no., %			
0–1	30 (87)	**1.2 (1.1)**	**0.02**
≥2	70 (202)	**1.8 (1.7)**	
Survey delivery			
Survey language, %			
English	43 (131)	1.4 (1.4)	
Spanish	56 (170)	2.1 (2.0)	0.38
Other	0.3 (1)	—	
Oral administration, %			
Yes	4 (13)	**0.66 (1.3)**	**0.001**
No	96 (289)	**1.9 (1.8)**	

Percentages are for items with answers.

TV, television; SD, standard deviation.

Bolded values are statistically significant with $p < 0.05$.

Table 2. Percent of Children Following AAP Guidelines in Each Category						
	Child age <2 years			Child age ≥2 years		
	Percent in each category with no screen time	Percent in each category with no bedroom TV	Percent in each category following both guidelines	Percent in each category with <2 hours screen time	Percent in each category with no bedroom TV	Percent in each category following both guidelines
Total, %	45	61	23	58	52	33
Child characteristics						
Age, months, %						
0–11	**59**	56	**30**	—	—	—
12–23	**26**	70	**14**	—	—	—
24–35	—	—	—	70[a]	59	42[a]
36–47	—	—	—	48[b]	44	21[b]
48–60	—	—	—	55[ab]	54	33[ab]
Chi-square p value	**<0.001**	0.14	**0.05**	0.06	0.25	**0.05**
Ethnicity, %						
Latino, any race	45	60	20	60	50	32
Non-Latino, any race	46	63	28	47	60	37
Chi-square p value	0.91	0.77	0.32	0.18	0.32	0.67
BMI category, %						
Obese	**28**[a]	**84**[a]	22	65	50	31
Overweight	**37**[ab]	**47**[b]	24	59	51	29
Healthy weight	**56**[b]	**58**[b]	25	54	54	34
Chi-square p value	0.06	**0.05**	0.97	0.50	0.90	0.86
Parent characteristics						
Age, %						
Younger than 30	39	64	21	59	53	31
30 or older	57	61	29	57	54	35
Chi-square p value	0.07	0.75	0.40	0.84	0.91	0.59
Ethnicity, %						
Latino, any race	46	60	20	61	53	33
Non-Latino, any race	46	64	29	46	52	30
Chi-square p value	0.97	0.68	0.31	0.10	0.90	0.74
Survey language, %						
English	47	62	26	51	54	30
Spanish	44	60	19	61	51	33
Chi-square p value	0.75	0.80	0.40	0.20	0.67	0.73
Parent-weighted daily screen time, hours, %						
<2	59	73	**42**	**83**	**68**	**53**
≥2	42	58	**19**	**46**	**44**	**22**
Chi-square p value	0.12	0.16	**0.02**	**<0.001**	**0.004**	**<0.001**
Household media environment						
TV on during dinner, days, %						
0	50	58	22	**75**	56	**44**
>0	38	63	24	**42**	49	**21**
Chi-square p value	0.20	0.63	0.86	**<0.001**	0.42	**0.003**
TVs in home, no., %						
0–1	46	**97**	**40**	**71**	**86**	**64**
≥2	47	**46**	**18**	**54**	**38**	**20**
Chi-square p value	0.89	**<0.001**	**0.02**	**0.04**	**<0.001**	**<0.001**

[a,b]Within each column, percentages with different subscripts differ at least at the 0.05 level.

AAP, American Academy of Pediatrics; TV, television.

Bolded values are statistically significant with $p < 0.05$.

Table 3. Adjusted Odds of Following AAP Guidelines (95% Confidence Interval)

	<2 years			≥2 years		
	No screen time	**No bedroom TV**	**Following both guidelines**	**<2 hours screen time**	**No bedroom TV**	**Following both guidelines**
R^2 for model with all listed variables	0.221	0.263	0.191	0.225	0.217	0.204
Child characteristics						
Age, months						
0–11	**5.58 (1.96–15.93)**	0.68 (0.22–2.13)	**3.92 (1.03–14.94)**	—	—	—
12–23	**1.00**	1.00	**1.00**	—	—	—
24–35	—	—	—	0.53 (0.20–1.41)	0.96 (0.358–2.58)	0.74 (0.26–2.09)
36–47	—	—	—	0.88 (0.34–2.31)	1.69 (0.64–4.49)	1.54 (0.51–4.64)
48–60	—	—	—	1.00	1.00	1.00
BMI category						
Obese or overweight	0.35 (0.12–1.05)	1.58 (0.51–4.85)	0.96 (0.27–3.36)	1.51 (0.67–3.42)	1.06 (0.47–2.36)	0.83 (0.34–1.99)
Healthy weight	1.00	1.00	1.00	1.00	1.00	1.00
Parent characteristics						
Age						
Younger than 30	0.57 (0.21–1.56)	1.38 (0.46–4.12)	1.26 (0.39–4.06)	0.97 (0.42–2.23)	0.56 (0.24–1.30)	0.62 (0.25–1.54)
30 or older	1.00	1.00	1.00	1.00	1.00	1.00
Ethnicity						
Latino, any race	1.99 (0.49–8.13)	1.03 (0.24–4.48)	0.75 (0.12–4.85)	1.44 (0.41–5.15)	2.10 (0.60–7.37)	1.60 (0.40–6.30)
Non-Latino, any race	1.00	1.00	1.00	1.00	1.00	1.00
Survey language						
Spanish	1.79 (0.37–8.65)	1.98 (0.35–11.29)	1.52 (0.19–12.17)	1.22 (0.41–3.68)	2.91 (0.97–8.78)	2.19 (0.67–7.16)
English	1.00	1.00	1.00	1.00	1.00	1.00
Parent-weighted daily screen time, hours						
<2	2.47 (0.65–9.40)	1.76 (0.42–7.40)	**5.81 (1.48–22.84)**	**5.27 (2.01–13.81)**	1.56 (0.63–3.84)	**2.65 (1.06–6.60)**
≥2	1.00	1.00	**1.00**	**1.00**	1.00	**1.00**
Household media environment						
TV on during dinner, days						
0	1.05 (0.37–2.94)	0.72 (0.239–2.18)	0.38 (0.11–1.35)	**4.12 (1.84–9.25)**	1.03 (0.47–2.27)	**2.70 (1.12–6.47)**
>0	1.00	1.00	1.00	**1.00**	1.00	**1.00**
TVs in home, no.						
0–1	0.90 (0.30–2.72)	**31.96 (3.75–272.37)**	**3.83 (1.12–13.08)**	1.32 (0.50–3.47)	**12.25 (3.72–40.30)**	**5.20 (1.99–13.55)**
≥2	1.00	**1.00**	**1.00**	1.00	**1.00**	**1.00**

AAP, American Academy of Pediatrics; TV, television.
Bolded values are statistically significant with $p < 0.05$.

beliefs about the *value of TV* were inversely associated with child screen time (Supplementary Table 1); other parent beliefs had no significant associations with mean screen time.

Associations with Following American Academy of Pediatrics Guidelines

On bi- and multivariate analysis, parent media use and household media environment had the most consistent associations with guideline adherence: All children were more likely to meet guidelines when there were <2 TVs in the home and parents spent less time viewing electronic media. Additionally, older children (ages 2–5) were more likely to meet guidelines if TV was never on during dinner (Tables 2 and 3). No association was found between guideline adherence and child BMI in either age group. In terms of other sociodemographic associations, children ages 0–11 months were more likely to be adherent to guidelines than children ages 12–23 months. Other sociodemographic factors, including parent language, ethnicity, and age, were not associated with guideline adherence on multivariate analysis.

Table 4. Percent of Parents Having Healthy Beliefs About Child Media Use

	TV is of value (% disagree)	TV is useful (% disagree)	I restrict TV (% agree)	I have to be sure my child does not watch too much TV (% agree)	I will switch off TV if too much (% agree)
Total, %	34	42	70	72	81
Child characteristics					
Age, years, %					
<2	**41**	40	72	74	81
≥2	**29**	43	68	70	80
Chi-square *p* value	**0.04**	0.65	0.54	0.47	0.91
Ethnicity, %					
Latino, any race	34	43	68	73	81
Non-Latino, any race	36	37	76	70	80
Chi-square *p* value	0.76	0.36	0.18	0.55	0.82
BMI category, %					
Obese or overweight	32	36	69	74	76
Healthy weight	34	46	70	71	83
Chi-square *p* value	0.76	0.11	0.94	0.62	0.19
Parent characteristics					
Age, %					
Younger than 30	29	37	67	72	83
30 or older	39	46	73	74	80
Chi-square *p* value	0.09	0.14	0.26	0.72	0.48
Ethnicity					
Latino, any race	35	42	**66**	72	80
Non-Latino, any race	34	41	**79**	72	83
Chi-square *p* value	0.87	0.81	**0.03**	0.93	0.54
Parent-weighted daily screen time, hours, %					
<2	**46**	**55**	70	78	78
≥2	**29**	**36**	70	70	81
Chi-square *p* value	**0.005**	**0.003**	0.98	0.14	0.48
AAP guidelines					
Screen time, %					
Meets recommendation for age	39	**48**	73	74	81
Does not meet recommendation for age	30	**35**	66	69	79
Chi-square *p* value	0.13	**0.03**	0.26	0.39	0.79
TV in bedroom, %					
No TV in bedroom	**40**	44	74	75	81
Yes TV in bedroom	**28**	36	67	70	81
Chi-square *p* value	**0.04**	0.17	0.25	0.37	0.95
Meets both recommendations, %					
Yes	**47**	**51**	78	75	81
No	**30**	**35**	68	71	80
Chi-square *p* value	**0.010**	**0.02**	0.11	0.46	0.85

AAP, American Academy of Pediatrics; TV, television.

Bolded values are statistically significant with *p* < 0.05.

Associations with Parental Media Attitudes

Several child and family factors correlated with parent media beliefs: Parents of children <2 years were more likely to have healthy beliefs about the value of TV than parents of children ≥2 years (Tables 4 and 5). Non-Latino parents were more likely to report healthy beliefs about restricting their child's TV compared to Latino parents. Parents who spent less time viewing electronic media were more likely to report healthy beliefs about the value of TV and the usefulness of TV. Parents of obese/overweight children were more likely to have healthy beliefs about the utility of TV and turn off the TV if too much compared to parents of healthy

Table 5. Adjusted Odds of Healthy Parent Beliefs for Child Media Usage (95% Confidence Interval)					
	TV is of value (disagree)	**TV is useful (disagree)**	**I restrict TV (agree)**	**I have to be sure my child does not watch too much TV (agree)**	**I will switch off TV if too much (agree)**
R^2 for model with all listed variables	0.048	0.047	0.038	0.021	0.018
Child characteristics					
Age, years					
<2	**2.00 (1.07–3.75)**	0.93 (0.52–1.67)	1.12 (0.59–2.13)	1.40 (0.74–2.66)	0.85 (0.41–1.76)
≥2	**1.00**	1.00	1.00	1.00	1.00
BMI category					
Obese or overweight	1.02 (0.57–1.82)	**1.88 (1.08–3.28)**	0.93 (0.51–1.69)	0.86 (0.47–1.55)	**1.95 (1.01–3.77)**
Healthy weight	1.00	**1.00**	1.00	1.00	**1.00**
Parent characteristics					
Age					
Younger than 30	0.61 (0.34–1.09)	0.73 (0.42–1.25)	0.59 (0.32–1.06)	0.85 (0.47–1.53)	1.08 (0.55–2.11)
30 or older	1.00	1.00	1.00	1.00	1.00
Ethnicity					
Latino, any race	1.04 (0.56–1.94)	0.91 (0.50–1.64)	**0.51 (0.26–0.998)**	1.03 (0.55–1.95)	0.83 (0.40–1.75)
Non-Latino, any race	1.00	1.00	**1.00**	1.00	1.00
Parent-weighted daily screen time, hours					
<2	**2.12 (1.15–3.89)**	**1.98 (1.10–3.56)**	1.56 (0.80–3.04)	1.99 (1.00–3.94)	1.05 (0.51–2.14)
≥2	**1.00**	**1.00**	1.00	1.00	1.00

TV, television.
Bolded values are statistically significant with $p < 0.05$.

weight children by multivariate analysis alone (Table 5). Other parent beliefs did not differ significantly by child BMI classification, parent ethnicity, or parent age. In terms of the relationship between AAP guideline adherence and parent media beliefs, parents of children who met hourly guidelines were more likely to have healthy beliefs about the usefulness of TV, and parents of children with no bedroom TV were more likely to have healthy beliefs about the value of TV. Parents of children who met both guidelines were more likely to have healthy beliefs about both the usefulness of TV and the value of TV (Table 4).

Discussion

To our knowledge, adherence to AAP screen time guidelines has not been previously investigated among WIC participants. Our study found that less than one third of children in our WIC-based sample meet AAP guidelines for hourly screen time limits and no bedroom TV, with many factors contributing to excessive childhood screen time. Specifically, we found that children were more likely to meet AAP guidelines when there were <2 TVs in the home, no TV during dinner, or parents spent less time viewing electronic media. Our research supports previous findings on this topic; in a previous systematic review of 71 studies published between 1980 and 2009, study investigators found

that family TV viewing and child media access were associated with child TV viewing among children <7 years.[38]

Interestingly, in our study BMI was not related to mean screen time or meeting AAP guidelines. This appears to contradict previous findings for this age group.[32] Lack of adequate statistical power in our study may have contributed; however, our results did not show any trend consistent with previous research. Our differing findings may alternatively be related to the WIC setting, given that families in WIC already are engaged in nutritional counseling and obesity prevention activities. Given that screen time is a known risk factor for obesity, and given the young age of children in this study, our findings may also represent a latency period, where screen time patterns are established before onset of obesity. Although our study did not find an association with screen time and BMI in the WIC setting, the low rate of guideline adherence remains concerning, given the association of screen time with other medical and developmental/educational risks.

This study points to specific areas that might be promising intervention targets. Given our findings about the household media environment, family-centered interventions in which parents serve as role models to promote healthy media habits within the entire family may be particularly effective. Specifically, strategies to help parents to reduce their own screen time may be useful. Another approach supported by

our data would be a campaign to turn off the TV during dinner, which would dually promote goals of reducing screen time and improving eating habits. Several existing initiatives already include some of these components[21,23] and are often promoted in WIC and other community-based settings. Our study suggests that targeting specific messages within these initiatives may be especially important. For instance, in our study, over half of parents believed that TV was of value to children <2 years old, even though studies demonstrate that this is likely not the case.[11,39,40] These beliefs about the value of TV were associated with more screen time in children. As a result, messages countering beliefs about the value of TV for young children may be particularly effective in reducing childhood screen time. It is critical for pediatric healthcare providers to partner with community agencies around the issue of screen time so families receive consistent messaging across settings.

Strengths of this study include its focus on a low-income, predominantly Latino population, survey administration in both English and Spanish, high participation rate, and the use of measured child anthropometrics rather than parental report. The study also has limitations, including data collection in summer months only, parent self-reported screen-time, not distinguishing among different reasons for screen time (e.g., educational purposes, work), and not differentiating between background and foreground media exposure. Additionally, missing sex data required calculating BMI classification for both sexes and excluding those with indeterminate BMI classifications, possibly resulting in misclassification bias.

Importantly, the study does not clarify whether children in WIC are at higher or lower risk than similar low-income children who are not enrolled in WIC. Because this was a single-center study, there is limited generalizability to WIC overall, or to other low-income settings; however, the population studied was similar to other WIC clinics nationally.[20] Interestingly, the proportion of children meeting hourly screen time guidelines in our sample (45% of children age <2 and 58% of children ages 2–5) was somewhat higher than Oregon data from the 2007 NSCH (40% of children age <2, and 46% ages 2–5),[27] and was fairly similar to rates found in another recent national survey.[15] This suggests that the problem of screen time is widespread. It also suggests that existing interventions in the WIC setting may be having positive effects, though we did not explicitly examine exposure to interventions.

Conclusions

This study adds to evidence that many low-income children experience excessive screen time. In a predominantly Latino population of children attending WIC, we found screen time to be strongly associated with parent media-viewing habits and the household media environment, including number of TVs in the home and watching TV during dinner. Our findings should inform future interventions seeking to reduce child screen time by leveraging community programs to educate parents and empower them to lead by example, by limiting family screen time and turning off the TV during meals.

Author Disclosure Statement

No competing financial interests exist.

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