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Screen Time Use Among Urban Children with Asthma

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Abstract

Objective—To describe screen time use and factors related to screen time among urban children with persistent asthma.

Patients and Methods—We analyzed data for 224 children (3–10 years) with persistent asthma. Parents reported on children's asthma severity, screen time use, and family practices regarding screen time. We asked parents: "On weekdays [and weekends] on average, over a 24 hour period, how many hours of screen time does your child have?" Parents also reported activity limitation due to asthma, and activities their child engaged in during times of activity limitation.

Results—Most children were male (58%), Black (65%), and had Medicaid (74%); average screen time was 3.4 hours per day. Most parents (74%) reported that their child had >2 hours of screen time per day and 1/3 were concerned that their child had too much screen time. Many children (63%) engaged in screen time activities during activity limitation due to asthma. Children who needed to slow down or stop normal activity due to asthma had more screen time compared to children who didn't need to slow down (3.51hrs vs. 2.44hrs, $p=.02$). Additionally, children who engaged in screen time activities during times of physical limitation had more screen time compared to children who engaged in other activities (3.67hrs vs. 2.99hrs, $p=.01$).

Conclusions—We found that urban children with asthma, particularly those with activity limitation, have excessive use of screen time. Strategies are needed to avoid activity limitation by improving asthma care and to empower families with alternate strategies to avoid excess screen time.

Keywords

Asthma; Activity limitation; Screen time; TV

INTRODUCTION

Children engage in a variety of "screen time" or "entertainment media" activities including watching television (TV) and videotapes, playing video and computer games, and surfing the Internet.¹ For children ≥ 2 years of age the American Academy of Pediatrics (AAP) recommends limiting screen time to no more than 2 hours per day of quality viewing,¹ however children's screen time viewing often exceeds this recommendation.^{1, 2} Nationally, young children watch approximately 3 hours of television per day.^{3, 4}

Excessive screen time is associated with multiple adverse health outcomes including obesity,^{1, 5} attention deficit disorder,⁶ aggressive behaviors,^{7, 8} and poor school performance.^{1, 9,}

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¹⁰ Many of these adverse outcomes associated with excessive screen time also are more prevalent among children with asthma, including obesity,^{11–13} behavior problems,^{14, 15} and poor school readiness.¹⁶

The National Heart, Lung, and Blood Institute's (NHLBI) goals of asthma therapy¹⁷ state that children should experience no symptoms of asthma and no limitation of activity. However, many parents report that persistent symptoms inhibit their child's participation in normal physical activity.¹⁸ Parents also may place limits on their child's activities in anticipation of an exacerbation of symptoms.¹⁹ Thus, children with asthma may be more likely to participate in sedentary activities, such as screen time viewing, compared to other children.

A better understanding of screen time habits of children with asthma and the circumstances under which screen time occurs might help to shape anticipatory guidance for this high-risk population. The objective of this study is to describe screen time use and factors related to screen time among urban children with persistent asthma.

PATIENTS AND METHODS

Study Population

For this study, we analyzed baseline data from the first year of a school-based asthma intervention which included 226 children ages 3–10 years enrolled from the Rochester City School District (August–November 2006, response rate:72%). We identified children with asthma through school health forms and completed a telephone screening with the child's primary caregiver to determine eligibility. All children with physician-diagnosed asthma and persistent symptoms¹⁷ over the past year were eligible. Parents provided informed consent and children ≥ 7 provided assent to participate. We performed detailed in-home baseline assessments with parents prior to the initiation of the intervention. Methodological details of the intervention are available.²⁰ The University of Rochester Institutional Review Board approved the study protocol.

Measures

Screen Time—We asked parents 8 questions about their child's hours of screen time and their knowledge, attitudes, and practices regarding screen time. We carefully ordered survey questions to limit the influence of previous questions on answers to subsequent questions. The questions are presented in the order that they were asked.

To determine what activities children participated in during times of activity limitation we asked: "When your child needs to stop activity due to asthma, what does your child typically do to occupy his/her time?" We asked this in an open-ended format and recorded responses (Yes/No) into a list of 7 categories on the survey instrument. If answers did not fit into these categories, responses were recorded individually. Parents could provide more than one response, and all were recorded. We combined watching TV, computer, and video game use to create an overall screen time variable.

We next asked parents to report their child's overall screen time on weekdays and weekends by asking: "On weekdays [and weekends] on average, over a 24 hour period, how many hours of screen time does your child have?" We defined screen time as: watching TV and video tapes, playing video and computer games, and surfing the Internet. We then calculated children's average daily screen time (weekday hours \times 5 days plus weekend hours \times 2 days, divided by 7 days).

We included assessments of parental practices and attitudes that have been shown to relate to children's screen time.^{2, 21} Parents reported whether their child had a TV in their bedroom

(Yes/No), had a computer or game system in their bedroom (Yes/No), and owned a “Game Boy®” or other hand-held videogame (Yes/No). We rated parents’ concerns about their child’s screen time (5-point scale; “Strongly Disagree” to “Strongly Agree”) with the following statement: “I am concerned that my child spends too much time watching TV, playing video games and using a computer.” Lastly, we assessed parent’s knowledge of the AAP guidelines for media use¹ by asking parents if they knew of the AAP recommendation to limit the number of “screen time” hours children have each day (Yes/No).

Asthma Severity—All children had persistent asthma symptoms during the previous year at the time of screening. We reassessed asthma severity at the baseline interview by asking: “Over the past 2 weeks on how many days did your child have any wheezing, coughing, tightness in the chest, or trouble breathing during the daytime?” and “Over the past 2 weeks on how many nights did your child have any wheezing, coughing, tightness in the chest or trouble breathing during the nighttime?” We defined persistent asthma as a child experiencing ≥ 5 days per 2 weeks with symptoms or ≥ 2 nights per 2 weeks with symptoms according to NHLBI guidelines.¹⁷ Parents also reported their child’s activity limitation due to asthma by responding yes or no to: “Does your child ever need to slow down or stop normal activity due to asthma?”

Sociodemographic and Health Variables—Demographic variables for participating children included gender, age, race (White, Black, other), ethnicity (Hispanic, not Hispanic) and insurance status (Medicaid, other insurance). Parent characteristics included age, education (<high school or \geq high school) and employment (no hours worked/week vs. work >0 hours/week).

Analysis

We performed all analyses using SPSS version 15.0 software (Statistical Product and Service Solutions 15.0; SPSS Inc, Chicago, III). We used descriptive statistics to illustrate overall screen time attitudes and practices and student’s independent t-test to assess the relationship between screen time and demographics, parent knowledge and attitudes, and asthma severity. A 2-sided alpha level of <.05 was considered statistically significant.

RESULTS

We included children with complete data on screen time habits (n=224). Most children were male (58%), Black (65%), and had Medicaid insurance (74%) (Table 1). The average parent age was 34.4 years and most graduated from High School (66%). Parents reported persistent asthma symptoms at the baseline interview for 63% of the children and the majority of children needed to slow down or stop normal activity due to asthma (91%).

Children’s screen time behaviors and factors related to screen time are presented in Table 2. Children’s average screen time was 3.4 hours per day; range 0–9.7 hrs (mean hrs 2.8 weekday; 4.9 weekend days) with 74% of children exceeding the AAP guidelines of no more than 2 hours of screen time per day. Many children (77%) had a TV in their bedroom and 44% owned a handheld game system. Approximately half of parents were aware of the guidelines for media use, and nearly one-third were concerned about their child’s amount of screen time. During times of physical limitation due to asthma, most parents reported that their child engaged in at least one screen time activity (watched television (56%), played video games (17%), used a computer (12%)).

Table 3 shows children’s screen time hours and its relationship with parent attitudes and practices regarding screen time and asthma severity. Children with televisions in their bedroom had more screen time compared to children without televisions in their bedrooms (3.59 hrs.

vs. 2.84 hrs, $p=.01$). Children whose parents were concerned that their child had too much screen time had greater screen time use compared to children whose parents were not concerned (4.24 hrs. vs. 3.08 hrs, $p<.001$). Additionally, children who needed to slow down or stop normal activity due to asthma had greater screen time use compared to children who didn't need to slow down (3.51 hrs. vs. 2.44 hrs., $p=.02$). Further, children who engaged in screen time activities during times of physical limitation due to asthma had more screen time hours compared to children who engaged in other activities (3.67 hrs. vs. 2.99 hrs., $p=.01$)

DISCUSSION

We found that urban children with persistent asthma had, on average, 3.4 hours of screen time use per day and almost $\frac{3}{4}$ engaged in >2 hours of screen time per day. These findings are consistent with other studies reporting that young children in the US are experiencing an excessive amount of screen time¹⁻⁴ and provide additional cause for national efforts to encourage reduction in children's screen time viewing. Efforts to reduce screen time may be particularly pertinent for children with asthma who are at heightened risk for many of the negative consequences associated with screen time use.

Prior studies have demonstrated a relationship between the amount of time children spend engaging in screen time activities and unfavorable health outcomes such as attention problems,⁶ aggressive behaviors,^{7, 8} poor nutrition,^{22, 23} and obesity.^{1, 5} Furthermore, excessive screen time viewing is associated with lower reading skills, poor school achievement, and substandard social relationships.²⁴ Despite the heightened public awareness regarding the detriments of excessive screen time, many children continue to have minimal parent-imposed restrictions on viewing time.^{21, 25} For example, in one study of sixth and seventh graders, almost half of the children reported that their parents set no limits on their television viewing.²¹ Television, videogames, and computers remain a constant presence in children's lives, and further efforts are needed to ensure limits on children's exposure.

In this study, over half of parents were aware of guidelines for screen time use. Additionally, many parents were concerned that their child spent too much time in front of a screen. However, we found that children had ample access to screens for viewing with approximately $\frac{3}{4}$ of children having a television in their bedroom and $\frac{1}{2}$ owning a hand-held game system. Consistent with prior studies,^{1, 2, 21} we found a relationship between having a television in the child's bedroom and more screen time hours in this sample of asthmatic children.

We also found that screen time habits seemed to be influenced by certain aspects of the disease process. The goals for asthma treatment¹⁷ suggest that, with current therapies available, children should be able to experience no activity limitation due to asthma, yet the majority of the children in this study needed to slow down or stop normal activity due to symptoms. More than half of parents reported that their child engaged in at least one screen time activity during times of limitation, and children who needed to limit activity had increased screen time hours.

We are not aware of other studies assessing screen time among children with asthma. Findings from this study are particularly concerning since there is evidence that obesity, behavioral problems, and poor school performance are more prevalent among children with asthma.¹¹⁻¹⁶ It may not be unreasonable for children to relax in front of a television during an asthma attack. However, these routines may perpetuate unhealthy screen time habits. Suggestions of alternate activities when children with asthma are not able to be active should be considered.

A few limitations of this study should be noted. First, this is a cross-sectional study and is primarily descriptive. We present associations between screen time viewing and children's activity limitation due to asthma; however we are unable to determine a causal link. We relied on parent report for asthma symptoms and screen time behaviors, thus reporting bias is possible.

We suspect that some parents underestimated screen time use. Our study included only children with significant asthma, and a control group without asthma was not available. Lastly, this study was conducted in urban Rochester, NY and results can only be generalized to similar populations.

Implications

We found that the majority of urban children with persistent asthma engaged in excessive screen time viewing, and activity limitation due to asthma was associated with an increased number of viewing hours. This is particularly problematic because of the risk of adverse health outcomes with excessive screen time use. In order to maximize the health of high-risk children, strategies are needed to assure optimal asthma control and to guide families towards alternate activities for their children if times of physical limitation occur.

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References

1. American Academy of Pediatrics. Children, adolescents, and television. *Pediatrics* 2001;107(2):423–6. [PubMed: 11158483]
2. Christakis DA, Ebel BE, Rivara FP, Zimmerman FJ. Television, video, and computer game usage in children under 11 years of age. *J Pediatr* 2004;145(5):652–6. [PubMed: 15520768]
3. Burdette HL, Whitaker RC. A national study of neighborhood safety, outdoor play, television viewing, and obesity in preschool children. *Pediatrics* 2005;116(3):657–62. [PubMed: 16140705]
4. Zimmerman FJ, Christakis DA. Children's television viewing and cognitive outcomes: a longitudinal analysis of national data. *Arch Pediatr Adolesc Med* 2005;159(7):619–25. [PubMed: 15996993]
5. Dennison BA, Erb TA, Jenkins PL. Television viewing and television in bedroom associated with overweight risk among low-income preschool children. *Pediatrics* 2002;109(6):1028–35. [PubMed: 12042539]
6. Christakis DA, Zimmerman FJ, DiGiuseppe DL, McCarty CA. Early television exposure and subsequent attentional problems in children. *Pediatrics* 2004;113(4):708–13. [PubMed: 15060216]
7. Robinson TN, Wilde ML, Navracruz LC, Haydel KF, Varady A. Effects of reducing children's television and video game use on aggressive behavior: a randomized controlled trial. *Arch Pediatr Adolesc Med* 2001;155(1):17–23. [PubMed: 11177057]
8. Ozmert E, Toyran M, Yurdakok K. Behavioral correlates of television viewing in primary school children evaluated by the child behavior checklist. *Arch Pediatr Adolesc Med* 2002;156(9):910–4. [PubMed: 12197799]
9. Borzekowski DL, Robinson TN. The remote, the mouse, and the no. 2 pencil: the household media environment and academic achievement among third grade students. *Arch Pediatr Adolesc Med* 2005;159(7):607–13. [PubMed: 15996991]
10. Hancox RJ, Milne BJ, Poulton R. Association of television viewing during childhood with poor educational achievement. *Arch Pediatr Adolesc Med* 2005;159(7):614–8. [PubMed: 15996992]
11. Bibi H, Shoseyov D, Feigenbaum D, et al. The relationship between asthma and obesity in children: is it real or a case of over diagnosis? *J Asthma* 2004;41(4):403–10. [PubMed: 15281326]
12. Shore SA, Johnston RA. Obesity and asthma. *Pharmacol Ther* 2006;110(1):83–102. [PubMed: 16297979]
13. Epstein LH, Wu YW, Paluch RA, Cerny FJ, Dorn JP. Asthma and maternal body mass index are related to pediatric body mass index and obesity: results from the Third National Health and Nutrition Examination Survey. *Obes Res* 2000;8(8):575–81. [PubMed: 11156433]

14. Halterman JS, Conn KM, Forbes-Jones E, Fagnano M, Hightower AD, Szilagyi PG. Behavior problems among inner-city children with asthma: findings from a community-based sample. *Pediatrics* 2006;117(2):e192–9. [PubMed: 16452328]
15. McQuaid EL, Kopel SJ, Nassau JH. Behavioral adjustment in children with asthma: a meta-analysis. *J Dev Behav Pediatr* 2001;22(6):430–9. [PubMed: 11773808]
16. Halterman JS, Montes G, Aligne CA, Kaczorowski JM, Hightower AD, Szilagyi PG. School readiness among urban children with asthma. *Ambul Pediatr* 2001;1(4):201–5. [PubMed: 11888401]
17. National Asthma Education and Prevention Program. NAEPP Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma-Update on Selected Topics 2002, NIH Publication No. 02-5075. Bethesda, MD: National Institutes of Health, National Heart, Lung, and Blood Institute; 2002.
18. Maier WC, Arrighi HM, Morray B, Llewellyn C, Redding GJ. The impact of asthma and asthma-like illness in Seattle school children. *J Clin Epidemiol* 1998;51(7):557–68. [PubMed: 9674662]
19. Lang DM, Butz AM, Duggan AK, Serwint JR. Physical activity in urban school-aged children with asthma. *Pediatrics* 2004;113(4):e341–6. [PubMed: 15060265]
20. Halterman JS, Borrelli B, Fisher S, Szilagyi P, Yoos L. Improving care for urban children with asthma: design and methods of the School-Based Asthma Therapy (SBAT) trial. *J Asthma* 2008;45(4):279–86. [PubMed: 18446591]
21. Wiecha JL, Sobol AM, Peterson KE, Gortmaker SL. Household television access: associations with screen time, reading, and homework among youth. *Ambul Pediatr* 2001;1(5):244–51. [PubMed: 11888409]
22. Coon KA, Tucker KL. Television and children's consumption patterns. A review of the literature. *Minerva Pediatr* 2002;54(5):423–36. [PubMed: 12244280]
23. Goldberg M, Gorn GJ, Gibson W. TV messages for snack and breakfast foods: do they influence children's preferences? *J Consumer Res* 1978;5:73–81.
24. Kennedy C. Examining television as an influence on children's health behaviors. *J Pediatr Nurs* 2000;15(5):272–81. [PubMed: 11077764]
25. Jordan AB, Hersey JC, McDivitt JA, Heitzler CD. Reducing children's television-viewing time: a qualitative study of parents and their children. *Pediatrics* 2006;118(5):e1303–10. [PubMed: 17079531]

Table 1

Population Demographics

	Overall N (%)
<i>Child Demographics</i>	
Child Age in years, mean (SD)	6.96 ±1.9
Child Gender	
Male	131 (58)
Female	93 (42)
Child Race	
White	24 (11)
Black	146 (65)
Other	54 (24)
Child Ethnicity	
Hispanic	62 (28)
Non-Hispanic	162 (72)
Medicaid	
Yes	166 (74)
No	58 (26)
<i>Parent Demographics</i>	
Parent Age in years, mean (SD)	34.4 (8.4)
Parent Education	
<HS	76 (34)
HS graduate or higher degree	148 (66)
Parent Employed	
Yes	143 (68)
No	69 (32)
<i>Asthma Severity</i>	
Asthma Severity	
Mild Intermittent	83 (37)
Persistent	141 (63)
Child ever need to slow down or stop normal activity or playing due to asthma	
Yes	205 (91)

	Overall N (%)
No	19 (9)

Table 2

Screen Time Characteristics

	Total Sample (N, %)
Average screen time hours (mean, SD)	3.4 ± 1.89
> 2 hours of screen time per day	166 (74)
TV in child's bedroom	173 (77)
Computer in child's bedroom	94 (42)
Own a handheld video game system	98 (44)
Parent knowledge of AAP guidelines	132 (59)
Parent concerned child has too much screen time	66 (30)
<i>During Physical Limitation Due to Asthma</i>	
Use screen time during activity limitation (at least one of: TV, Video games, or Computer/Internet)	140 (63)
Watch Television	126 (56)
Video Games	39 (17)
Computer/Internet	28 (12)
Sit Down/Rest/Nap	111 (50)
Read	64 (29)
Color/Write/Arts and Crafts	59 (26)

Table 3
Screen time attitudes and practices and asthma severity

	<u>Average screen time Mean (SD)</u>	<u>P-Value</u>
TV in child's bedroom		
Yes	3.59 (1.92)	.01
No	2.84 (1.70)	
Computer in child's bedroom		
Yes	3.60 (2.02)	.22
No	3.23 (1.79)	
Own a handheld video game system		
Yes	3.35 (1.71)	.64
No	3.47 (2.03)	
Parent knowledge of guidelines		
Yes	3.45 (1.84)	.80
No	3.34 (1.97)	
Parent concerned child has too much screen time		
Yes	4.24 (1.88)	<.001
No	3.08 (1.79)	
Asthma Severity		
Screen time use during activity limitation		
Yes	3.67 (1.98)	.01
No	2.99 (1.66)	
Child ever need to slow down or stop normal activity or playing due to asthma		
Yes	3.51 (1.90)	.02
No	2.44 (1.57)	
Asthma Severity		
Mild Intermittent	3.50 (2.14)	.62
Persistent	3.37 (1.74)	