Analysis of Timely Access to Healthcare and Difficulty Procuring Specialist Care Among Children With and Without Anxiety or Depression Disorders

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Background: *To examine timely preventive care access and specialist care among children with and without anxiety or depression disorders.* **Methods:** *The population of interest was extracted from the National Survey of Children's Health 2011/2012 (NSCH 2011/12) data set. The sample included children (0-17 years old) and their caregivers who completed the survey. Data were analyzed from February 2011 to June 2012. Outcome variables included reports for missed or delayed care, and problems procuring specialist care based on parental response to interview questions. Covariates included child demographics, insurance status, caregiver education, household employment, and poverty levels.* **Findings:** *A total of 85 412 records were extracted from the NSCH 2011/12 data set. The covariate-adjusted odds (also adjusted using the sampling weight methods suggested by the NSCH) of having delayed or missed care for a child with anxiety or depression were 2.22 (95% confidence interval [CI], 1.80-2.73, p<0.001) times higher than a child without anxiety or depression. In a subsample of 24 869 records, the covariate-adjusted odds of the caregiver reporting problems procuring specialist care for a child with anxiety or depression were 2.11 (95% CI, 1.72-5.58, p<0.001) times higher than a child without these diagnoses.* **Conclusions:** *Children with anxiety or depression are less likely to obtain timely preventive care and have problems procuring specialist care. These findings highlight a disparity that requires the attention of healthcare providers and outreach programs.*

Keywords: *Healthcare utilization, anxiety, depression, caregiver*

Introduction

Nearly 1 in 5 children in the US have a mental health disorder, with an estimated annual cost of $247 billion for mental illness-related treatments, services and decreased productivity [1]. Yet, fewer than half of these affected children received the necessary care they need [2,3]. Anxiety and/or depression are the most common mental health disorders. In the U.S., 7.1% of children have been diagnosed with anxiety and 3.2% of children have been diagnosed with depression [4]. Among them, only about 20 percent with anxiety and 40 percent with depression are getting treatment [5].

Diagnosis of Anxiety or Depression and Preventive Care Utilization

Some studies exploring the relationship between diagnoses of anxiety or depression and primary care utilization among adults have found that those with anxiety or depression use primary care services less than those individuals without these disorders [6,7]. On the other hand, other studies conducted on different populations, show the opposite relationship [8-11]. For example, a study examining the relationship between depression and healthcare utilization of 3 481 elderly patients seen in a primary care practice in the last 12 months actually found patients with depression had an increased outpatient service utilization[11]. To our knowledge, no studies have examined the relationship between having a diagnosis of anxiety or depression and children's access to medical care.

While there is no research published specifically involving children with anxiety or depression and their utilization of vision care, there is some research describing general factors associated with vision care utilization [12,13]. For example, a study of 11 015 Canadian adolescents in 2007-2008 found that a lack of vision care insurance, being male, their parents not owning the residential home, reading fewer than three hours weekly, and not having diabetes were all associated with not utilizing vision care [12].

Some studies also demonstrated that children with severe mental illness received dental care less often than children without it [14]. Poor utilization of preventive dental health care services also highlights the importance of helping those with mental illness get the care they need to reduce long-term adverse events. This is especially the case in children, as shown in an article published using the NSCH 2011/12. The study found that children who had unmet dental needs had a higher mean number of days of school missed in the past year due to injury/illness than those who did not have unmet dental needs[15].

Socio-demographic Factors and Preventive Care Utilization

Aside from the child's mental illness, there are a variety of other factors that have been shown to be associated with the utilization of preventive health care [16-24]. Many studies found that the child's age, race, household socioeconomic and educational levels, and insurance plans were associated with the utilization of care. Specifically, younger children, non-Hispanic Black and Hispanic children, those in non-English speaking home, living in low-education or low-income households, or were uninsured had higher odds of not receiving either family center care or pediatric primary care[16-18,25-27]. Even with the trend in the US toward more equal health care opportunities for all, these findings point to potential racial/ethnic and sociodemographic co-factors or confounding relationships that may exist in the association between children with anxiety or depression and their utilization of preventive healthcare services.

Even though a large amount of research has examined differences in health care access in certain subgroups of children with special health care needs (for example, those with asthma, or autism spectrum disorders)[28,29], little is known about health care access among children with and without anxiety or depression disorders. In this study, we used data from the 2011/2012 National Survey of Children Health (NSCH 2011/12) to determine if children with diagnosed anxiety or depression have delayed or missed preventive healthcare services, and if their parents/caregivers reported difficulty procuring the specialist care they need for them. Second, we also explored if socio-demographic factors of children and their caregivers may independently associate with health care access in children with anxiety or depression disorders .

Methods

NSCH Survey Design

The current study used the publicly available, de-identified NSCH 2011/12, which was conducted by the Centers for Disease Control (CDC)'s National Center for Health Statistics between 2/28/11 and 6/25/2012 and was designed to assess the well-being of children aged 0-17 and their families. The 2011/12 survey was collected via cross-sectional phone interview of households with at least 1 individual aged 0-17 years in which parents, family, and household residents (who reported knowledge of the health and healthcare of the sample child) answered questions about the child's and their own health. Household demographics were collected, and the family was screened for survey eligibility. If a child under 18 was living in the house, the survey was completed. The interviewer selected a child who was either the sole child in the house (under 18), or a randomly selected child, if there was more than one child. From there, the study questions were directed at the selected child [30].

The NSCH is funded and directed by the Health Resources and Services Administration Maternal and Child Health Bureau, and is conducted by the U.S. Census Bureau. This study collects myriad child health and healthcare factors including child and family demographics, child health status, child development status, insurance coverage, preventive and specialty care use, family health and activities, parental health, and neighborhood characteristics. Data are randomly sampled from all residential addresses in the United States, and released data is stripped of all identifying factors. Since only de-identified data were used, the Temple University institutional review board determined that the present study was exempt.

Study Sample

The study sample is children (0-17 years old) and their parents/caregivers who completed the 2011/2012 NSCH survey (sample size=95 677). Surveys with missing data about exposure questions (has a doctor or other healthcare provider ever told you that your child has depression or anxiety even if they do not have the condition now) or outcome questions (1. During the past 12 months/Since his/her birth, was there any time when your child needed preventive care, including: medical, dental, or vision, but it was delayed or not received? 2. During the past 12 months/Since his/her birth, how much of a problem, if any, was it to get the care from the specialists that your child needed?) are excluded from the analysis. The final analytic sample includes 85 412 eligible children; among them, 24 869 reported the need to get the care from the specialists.

Data Measures

The first dependent variable was delayed or non-received preventive care and was defined using a combination of the questions "During the past 12 months/Since his/her birth, was there any time when your child needed health care but it was delayed or not received?" and "What type of care was delayed or not received?". Those answering "yes" to delayed/not received care and reporting that the delay was "medical, dental, or vision" care were considered to have a positive outcome.

The second dependent variable was firstly based on two filter questions: "During the past 12 months/Since his/her birth, did your child see a specialist, or did you or a doctor think that [he/she] needed to see a specialist?" Those answering "yes" to these two filter questions were further asked the answer to "During the past 12 months/Since his/her birth, how much of a problem, if any, was it to get the care from the specialists that your child needed?". The outcome was compressed into two classes: "big

problem" and "small problem" were combined into "positive for problem", and the other choice "not a problem". This was done because an inadequate number of respondents reported they had a "big problem".

Besides child's mental health status (any reported anxiety or depression disorder), we selected child and household characteristics as covariates that have established associations with child's different mental health status and healthcare access[16-20]. These covariates in the model include a child's biological age, sex (Male/Female), race (White/Black/Other. Other includes American Indian/Native American, Alaska Native, Asian, Native Hawaiian, Pacific Islander, and other answers. Multiple responses were allowed; if so, a primary

category to White/Black was assigned when either White/Other or Black/Other were chosen), ethnicity (Hispanic/Non-Hispanic), insurance status (have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicaid: Yes/No), caregiver's highest education (Less than high school, High school graduate, More than high school), household employment status (Was anyone in the household employed at least 50 weeks out of the past 52 weeks: Yes/No) and poverty level (Percentage levels used to calculated minimum annual income a household needed to receive certain welfare benefits based on Federal Poverty Guidelines).

Statistical Analysis

The 2011/2012 NSCH survey has sampling strata and weighting. This was the same sampling frame as the National Immunization Survey (NIS) conducted by the CDC, and was carried out directly following the NIS in sampled houses. Weighting was calculated beginning with the base sampling weight being set to the inverse probability of the phone number being selected. Certain adjustments were independently made to the base weights of the landline and cell phone strata prior to their being combined. Population control totals used for weighting data were derived from the 2011 American Community Survey. After weighting, data estimates are representative of all non-institutionalized children 0-17 years old in the US [30].

All analyses were adjusted using the correct sampling methods provided by the NSCH. Summary data of relevant variables (dependent variables: care delayed/not received, how much of a problem was it to get care; independent variable: mental health disorder; co-factors: child demographics, insurance

status, caregiver's highest education, household employment status and poverty level) included N/percent for categorical variables and mean/standard deviation for continuous variables. Univariate and multivariable analyses were used to determine the relationships between child mental health status and healthcare access. It was decided a priori that a child's age, gender and race would be included in the final analysis as well as any covariate with a univariate p-value less than or equal to 0.20. Both research questions were addressed by using multivariable logistic regression. The interaction term between each covariate and child's mental health status was examined and retained in the final regression model if p-value less than 0.05. In all analyses, complex survey design including weight and strata (state and phone line type) provided in the NSCH public use dataset were considered, and two-sided p-values < 0.05 were deemed statistically significant. All analyses were performed in R complex survey package.

Results

Of the 85 412 eligible children aged <18 years in the 2011/2012 NSCH, 6 404 were diagnosed with anxiety or depression. The distribution of study population characteristics both in total

and stratified by presence/absence of anxiety or depression were shown in Table 1. The overall proportion of children having missed/delayed care was relatively low for the population (6.0%

weighted) and was similar to the proportion of children without anxiety or depression (5.5% weighted), but the proportion of children with anxiety/depression having missed/delayed care was more than double (12.8% weighted). Problems with obtaining specialist care were a much more prevalent factor than missed/delayed care, occurring in 23.8%

(weighted) of 24 869 eligible children who needed to see a specialist in the past 12 months. That proportion was, as with missed/delayed care, similar in those children without anxiety or depression (22.1% weighted), but higher in children with anxiety/depression (36.2% weighted). Similar distributions of population characteristics were found between children diagnosed with and without anxiety/depression.

Table 1.
Sample Characteristics and Study Variables[a] Under Two Outcomes

Outcome 1: During the past 12 months/Since his/her birth, was there any time when your child needed preventive care, including: medical, dental, or vision, health care but it was delayed or not received?

Characteristic[a]	Total (N=85 412)	Child with Anxiety or Depression (N=6 393)	Child with no Anxiety or Depression (N=79 019)
Delayed/Missed, No. (% weighted)			
Yes	4 419 (6.0)	709 (12.8)	3 710 (5.5)
No	80 993 (94.0)	5 684 (87.2)	75 309 (94.5)
Child Sex, No. (% weighted)			
Male	44 053 (51.2)	3 572 (55.5)	40 481 (50.9)
Female	41 257 (48.8)	2 817 (44.5)	38 440 (49.1)
Child Race, No. (% weighted)			
White	61 507 (66.2)	4 904 (73.0)	56 603 (65.7)
Black	8 532 (14.7)	463 (11.3)	8 069 (15.0)
Other	13 109 (19.1)	916 (15.7)	12 193 (19.3)
Child Ethnicity, No. (% weighted)			
Hispanic	11 100 (23.0)	700 (16.9)	10 400 (23.4)
Non-Hispanic	72 613 (77.0)	5 603 (83.1)	67 010 (76.6)
Child Insurance Status, No. (% weighted)			
Yes	81 551 (94.3)	6 175 (95.3)	75 376 (94.2)
No	3 727 (5.7)	213 (4.7)	3 514 (5.8)
Child Age, Mean (SD) weighted	9.60 (4.59)	12.35 (3.67)	9.40 (4.59)
Caregiver's Highest Education, No. (% weighted)			
Less than High School	11 742 (20.9)	1 007 (21.4)	10 735 (20.8)
High School Graduate	27 897 (32.7)	2 131 (33.4)	25 766 (32.6)
More than High School	40 917 (46.4)	2 888 (45.2)	38 029 (46.5)
Anyone in household Employed, No. (% weighted)			
Yes	73 573 (84.4)	5 050 (76.4)	68 608 (85.0)
No	10 097 (15.6)	1 260 (23.6)	8 865 (15.0)
Poverty level[b], No. (% weighted)			
<=100%	11 230 (21.2)	1 186 (26.6)	10 044 (20.8)
(100%-133%]	5 935 (9.8)	558 (10.8)	5 377 (9.7)
(133%-150%]	1 114 (1.9)	111 (2.1)	1 003 (1.9)
(150%-185%]	4 985 (7.5)	412 (8.4)	4 573 (7.4)
(185%-200%]	1 870 (2.9)	154 (2.4)	1 716 (3.0)
(200%-300%]	12 854 (16.7)	937 (14.5)	11 917 (16.9)
(300%-400%]	11 271 (12.4)	709 (10.9)	10 562 (12.5)
>400%	28 282 (27.6)	1 857 (24.4)	26 425 (27.8)

Table 1 (Continued)
Outcome 2: During the past 12 months/Since his/her birth, how much of a problem, if any, was it to get the care from the specialists that your child needed?

Characteristic	Total (N=24 869)	Child with Anxiety or Depression (N=3 173)	Child with no Anxiety or Depression (N=21 696)
Problems Getting Care, No. (% weighted)			
Yes	5 109 (23.8)	972 (36.2)	4 137 (22.1)
No	19 760 (76.2)	2 201 (53.8)	17 559 (77.9)
Child Sex, No. (% weighted)			
Male	13 134 (53.3)	1 721 (53.8)	11 413 (53.3)
Female	11 710 (46.7)	1 451 (46.2)	10 259 (46.7)
Child Race, No. (% weighted)			
White	18 685 (70.2)	2 431 (73.4)	16 254 (69.7)
Black	2 261 (12.9)	231 (10.4)	2 030 (13.2)
Other	3 442 (16.9)	460 (16.2)	2 982 (17.1)
Child Ethnicity, No. (% weighted)			
Hispanic	2 865 (19.1)	359 (16.0)	2 506 (19.5)
Non-Hispanic	21 625 (80.9)	2 775 (84.0)	18 850 (80.5)
Child Insurance Status, No. (% weighted)			
Yes	24 233 (96.6)	3 096 (96.8)	21 137 (96.7)
No	616 (3.3)	76 (3.2)	540 (3.3)
Child Age, Mean (SD) weighted	10.18 (4.71)	12.25 (3.81)	9.89 (4.75)
Caregiver's Highest Education, No. (% weighted)			
Less than High School	3 067 (16.8)	481 (18.2)	2 586 (16.7)
High School Graduate	7 969 (32.0)	1 055 (35.2)	6 914 (31.6)
More than High School	12 755 (51.1)	1 468 (46.6)	11 287 (51.7)
Anyone in household Employed, No. (% weighted)			
Yes	21 629 (85.1)	2 502 (77.4)	19 127 (86.1)
No	2 868 (14.9)	635 (22.6)	2 502 (13.9)
Poverty level[b], No. (% weighted)			
<=100%	2 805 (17.5)	577 (24.1)	2 228 (16.5)
(100%-133%]	1 515 (8.9)	256 (10.7)	1 259 (8.7)
(133%-150%]	290 (1.6)	45 (1.3)	245 (1.6)
(150%-185%]	1 266 (7.4)	212 (9.0)	1 054 (7.2)
(185%-200%]	492 (2.3)	77 (1.9)	415 (2.4)
(200%-300%]	3 484 (15.2)	442 (14.0)	3 042 (15.4)
(300%-400%]	3 273 (12.9)	365 (12.3)	2 908 (13.0)
>400%	9 577 (34.1)	954 (26.7)	8 623 (35.2)

[a] All missing data <1% of total No.
[b] Based on DHHS poverty guidelines

Delayed or Missed Preventive Care in Children with Anxiety or Depression

Factors considered in univariate analysis for this research question are shown in Table 2. Multivariable logistic regression (Table 4) showed that anxiety/depression (adjusted Odds Ratio [aOR], 2.22 [95% confidence interval [CI], 1.80-2.73]), black race (aOR, 1.33 [95% CI, 1.09-1.62]), older age of the child (aOR, 1.04, [95% CI, 1.02-1.06]), and higher education level achieved by the caregiver (aOR for high school graduate, 1.25, [95% CI, 1.00-1.56]; aOR for more than high school, 1.43, [95% CI, 1.15-1.79]) were associated with

missed/delayed care for the child in the past 12 months. In contrast, being insured (aOR, 0.24, [95% CI, 0.19-0.30]) and having incomes exceeding 200% of the federal poverty level (aOR for 200%-300%, 0.75, [95% CI, 0.58-

0.96]; aOR for 300%-400%, 0.49, [95% CI, 0.36-0.67]; aOR for >400%, 0.25, [95% CI, 0.19-0.32]) were associated with less missed/delayed care for the child in the past 12 months.

Table 2.

Factors independently associated with missed/delayed care by weighted univariate logistic regression

Characteristic	Missed/ Delayed (N=4 419)	Not Missed/Delayed (N=80 993)	cOR (95% CI)[a]	P Value[b]
Children with Anxiety or Depression, No. (% weighted)				
No	3 710 (85.6)	75 309 (93.7)	1 [Reference]	-
Yes	709 (14.4)	5 684 (6.3)	2.51 (2.11-2.99)	<.001
Child Sex, No. (% weighted)				
Male	2 236 (51.6)	41 817 (51.2)	1 [Reference]	-
Female	2 177 (48.4)	39 080 (48.8)	0.98 (0.86-1.12)	.81
Child Race, No. (% weighted)				
White	2 864 (58.0)	58 643 (66.7)	1 [Reference]	-
Black	583 (20.2)	7 949 (14.4)	1.62 (1.35-1.93)	<.001
Other	865 (21.8)	12 244 (18.9)	1.33 (1.11-1.59)	.002
Child Ethnicity, No. (% weighted)				
Non-Hispanic	3 658 (75.5)	68 955 (77.1)	1 [Reference]	-
Hispanic	682 (24.5)	10 418 (22.9)	1.09 (0.91-1.31)	.34
Child Insurance Status, No. (% weighted)				
No	707 (20.1)	3 020 (4.8)	1 [Reference]	-
Yes	3 702 (79.9)	77 849 (95.2)	0.20 (0.16-0.24)	<.001
Child Age, Mean (SD), yr, weighted	10.32 (4.64)	9.55 (4.58)	1.04 (1.02-1.05)	<.001
Caregiver's Highest Education, No. (% weighted)				
Less than High School	815 (23.8)	10 927 (20.7)	1 [Reference]	-
High School Graduate	1 393 (32.9)	26 504 (32.7)	0.88 (0.72-1.06)	.18
More than High School	1 933 (43.3)	38 984 (46.6)	0.81 (0.67-0.97)	.02
Anyone in household Employed, No. (% weighted)				
No	884 (20.8)	9 213 (15.3)	1 [Reference]	-
Yes	3 455 (79.2)	70 118 (84.7)	0.69 (0.58-0.81)	<.001
Poverty level[c], No. (% weighted)				
<=100%	989 (30.0)	10 241 (20.6)	1 [Reference]	-
(100%-133%]	535 (16.3)	5 400 (9.4)	1.20 (0.95-1.52)	.12
(133%-150%]	108 (3.3)	1 006 (1.8)	1.23 (0.78-1.93)	.37
(150%-185%]	394 (10.8)	4 591 (7.2)	1.02 (0.79-1.32)	.86
(185%-200%]	156 (3.6)	1 714 (2.9)	0.85 (0.58-1.24)	.41
(200%-300%]	828 (17.5)	12 026 (16.7)	0.72 (0.59-0.89)	.002
(300%-400%]	418 (8.5)	10 853 (12.6)	0.46 (0.35-0.61)	<.001
>400%	648 (10.0)	27 634 (28.8)	0.24 (0.20-0.29)	<.001

Abbreviation: -, not applicable. cOR, crude odds ratio.

[a] Shown are crude odds ratio estimates and 95% CIs from weighted univariate logistic regression

[b] P values for differences compared to reference

[c] Based on DHHS poverty guidelines

Problems Procuring Specialist Care in Children with Anxiety or Depression

Factors considered in univariate analysis for this research question are shown in Table 3. Multivariable logistic regression (Table 4) showed that anxiety/depression (aOR, 2.11 [95% CI, 1.72-2.58]), race (aOR for black, 1.45 [95% CI, 1.18-1.78]; aOR for other race, 1.51 [95% CI, 1.22-1.86]) were associated with problems procuring needed specialist care for the child in the past 12 months. In contrast, being insured (aOR, 0.36 [95% CI, 0.25-0.51]), and having higher education level achieved by the caregiver (aOR for high school graduate, 0.71, [95% CI, 0.56-0.89]; aOR for more than high school, 0.77, [95% CI, 0.62-0.79]), and being above 200% of the federal poverty lines (aOR for 200%-300%, 0.69, [95% CI, 0.54-0.88]; aOR for 300%-400%, 0.71, [95% CI, 0.54-0.95]; aOR for >400%, 0.48, [95% CI, 0.38-0.61]) were associated with less problems procuring needed specialist care for the child in the past 12 months.

Table 3.
Factors independently associated with problems procuring specialist care by weighted univariate logistic regression

Characteristic	Problem (N=5 109)	No Problem (N=19 760)	cOR (95% CI)[a]	P Value[b]
Children with Anxiety or Depression, No. (% weighted)				
No	4 137 (81.6)	17 559 (89.9)	1 [Reference]	-
Yes	972 (18.4)	2 201 (10.1)	2.00 (1.67-2.39)	<.001
Child Sex, No. (% weighted)				
Male	2 688 (53.7)	10 446 (53.2)	1 [Reference]	-
Female	2 416 (46.3)	9 294 (46.8)	0.98 (0.86-1.12)	.76
Child Race, No. (% weighted)				
White	3 348 (60.0)	15 337 (73.4)	1 [Reference]	-
Black	630 (16.9)	1 631 (11.6)	1.78 (1.48-2.14)	<.001
Other	1 007 (23.1)	2 435 (15.0)	1.88 (1.56-2.27)	<.001
Child Ethnicity, No. (% weighted)				
Non-Hispanic	4 224 (74.7)	17 401 (82.9)	1 [Reference]	-
Hispanic	803 (25.3)	2 062 (17.1)	1.64 (1.35-1.98)	<.001
Child Insurance Status, No. (% weighted)				
No	283 (7.4)	333 (2.0)	1 [Reference]	-
Yes	4 823 (92.6)	19 410 (98.0)	0.26 (0.19-0.36)	<.001
Child Age, Mean (SD), yr, weighted	10.09 (4.76)	10.20 (4.70)	0.99 (0.98-1.01)	.49
Caregiver's Highest Education, No. (% weighted)				
Less than High School	847 (24.5)	2 220 (14.5)	1 [Reference]	-
High School Graduate	1 524 (29.5)	6 445 (32.8)	0.53 (0.43-0.66)	<.001
More than High School	2 444 (46.0)	10 311 (52.7)	0.52 (0.43-0.63)	<.001
No	847 (21.1)	2 021 (13.0)	1 [Reference]	-
Yes	4 179 (78.9)	17 450 (87.0)	0.56 (0.46-0.67)	<.001
Poverty level[c], No. (% weighted)				
<=100%	902 (25.4)	1 903 (15.0)	1 [Reference]	-
(100%-133%]	466 (13.9)	1 049 (7.4)	1.11 (0.84-1.46)	.46
(133%-150%]	83 (1.6)	207 (1.5)	0.60 (0.38-0.95)	.03
(150%-185%]	351 (10.0)	915 (6.6)	0.89 (0.66-1.19)	.43
(185%-200%]	110 (2.1)	382 (2.4)	0.51 (0.33-0.78)	<.001
(200%-300%]	760 (14.1)	2 724 (15.6)	0.53 (0.42-0.66)	<.001
(300%-400%]	620 (11.4)	2 653 (13.4)	0.50 (0.39-0.65)	<.001
>400%	1 380 (21.5)	8 197 (38.1)	0.33 (0.27-0.41)	<.001

Table 4.

Factors associated with missed/delayed care, and problems procuring specialist care by weighted multivariable logistic regression

Characteristic	Missed/delayed care (N=85 412)		Problems procuring specialist care (N=24 869)	
	aOR (95% CI)[a]	P Value[b]	aOR (95% CI)[a]	P Value[b]
Children with Anxiety or Depression				
No	1 [Reference]	-	1 [Reference]	-
Yes	2.22 (1.80-2.73)	<.001	2.11 (1.72-2.58)	<.001
Child Sex				
Male	1 [Reference]	-	1 [Reference]	-
Female	1.01 (0.87-1.17)	.89	0.93 (0.80-1.08)	.34
Child Race				
White	1 [Reference]	-	1 [Reference]	-
Black	1.33 (1.09-1.62)	.004	1.45 (1.18-1.78)	<.001
Other	1.15 (0.94-1.42)	.17	1.51 (1.22-1.86)	<.001
Child Ethnicity				
Non-Hispanic			1 [Reference]	-
Hispanic			1.13 (0.96-1.33)	.13
Child Insurance Status				
No	1 [Reference]	-	1 [Reference]	-
Yes	0.24 (0.19-0.30)	<.001	0.36 (0.25-0.51)	<.001
Child Age, yr	1.04 (1.02-1.06)	<.001	0.99 (0.98-1.01)	.29
Caregiver's Highest Education				
Less than High School	1 [Reference]	-	1 [Reference]	-
High School Graduate	1.25 (1.00-1.56)	.05	0.71 (0.56-0.89)	.003
More than High School	1.43 (1.15-1.79)	.001	0.77 (0.62-0.97)	.03
Anyone in household Employed				
No	1 [Reference]	-	1 [Reference]	-
Yes	0.92 (0.76-1.13)	.45	0.85 (0.68-1.05)	.13
Poverty level[c]				
<=100%	1 [Reference]	-	1 [Reference]	-
(100%-133%]	1.12 (0.87-1.44)	.39	1.22 (0.92-1.62)	.17
(133%-150%]	1.05 (0.74-2.06)	.85	0.81 (0.50-1.30)	.37
(150%-185%]	0.97 (0.66-1.67)	.81	1.12 (0.82-1.54)	.47
(185%-200%]	0.87 (0.59-1.28)	.49	0.73 (0.47-1.12)	.15
(200%-300%]	0.75 (0.58-0.96)	.02	0.69 (0.54-0.88)	.003
(300%-400%]	0.49 (0.36-0.67)	<.001	0.71 (0.54-0.95)	.02
>400%	0.25 (0.19-0.32)	<.001	0.48 (0.38-0.61)	<.001

Discussion

Anxiety or depression disorders in children is an increasingly recognized problem. The study has shown that children with early behavioral problems or symptoms of anxiety or depression were at greater risk for becoming more isolated over time, receiving peer rejection and friendship and suicide [34-38]. These children need proper treatment plans for their conditions as well as timely preventive health care visits. In the current study, we found that children with anxiety or depression had significantly higher odds of missed/delayed preventive care and parental reporting of problems procuring specialty appointments. There may be several explanations for these findings. First, parents/caregivers of children with anxiety/depression may place a higher priority on obtaining treatment for their child's mental health condition than accessing preventive care services. Second, specialist care providers have limited appointment times, making it more difficult to find a time when all parties are available [39]. Finally, children and adolescents with anxiety/depression increase parental stress and perceived family dysfunction [40,41]. In addition, children with worsening symptoms are even more difficult to take to doctor appointments and it may affect parents' ability to access all types of medical care.

Health insurance coverage of children is an important determinant of access to health care. Of note, we found that uninsured children were highly associated with both missed/delayed care and parental reporting of problems procuring specialty appointments. Uninsured children have out-of-pocket costs associated with their care. Well care may not be seen as a priority when it has associated costs, and specialist care is very expensive when not partially covered by insurance [39,44].

The Federal Poverty guidelines are calculated based on yearly income and the number of individuals living in the household. Lower percentages indicate less income per person per household [42]. Children living in households with incomes at or above 200% of the federal poverty level (FPL) have decreased odds of missed/delayed care or problems procuring specialist care than children living in households with incomes below 100% of the FPL. With each increase in income per person per household, families have more resources available to access pediatric preventive care. However, since FPL can be an ultimate determinant in whether someone is eligible for Medicaid coverage, and Medicaid eligibility levels vary by state, further research using geographic data on FPL to subsides health insurance coverage for planning within health care access systems are warranted.

Caregiver's education played a significant role in the odds of a child having missed delayed care [45]. A study conducted using the National Health Interview Survey found that child healthcare utilization increased with increased maternal education [31]. Contrary to this and other research findings, our results suggest that children with anxiety/depression and more educated caregivers have higher odds of having missed preventive care appointments than children with less educated caregivers. Although the links between caregiver's education and the odds of a child having missed delayed care are quite surprising, it sheds light on the need to conduct further research to fully detect and address this relationship in the expected direction.

Regarding reporting problems to care, the opposite association existed for caregiver's education. Higher caregivers' education was associated with fewer problems accessing specialty care for children. Scheduling specialty appointments most often require a referral from a primary care provider, and some specialties have a shortage of qualified physicians [39]. This increased complexity, and lower availability of providers may make it more difficult to schedule appointments. Individuals with higher levels of education may live in areas with more access to specialty care, or have a greater understanding and tolerance of the process of navigating the complex specialty systems.

Mean child age was significantly associated with the odds of a child having missed or delayed care. Given that required childhood vaccinations are clustered in the

earlier years and are administered less frequently as the child ages, this association is to be expected [46]. As the child ages, and fewer vaccinations are administered, well visits may be perceived as less important to parents. Problems procuring specialty visits, however, did not have a significant association with child age. This is consistent with other studies [47].

The child's race was significantly associated with both missed/delayed care and parental reporting of problems procuring specialty appointments. Specifically, compared to Whites, Black children had significantly higher odds of having missed/delayed care or problems getting specialist care. Children of a race other than Black/White, also had higher odds of problems getting specialist care. This finding confirms another study that children of minority races, especially black children, are less likely to visit a doctor's office for any reason [48]. In our data, both the uninsured rate and the unemployment rate for Black/Other children are significantly higher as compared to Whites, which may further suggest that other socioeconomic factors may be at play and need to be addressed.

Our findings have both important clinical and policy implications. Children with anxiety or depression disorders may be very vulnerable and resistant to communication, yet have many additional healthcare needs that other children may not. To lessen any health disparity that may occur, preventative health and specialist pediatricians could work in conjunction with child psychologists and mental health providers to provide joint comprehensive care to children who have a higher chance of missing or delaying the care that they need. In addition, many other socio-demographic factors, for example, racial and health insurance coverage, were found to bear importance on health care access. Even though these differences did not fully explain issues to health care access, policymakers should be attentive to these disparities and strive to refine and implement plans through which these disparities may not unequally influence health care access anymore.

Strengths and Limitations

The strengths of this research are the use of the National Survey of Children's Health, which has a very large sample size and is weighted to be nationally representative. The survey implements random digit dialing as a method of contacting potential enrollees, which has the benefit of including non-listed numbers that may be missed using other phone survey methodologies. Since the NSCH is cross-sectional in design, there are no long follow-up periods where enrollees can be lost. Upon completing the survey, all the data that is needed and available for a particular subject has already been collected. This allows for prevalence to be determined for the selected outcomes. As a result, the NSCH has a high capability to be representative of the population compared to other research designs. Because of this, the present study is generalizable to all populations.

This study has several limitations. First, outcome variables were defined as binary due to the low frequency of individuals perceiving a "big problem" getting their child the care that they need (1.7%). As a result, the outcome was made to be "any problem" vs "no problem" which may result in a less nuanced interpretation of results. Second, since NSCH was conducted using telephone methodology, none of the children's anxiety and depression diagnoses was clinically confirmed, they were merely based on caregivers' self-reported answers with the aid of screen questions to help them understand their children's health conditions. In addition, some anxiety and depression diagnoses may not apply to very young children. Third, the NSCH has a relatively poor response and completion rate. As a result, certain populations may be underrepresented in the sample. Weighting was used as a method for correcting any underrepresentation, but it cannot be known if certain populations are under or not represented in the study. Fourth, since the NSCH is a phone survey and asks patients/caregivers to remember as far back as a year about their

activities of daily living, survey respondents may feel pressure to give favorable answers, or answers that present their child and how they care for them in a positive light. Fifth, parents/caregivers struggling the most with their lives and their children may not have gotten to the doctor to get their child diagnosed or may not remember the particularities if they are concerned with more pressing issues. This, again, will result in the underreporting of issues a child/parent has. Finally, there is a potential for recall bias in the study design [30].

Conclusions

Children with anxiety or depression, in addition to other, previously known sociodemographic differences, need ongoing preventive care as well as additional care from specialists, yet they are less likely to obtain timely preventive care and have problems procuring specialist care. These findings highlight a disparity that requires the attention of healthcare providers and outreach programs. Recent efforts by some primary care offices in economically depressed areas to co-locate mental health services is one potential solution to improving access to preventive care [49,50], but more creative approaches to care delivery should be developed to help improve healthcare for all children.

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Conflicts of Interest
All authors have indicated they have no relationships to disclose.

Statement of Contributions
Dr Wu contributed to the conception and design of the study, supervised data collection, was involved in the interpretation of the data analyses, drafted the initial manuscript and critically reviewed and revised the manuscript for important intellectual content.

Mr Paoletti contributed to the conception and design of the study, collected the data, was substantially involved in the interpretation of the data analyses, and drafted the initial manuscript.

Dr DeLago contributed to the conception and design of the study, and critically reviewed and revised the manuscript for important intellectual content.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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