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Evaluating the Rates of Autism Spectrum Disorder Diagnoses in San Bernardino County

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INTRODUCTION

- The term autism spectrum disorders (ASDs) was first introduced in the fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM) in 2013.[1]
- CDC Autism and Developmental Disabilities Monitoring (ADDM) Network reports that 1 in 59 children have ASD. It is a heterogeneous disorder that involves deficits in social behavior and communication, as well as varied degrees of symptoms and comorbidities.[2,3]
- Social communication and restricted, repetitive behavior are considered the hallmarks for ASD criteria and can determine the severity of the disability.[3]
- While the etiology of ASD is not fully understood, multiple elements including genetic and environmental factors have been implicated.
- Children can begin to show signs as early as 9 months and can be diagnosed by 18 months, but most are not diagnosed until after age 4.[1,3]
- White children were 1.2x more likely to be diagnosed than black children, and 1.5x more likely than Latino children.[3]
- A greater prognosis is observed among individuals who engage in intervention at earlier ages.[1,6]

The goal of this project was to utilize California Department of Education public data to evaluate the relationship between place, race, and age in the prevalence of ASD in San Bernardino County (SBC). We hypothesized that race and geographic location are both factors that influence ASD prevalence, especially among children in early age groups.

METHODS

We utilized data reports for SBC made available by the California Department of Education (CDE) DataQuest, which provides publicly reported information about California school districts.[4]

- School districts within the state of California have been divided into geographical regions called Special Education Local Plan Areas (SELPA) to provide special education services to children that specifically reside within each region (Administrators of California).[5]
- Within SBC, there are six SELPAs. Data reports on each of these SELPAs includes information on age, ethnicity, and type of disability for all children within each SELPA that are receiving special education services.

Microsoft Excel was used to gather and organize data from DataQuest. Information regarding the racial make-up for each school district was compiled into their associated SELPA to reflect the demographics of each region.

- Age group categories were created based on schooling (3 to 5 years — Pre-School, 6 to 9 years—Elementary, 10 to 12 years—Middle School, 13 to 18 years—High School)

SPSS was used to perform multiple Chi Squared tests assessing ASD rates in relation to age and ethnicity.

- Chi square tests were supplemented by Z tests to find differences between individual age and race/ethnicity categories.

RESULTS

- Both age and ethnicity were shown to be statistically significant factors in ASD Diagnosis
- Predictions of ASD rates in various races/ethnicities based on local population density showed that White children were relatively overdiagnosed while Latino and African American children were relatively underdiagnosed.

ASD Rates by Age

			Age				
			3-5 years	6-9 years	10-12 years	13-18 years	Total
SELPA	Desert Mountain	Count	243$_c$	488$_{a,b}$	356$_a$	508$_{b,c}$	1595
		% within SELPA	15.2%	30.6%	22.3%	31.8%	100.0%
	East Valley Consortium	Count	190$_a$	349$_a$	252$_a$	373$_a$	1164
		% within SELPA	16.3%	30.0%	21.6%	32.0%	100.0%
	Fontana United	Count	115$_c$	155$_{a,c}$	95$_a$	111$_b$	476
		% within SELPA	24.2%	32.6%	20.0%	23.3%	100.0%
	Morongo Unified	Count	29$_b$	21$_a$	15$_a$	30$_a$	95
		% within SELPA	30.5%	22.1%	15.8%	31.6%	100.0%
	San Bernardino City Unified	Count	197$_b$	264$_a$	173$_a$	288$_a$	922
		% within SELPA	21.4%	28.6%	18.8%	31.2%	100.0%
	West End	Count	274$_a$	475$_a$	288$_a$	624$_b$	1661
		% within SELPA	16.5%	28.6%	17.3%	37.6%	100.0%
Total		Count	1048	1752	1179	1934	5913
		% within SELPA	17.7%	29.6%	19.9%	32.7%	100.0%

Table 1. Distribution of Students Per Age-Group in Each SELPA (Chi Square = 79.061; df = 15; p < 0.0001)

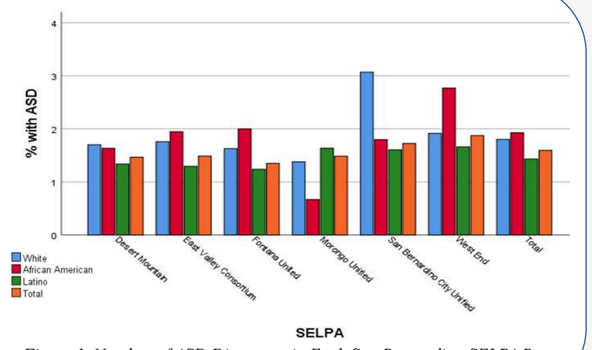

Figure 1. Number of ASD Diagnoses in Each San Bernardino SELPA By Race/Ethnicity

Comparing Racial Distributions with ASD Diagnosis

			Ethnicity			
SELPA			White	Latino	African American	Total
Desert Mountain	Diagnosed with ASD	Count	468$_a$	835$_b$	207$_a$	1632
		% with ASD	1.7%	1.3%	1.6%	1.5%
	Total Students	Count	27502	62305	12655	109461
		% in School	25.1%	56.9%	11.6%	100.0%
East Valley Consortium	Diagnosed with ASD	Count	261$_a$	728$_b$	96$_a$	1214
		% with ASD	1.8%	1.3%	1.9%	1.5%
	Total Students	Count	14833	56154	4927	81470
		% in School	18.2%	68.9%	6.0%	100.0%
Fontana United	Diagnosed with ASD	Count	23$_{a,b}$	394$_b$	37$_a$	491
		% with ASD	1.6%	1.2%	2.0%	1.4%
	Total Students	Count	1411	31751	1850	36334
		% in School	3.9%	87.4%	5.1%	100.0%
Morongo Unified	Diagnosed with ASD	Count	62$_{a,b}$	46$_b$	5$_a$	128
		% with ASD	1.4%	1.6%	0.7%	1.5%
	Total Students	Count	4492	2810	748	8571
		% in School	52.4%	32.8%	8.7%	100.0%
San Bernardino City Unified	Diagnosed with ASD	Count	86$_b$	653$_a$	109$_a$	911
		% with ASD	3.1%	1.6%	1.8%	1.8%
	Total Students	Count	2803	40656	6062	51631
		% in School	5.4%	78.7%	11.7%	100.0%
West End	Diagnosed with ASD	Count	343$_b$	868$_c$	172$_a$	1732
		% with ASD	1.9%	1.7%	2.8%	1.9%
	Total Students	Count	17890	52232	6210	91756
		% in School	19.5%	56.9%	6.8%	100.0%
Total	Diagnosed with ASD	Count	1243$_a$	3524$_b$	626$_a$	6108
		% with ASD	1.8%	1.4%	1.9%	1.6%
	Total Students	Count	68931	245908	32452	379223
		% in School	18.2%	64.8%	8.6%	100.0%

Table 2. Chi-Square Analysis of Student Distribution in Each Race/Ethnicity Group in Each SELPA (Chi Square = 671.331; df = 30; p < 0.0001)

***Each subscript letter in Table 1 and 2 denote a subset of age or race/ethnicity categories whose column proportions do not differ significantly. (p <. 0.05) The categories are also color coded for clarity.**

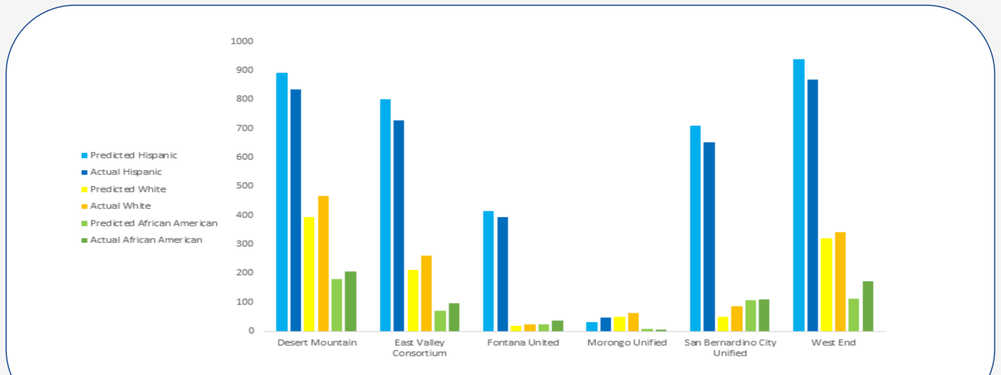

Figure 2. Predicted versus Actual Number of ASD Diagnoses Per Race/Ethnicity in Each San Bernardino SELPA

DISCUSSION

- There were a total of 6,108 (1.6%) children diagnosed with ASD in SBC in 2019.
- This study demonstrates a lower rate of children diagnosed with ASD and receiving services in the 3-5 age group compared to the 6-9 age group, excluding Morongo Unified SELPA.
- White children were also found to be more likely to be diagnosed with ASD and receiving services compared to Latino children.
- These racial differences were most evident in San Bernardino City Unified (SBCU) SELPA.
  - There were a total number of 40,656 Latino children and a total number of 2,803 White children enrolled in the SBCU school district.
  - The rate of Latino children diagnosed with ASD was 1.6% Compared to 3.1% in White children.
- Variations in the rates of ASD diagnosis between racial groups within the same service region supports inequities in health identified by the CDC ADDM Network.

Limitations:

- Our study only reflects the rates of children diagnosed with ASD within the public-school system, excluding children younger than 3 years of age and children who receive education through private schools, home school, charter schools, juvenile court schools, or continuation schools.
- DataQuest does not report an exact number for any total less than 11, instead it shows an asterisk indicating <11. We estimated any asterisk as 5, an average between 1 and 10.
- Limited availability of literature regarding the actual rates of children being offered screening services by ethnic/racial groups in SBC.

CONCLUSIONS & IMPLICATIONS

In order to adequately distribute specialized educational resources to children with ASD, proper screening and early diagnosis are crucial. However, even though it is recommended that children receive screenings at the ages of 9, 18, 24, and 30 months, only 43% of them were evaluated by the age of 36 months.[3,6]

Early diagnosis is critical to improving health outcomes and beginning interventions earlier in development. These findings may be utilized to improve developmental screening guidelines and to facilitate access to early detection within San Bernardino County. Further research is warranted to investigate differences in access to developmental screenings, early detection and diagnosis, and whether or not this may stem from existing systemic health disparities, health insurance status, and other indicators of socioeconomic status.

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